Using *Leximancer* to Identify Themes and Patterns in the Talk of Three High-Distinction Students

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Three graduate students were asked a series of questions about what they did to get either distinctions or high distinctions. The interviewer focused on the student's understanding of assessment requirements, motivation, interest levels, and the relevance of the set task. Other questions queried prior knowledge, course learnt knowledge, the lecturer's input, and peer input. Finally, these students were asked for advice that might assist students in getting high distinctions, or that might assist lecturers in helping students to achieve these outcomes. The transcribed interview with one of these students was entered into *Leximancer* for text analysis. *Leximancer* provides an automated procedure that computes the distance between each of the terms and presents the results in a two-dimensional spatial representation. The authors in the current study report and comment on the outcome of separate and merged *Leximancer* analyses of the talk of one of these three students in ways that illustrate the strengths and weaknesses of text analysis.

**Introduction**

This study utilised data gathered in the course of a pilot case study on coursework postgraduate perceptions and strategies in the context of achieving high quality performance (Loke & Bartlett, 2003).

It has been suggested from previous studies that getting intention and skill together and working well in terms of academic performance goals is by top-level structuring. Bartlett (2003) described this strategy as procedural action that highlights the key element of structure when presenting or encountering an array of information and use of that element to transfer what is important. It follows that one would expect these high distinction students to reflect some elements of top-level structuring when asked questions about how they did it.

Since top-level structuring is hence defined as procedural, it can be contrasted with actions based on declarative knowledge that are easily described in words. That is, an issue with using student reflections to elicit evidence of top-level structuring is that since this activity is by definition procedural, one would not necessarily expect it to be readily available as part of that student's declarative knowledge.

The quest to identify top-level structuring can take either positivist or non-positivist forms. A positively-minded inductive researcher aims to identify the key elements of academic achievement. That is, this research strategy postulates an observable and
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A unitary top-level structure. A constructivist researcher who is not positively-minded takes a different tack, based on assumptions about the essential ambiguity of perception (Best, 1994). The problem of ambiguity is solved by postulating learnt or hardwired schemata that guide our ponderings about what is. In these terms, one person's schema for academic achievement is not necessarily that of another. In short, there is an essential tension between these two points of view.

Research aim and questions
The aim of this research was to use the automated text software, Leximancer, to gain indirect evidence of top-level structuring. The advantage of using an automated procedure is that it bypasses a student's conscious awareness of context (i.e., content) in favour of the student's semi-unconscious grouping together of specific terms. The key questions we sought to answer were:

- How does the student talk about academic performance?
- How does the interviewer steer the talk about academic performance?
- How does the combination of these two performances mesh?

Given the narrow focus of the interviewer, it seemed likely that a text analysis of student responses might produce a different cluster of terms to that produced by either the interviewer in isolation, or the two together.

Research method
The analysis was based on qualitative research using case study method (for details see Loke & Bartlett, 2003). One of the three student transcripts was selected at random.

Results
The transcript was pre-processed by minimal editing to reduce variation in the range of terms (high distinction=HD, distinction=D; Interviewer=I, Respondent=R) and by adding natural breaks (blank lines) between blocks of interchanges related to specific questions, and by reducing wherever possible the kinds of repetitions and minimal reinforcers typical of oral speech (e.g., I I; um, yeah, oh yeah – however, default analysis retained these). The resulting text was analysed in three ways.

The first analysis was concerned with interviewer questions in isolation. The material was prepared by excluding all student contributions. The second analysis considered student responses separately to interviewer questions and responses. The material was prepared by excluding all interviewer contributions. The third analysis adopted a default mode with questions and answered as transcribed.
Interviewer questions

Figure 1 shows the groupings for terms culled from the proposed protocol for interviewer questions to students. Given that the term, "HD", appears to be central to the interviewer's questions, it was rotated to align with the vertical axis.

From that perspective, it could be seen that the interviewer asked questions about the HD in relation to formal requirements (criteria, assignment, lecturer, advice: Quadrants 1 & 2) as opposed to specific activities (essay, help, research, writing: Quadrants 3 & 4). Here the term, "help" was used in the context of asking, "What helped?"
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Figure 2. Text analysis of Student 1’s responses to interviewer’s questions.

Figure 2 displays the selection of terms most frequently used by this student when answering questions related to achieving a distinction or high distinction. Notably, the term, "HD", does not appear in this list of frequently used terms.

With the term, "work", aligned to the vertical axis, it could be seen that the student discussed work in relation to academic interaction (questions, wanted, students, lecturers, academic, reading, assessment: Quadrants 1 & 2) or higher-order reflections (time, task, think, plus teacher: Quadrants 3 & 4). It is worth noting that the student used the term, "wanted", in relation to knowing or identifying what a lecturer might want, and the term, "teacher", referred to these academic activities as in contrast to his workplace role as a teacher.
Default analysis

Figure 3 illustrates the full interchange between the interviewer and this student, with the list of available terms (after excluding nonsequitur terms such as bit, suppose, Yeah, uh). With "work" aligned to the horizontal axis between Quadrants 1 and 2, and "assignment" aligned to the vertical axis between Quadrants 2 and 3.

In relation to the horizontal axis, it appears that these two protagonists discussed the term, "work", in relation to academic criteria (wanted, academic: Quadrant 1) or academic interaction (questions, students, lecturers: Quadrant 2). In relation to the vertical axis, they discussed the term, "assignment", in relation to academic interaction (Quadrant 2) versus academic reflection (think, reading: Quadrant 3).

If one considers these clusters of terms in relation to the left and right halves of the display, then it can be seen that Quadrants 1 and 2 deal with "work" in terms of the
everyday world of criteria and interaction while Quadrants 3 and 4 deal with "work" in terms of higher-order processing (reading, think). From this perspective, it is clear that the interviewer ID was more focussed on higher-order processing whereas the student ID was more focussed on the everyday world of academic criteria and academic interactions.

**Discussion**

The aim of the research was to use data gathered in relation to one student's perception of the quality of high-level academic performance to answer questions related to the top-level structure emerging from the interviewer, the student, and the combination of the two.

What emerges from this set of text analyses is that the interviewer and the student here analysed conducted aligned but not entirely symmetric exchanges in which the interviewer (Analysis 1) more frequently used terms related to achievement (HD) and achievement-related activities (assessment, criteria), whereas the student (Analysis 2) not only did not mention the grades associated with academic achievement frequently but tended in fact to talk about achievement in broader contexts than academic criteria. It is clear from the student's singular monologue that his talk revolved around academic interactions and more reflective activities.

Interviewer talk and student talk both involve academic criteria to some extent. However, while the interviewer dwelt on the HD and how these various things might help in achieving that goal, the student's talk more sensibly involved various kinds of academic work. When these two streams of talk were melded, the integration retained something of the flavour of both but with the student contribution predominant, as one might expect given the relative amounts of talk by the two protagonists.

This kind of analysis reflects strengths and weaknesses typical of text analysis. That is, the average of the responses (Analysis 3) to some extent disguises the nature of the slightly separate agendas pursued by the interviewer (Analysis 1) and student (Analysis 2). If this analytic approach were extended to include the other two students interviewed in relation to this project, then the pattern of responses would be expected to differ between students even as it differed between the student and the interviewer in the analyses above. That is, while each analysis is no doubt valid, the responses across participants tends to be inconsistent to an extent where it becomes necessary to treat each exchange as a separate case study rather than attempting to meld them.

More generally, the procedure of using Leximancer to examine the grouping of terms as a way to get at whether and how a thinker uses top-level structures seems to be an essentially constructivist activity. It is no surprise that the interviewer and the student have differing constructions of what is involved in academic achievement. Nor is it surprising that the final analysis of their joint interaction retains elements of both in a way that identifies both common ground and the essential tension.
References