Themes and patterns in 3 years of abstracts from the "International Conference on Cognition, Language, and Special Education Research" identified by Leximancer analysis

Peter Grimbeek, Fiona Bryer, Mike Davies, & Brendan Bartlett

School of Cognition, Language, and Special Education, Griffith University

Abstract

An international conference has been a successful innovation introduced and steered by the head of the School of Cognition, Language, and Special Education (CLS) and financially supported by the Faculty of Education at Griffith University. Three annual conferences (2003-2005) on aspects of research-based educational practice have provided a vehicle to increase academic productivity within the school community. First, the large number of publications generated by this conference has demonstrated its internal impact within this community of teacher educators. This conference has allowed these academics to further develop and showcase their activities as researchers, as participants in research-based community work with various educational partners, and as supervising instructors of their honours and research higher degree students. Second, this large number of publications has shown its external impact on the research quantum used to benchmark school, faculty, and university performance. These conference papers met the commonwealth criteria for the E1 category of research publication. Moreover, the conference focus on practice and research in education has brought together the disparate elements of the school's staff profile in applied linguistics, special education, and multidisciplinary aspects of cognitive learning in primary and secondary school. After 3 years, a content analysis of the conference abstracts with the Leximancer software package (Smith, 2005) was an opportunity to explore the defining themes characterising this conference and the changing patterns of interest over the past 3 years.

Conferencing research on educational practice

An inaugural meeting of the Cognition, Language, and Special Education (CLS) conference was held in December 2003, with the thematic title of *Re-imagining Practice, Researching Change*. The 2003 conference attracted approximately 70 papers and a somewhat larger group of participants. The 2004 conference with the thematic title of *Educating: Weaving Research into Practice* attracted approximately 100 papers. Finally, a preliminary count of

manuscripts submitted to the 2005 conference, with the thematic title of *Stimulating the "Action" as Participants in Participatory Research* shows that it has attracted approximately 70 papers.

A peer review process ensured the relevance of this conference to authors in the current economic climate for the Australian university sector. Government indicators of academic research productivity have placed a dollar value on a fully written, peer reviewed, and ISBN-published conference paper (i.e., the top E1 category of conference papers; Innovation and Research Systems Group, Department of Education, Science, and Training [DEST], 2004). The definition of research used by DEST in all categories of research publication (e.g., book = A, journal = C, conference = E) refers to original work undertaken on a systematic basis in order to increase the stock of knowledge (theoretical or practical) and use of this knowledge to devise new applications. Moreover, investigation must be a primary objective of the research activity. At the present time, therefore, institutional support for conference participation by university staff often requires an E1 conference paper published in formal, edited proceedings.

Therefore, establishment of this conference encouraged members of this tertiary educational school (department) in their research careers. The conference provided a scholarly vehicle for publication, which would be relevant to both (a) internal criteria for academic promotion and (b) external DEST criteria for teacher educators' contribution to university standing in governmental indicators of productivity. Since the integration of colleges of advanced education for teacher training into the university sector, education faculty administration has been engaged in a progressive 15-year process of fostering a more academic orientation towards research and publication related to this field. Provision of conference funding for an E1 publication has supported not only individual CLS registrants but also the overall organisation of the conference.

In the 2005 Faculty of Education Review Submission to its external review panel, the Dean of Education at Griffith University was able to report a dramatic increase in tertiary qualifications among staff to the one of the highest faculty rates across the university. Research higher degree (RHD) supervision also increased to some extent (i.e., 65% staff involved), but further growth in RHD student enrolment and a wider range of postgraduate supervisors were being encouraged. The overall amount of individual research, as expressed in inputs such as grant applications and outputs such as publication, also showed substantial improvements. In relation to the Research and Research Training Term of Reference of the

2005 Faculty of Education Review, the Dean specifically commented on and commended the disproportionate and increasing contribution by the CLS school members to the overall publication rate of the faculty.

Aims

For 3 years, this international conference has provided the academic community of CLS academics and their students with a vehicle for either developing or expanding the research component to their respective academic careers. The conferences have featured international contributions from keynote addresses and from individual researchers, and scholars from other universities and from other educational institutions have also participated, independently and in partnerships with CLS researchers. With the ongoing focus of the conferences on research and practice and with the ongoing collective of scholarly interests represented by the composite CLS staffing profiling, it seems likely that the flavour of abstracts across these successive conferences would change in an evolutionary manner as researchers found their ecological niches and settled down to produce some variant of research coral. The aim of this paper was to identify evolutionary trends in participation, if any, based on the contents of abstracts listed for each of the three conferences to date. A subsidiary question was to investigate whether changes in content, if any, were related to the thematic title.

Method

Smith and Humphries (in press) have demonstrated the utility of Leximancer for textual analysis. (*Note*. Leximancer can process a variety of file types, including .doc, .html, .htm, .txt, .xml, and .pdf.) Leximancer software is highly automated, extremely easy to use, and produces readily interpretable output from default settings. Thus, this kind of analysis is particularly beneficial in self-assessment of one's own activities, because it provides a fairly unbiased and objective method of reviewing complex text and a clear process of justifying decisions about text selection.

Abstracts formatted as three Word files, one for each conference, were entered into Leximancer for content analysis. Official conference documentation was used to reformat abstracts from the conferences in 2003 (accepted) and 2005 (submitted). The approximately 100 separately submitted-and-accepted files of abstracts from the 2004 conference were also compiled into a single file.

Content analysis phases

Leximancer commences content analysis by undertaking a conceptual analysis (thematic analysis) in which it detects and quantifies predefined concepts within the text. It continues this content analysis by undertaking a relational analysis (semantic analysis) in which it quantifies relationships between identified concepts within text.

During the initial conceptual phase, Leximancer scans the text to identify frequently used terms (concept seeds) from which it generates a thesaurus of terms. It also identifies names (e.g., start-of-sentence). It excludes nonlexical and weak semantic information (e.g., 9, &) and nontextual material such as menus. This phase of analysis can be turned off, such that self-defined concepts can be used instead. As part of this phase of content analysis, Leximancer identifies frequently used terms around which other terms cluster. For example, "fleas" and "bite" cluster around "dog", "hound", and "puppy." In an ensuing iterative process, elimination of some of the potential concepts aids visual inspection and map interpretation. This process converges on a stable state containing most highly relevant concepts, in which a shortlist of concepts is defined by a longer list of thesaurus terms.

In the second phase of relational analysis, Leximancer measures the co-occurrence of concepts within text. It does so by specifying a set length of words or sentences (called window). It moves this window sequentially through text, noting co-occurring concepts (usually in three-sentence blocks). Results are stored in the co-occurrence matrix, which stores the frequency of co-occurrence of all concepts against all others. The results of this analysis can be accessed via a spreadsheet (spreadsheet.txt). The final stage of relational analysis (cognitive mapping) represents information visually for comparison (concept map).

Concept mapping and other protocols for descriptive outputs

As illustrated in Figure 1, the reporting of results utilises a series of descriptive analyses, the most immediate of which is provided by the concept map. The concept map provides a visual summary of concepts and their co-occurrences. The concept map provides information about the results of the content analysis in a number of ways, accessible via three slide bars (i.e., concepts, theme, and rotation). The concepts slide bar allows the viewer to vary the number of visible concepts to show only the most frequent or to include by increments those less or least frequently used. The rotation slide bar allows the viewer to rotate the array of visible concepts to optimise their interpretability, usually by aligning one of the most frequent—and conceptually relevant—concepts with the horizontal or vertical axis. The theme slide bar

allows one to identify what might be described as prototypical concepts (i.e., highly frequent concepts around which others cluster). The size of thematic circles can be varied from (a) a minimum setting (Figure 1; only concepts visible); through (b) intermediate settings where circles identify a number of locally distinct concepts, to (c) a maximum setting in which one or two thematic circles encompass all concepts.
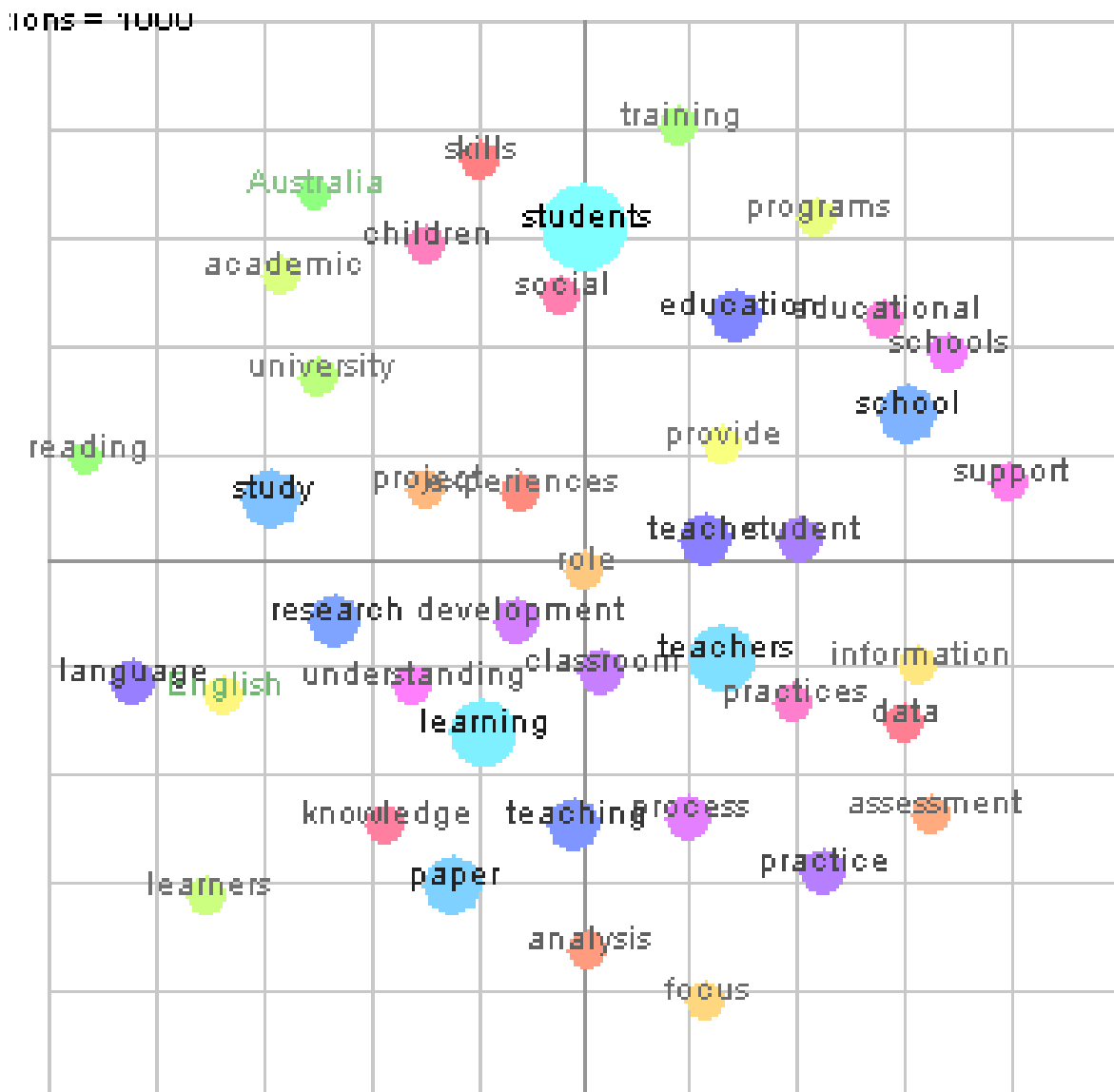
Content analysis of abstracts

Figure 1. Concept map for 3 years of conference abstracts, with all concepts shown and with the most frequent concept of "students" aligned with the vertical axis

For this set of abstracts, the analyst (first author) had to choose between either conducting separate analyses year by year or combining the 3 years of abstracts into a single analysis. In this case, the decision was to conduct a single conjoint analysis. Holistic analysis of the

corpus of texts would not only provide an overview of all abstracts but tagging year of abstract could also be used to deconstruct changes in themes and patterns.

Figure 1 features the most frequently used concept (i.e., *students*) aligned with the vertical axis (for ease of interpretation) and with all other concepts visible as well. (*Note*. All subsequent references to concepts in text have been highlighted in italicised font.) This first viewing of the concept map suggested that the 3-year crop of abstracts, broadly speaking, was focused on *students* in relation to academic projects (top left-hand quadrant), educational programs (top right-hand quadrant), teacher practice and assessment (bottom right-hand quadrant), and learning and knowledge (bottom left-hand quadrant).
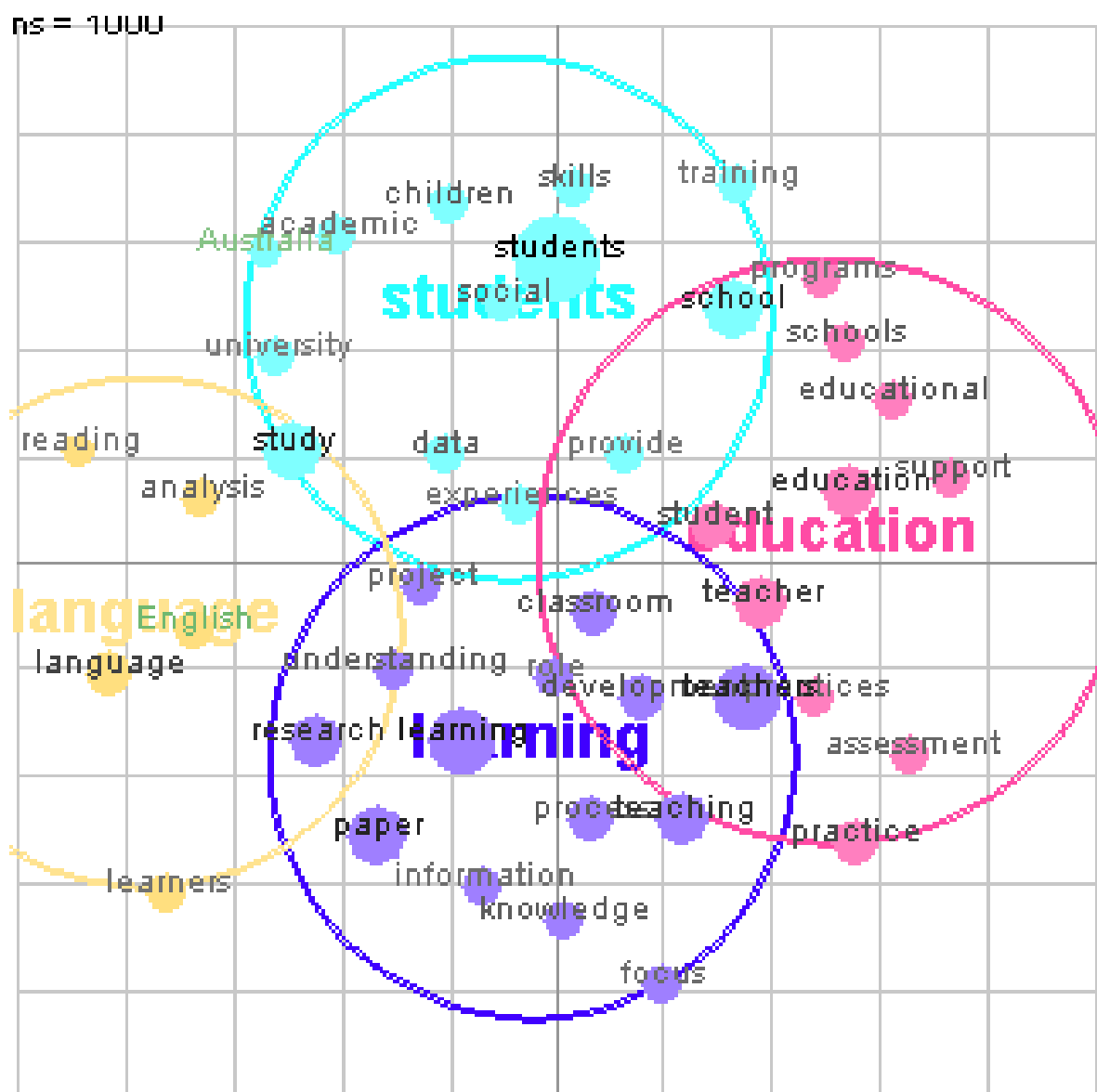

Figure 2. Concept map for 3 years of conference abstracts, with all concepts shown, with most frequent concept *students* aligned with vertical axis and with thematic circles set arbitrarily to display a subset of the most frequently used concepts

Figure 2 supplemented the initial impression by superimposing thematic circles, arbitrarily set to include *students*, *education*, *learning*, and *language*. This additional information allows the viewer to enrich the initial analytic description by noting the spatial position of frequently used concepts relative to their most proximal and sometimes overlapping thematic clusters. For example, concepts associated with academic projects (top right-hand quadrant) were most closely related to the study of students and language. Educational programs (top right-hand quadrant) were related most closely, thematically speaking, with students and education. Teacher practice and assessment (bottom right-and quadrant) fell in the thematic domains of education and learning. Finally, learning and knowledge (bottom left-hand quadrant) fell in the thematic domains of learning and language.

Concept	Absolute Count	Relative Count		Concept	Absolute Count	Relative Count
students	309	100%				
learning	193	62.4%		learning	92	29.7%
teachers	169	54.6%		study	87	28.1%
paper	169	54.6%				
study	166	53.7%		teachers	82	26.5%
school	152	49.1%		school	78	25.2%
research	133	43%				
teaching	121	39.1%		paper	70	22.6%
education	121	39.1%		education	67	21.6%
teacher	109	35.2%				
language	99	32%		teacher	54	17.4%
practice	88	28.4%				
student	76	24.5%		research	52	16.8%

Figure 3. Ranked concepts list (left-hand side) provides information about the frequency of concepts relative to the most frequent concept, "students." The ranked concepts list (right-hand side) lists other terms purely in terms of the frequency of links to students

As shown in the left-hand side of Figure 3, the ranked concept list also contributed frequency related information about these concepts. This list shows that the concept *students* appeared more than 300 times across the 3 years of conference abstracts. The concept *learning* appeared about two-thirds as often as *students*, and the concept *teachers* a little more than half of *students*. It is worth noting that the concepts *paper* and *study* appeared about as frequently. These concepts typically were used by authors in referring to the content of their abstracts (*my paper*, *this study*); at times, *study* was also used to refer to the study of, for example, *students*. Clicking on one of these concepts (e.g., *students*) brings up a secondary

ranked concepts list (illustrated by paired inspection of *students* and *learning* on the right-hand side of Figure 3).
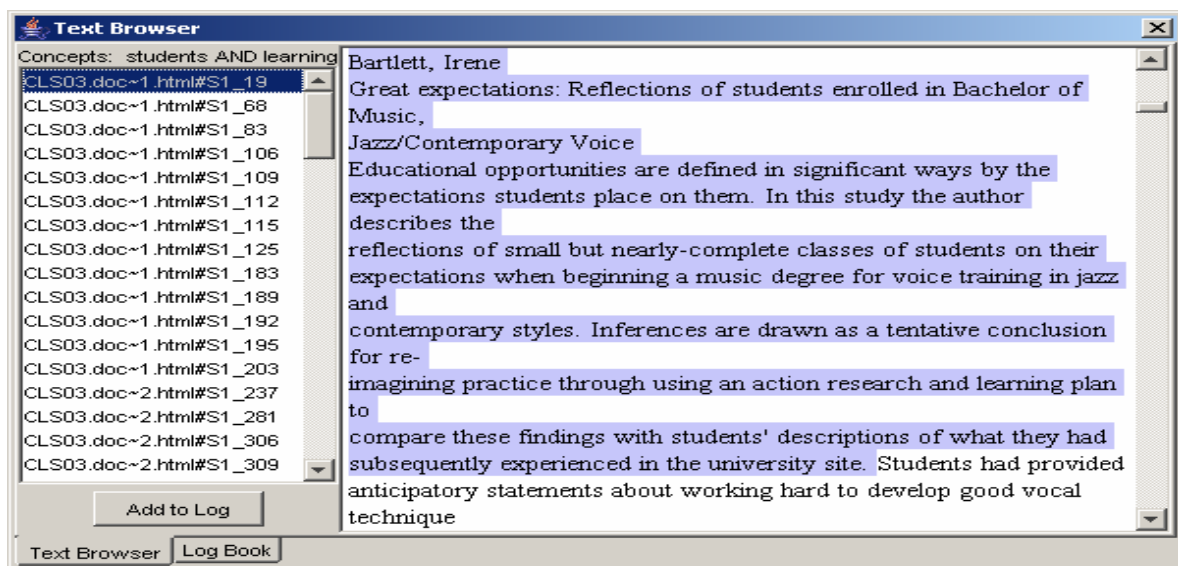

Figure 4. Example of use of Leximancer text browser, which lists and reveals text-based links between concepts

The concepts listed in Figure 4 include the number of times they were linked with *students*. A navigation button to the left-hand side of each of these listed concepts (not shown in illustration) takes the viewer to the text browser, which lists all examples of a specific linkage between concepts (in this instance, *students* AND *learning*) and which allows the viewer to examine these links in the body of the text.
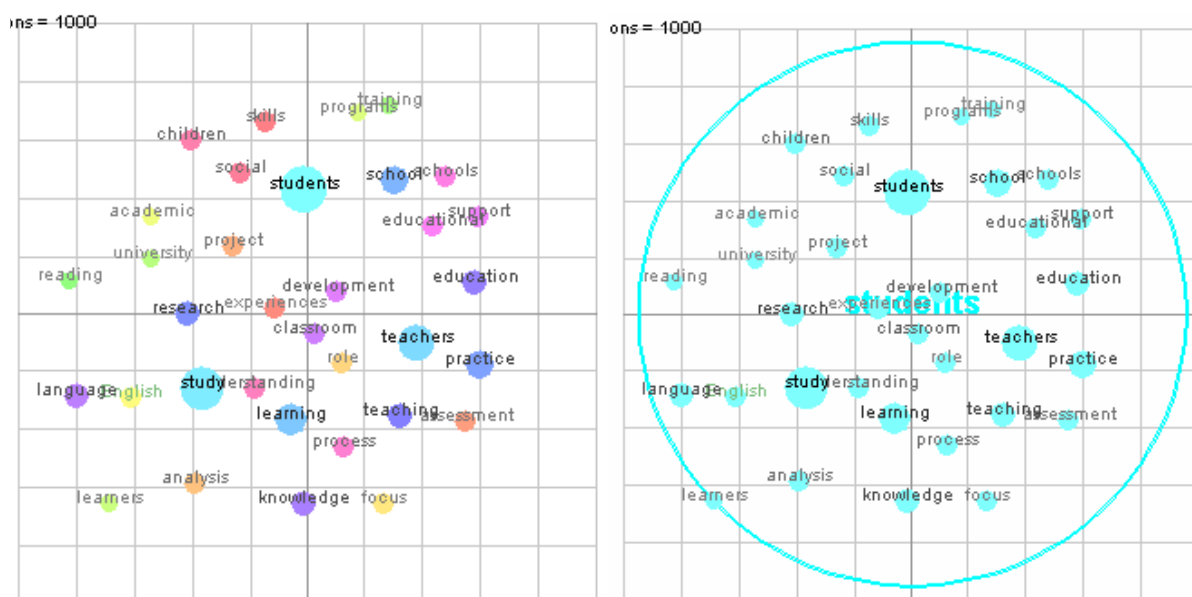

Figure 5. Concept map for 3 years of conference abstracts after merging or excluding a subset of concepts and with most frequent concept *students* aligned with the vertical axis (left-hand side) and with thematic mapping at maximum (right-hand side)

At this point, the concept editing menu in Leximancer allows the analyst to vary the analysis in a number of ways. One option was to merge concepts that are judged to be similar, such as *practice* and *practices*, *student* and *students*, and *paper* and *study*. Other concepts of lesser interest, such as *Australia* and *provide,* were excluded from analysis.

The three most frequent concepts were *students*, *study*, and *teachers,* suggesting that these abstracts concerned the study of students and teacher*s*. The right-hand figure makes it clear that, over a 3-year period, the focal point of interest was *students*, which is as it should be for a set of conferences devoted to educational research.
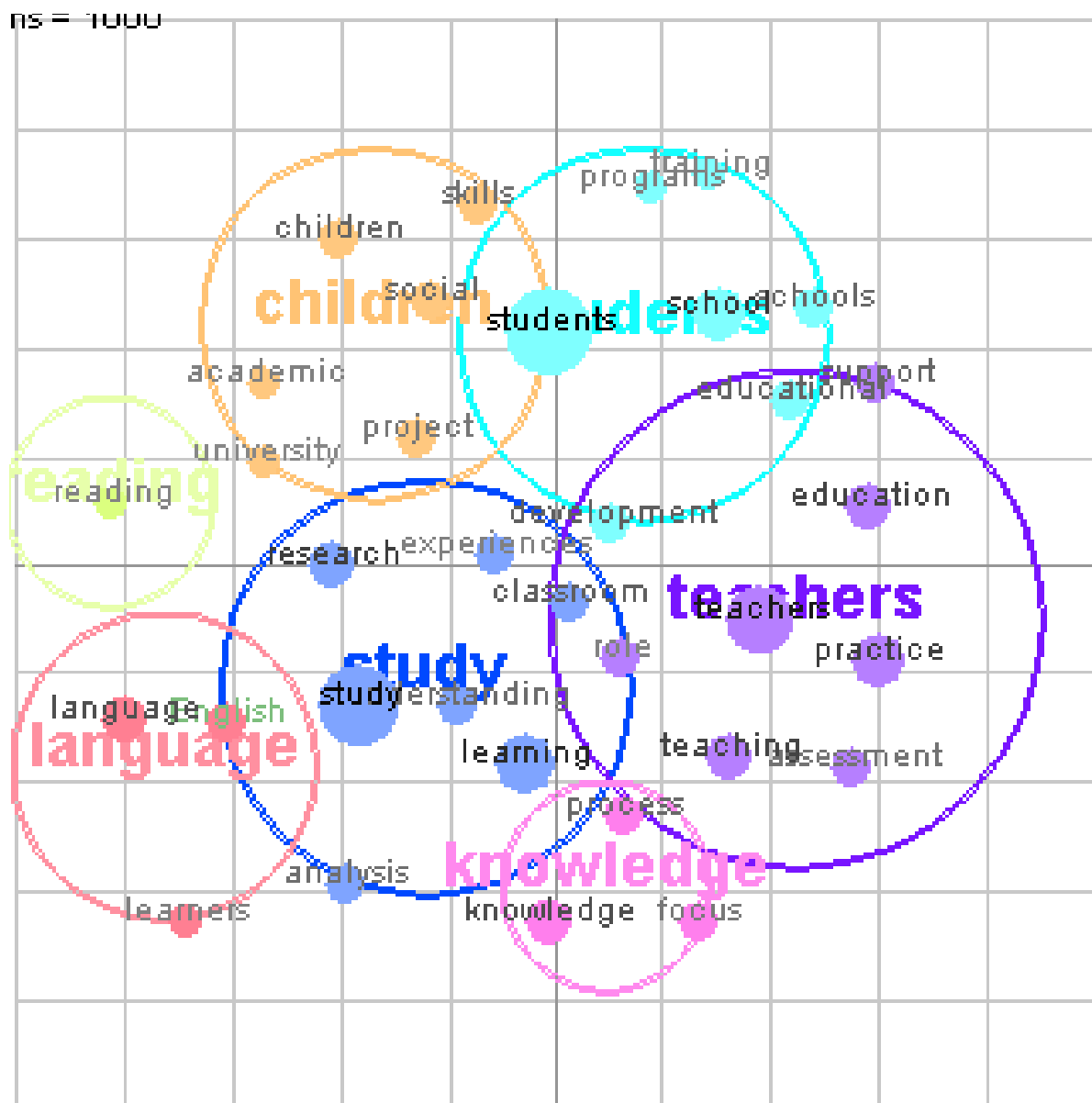

Figure 6. Concept map for 3 years of abstracts, after merging or excluding concepts, with "*students"* aligned with vertical axis and with thematic mapping at intermediate setting

A highlight of Figure 6 is that *study* (fairly synonymous with *my study*) can now be seen to be in relation to *students, children,* or *teachers* and in relation to *knowledge*, *language*, or *reading*. As Bryer (2005) found in the content analysis of whole peer-reviewed manuscripts accepted for a special education conference**,** the use of *children* in place of *students* often signals attention given to development and performance skills of specific classes of students (e.g., those with either ADHD or autism) as opposed to teaching and learning of the general class of students (e.g., those with disabilities).
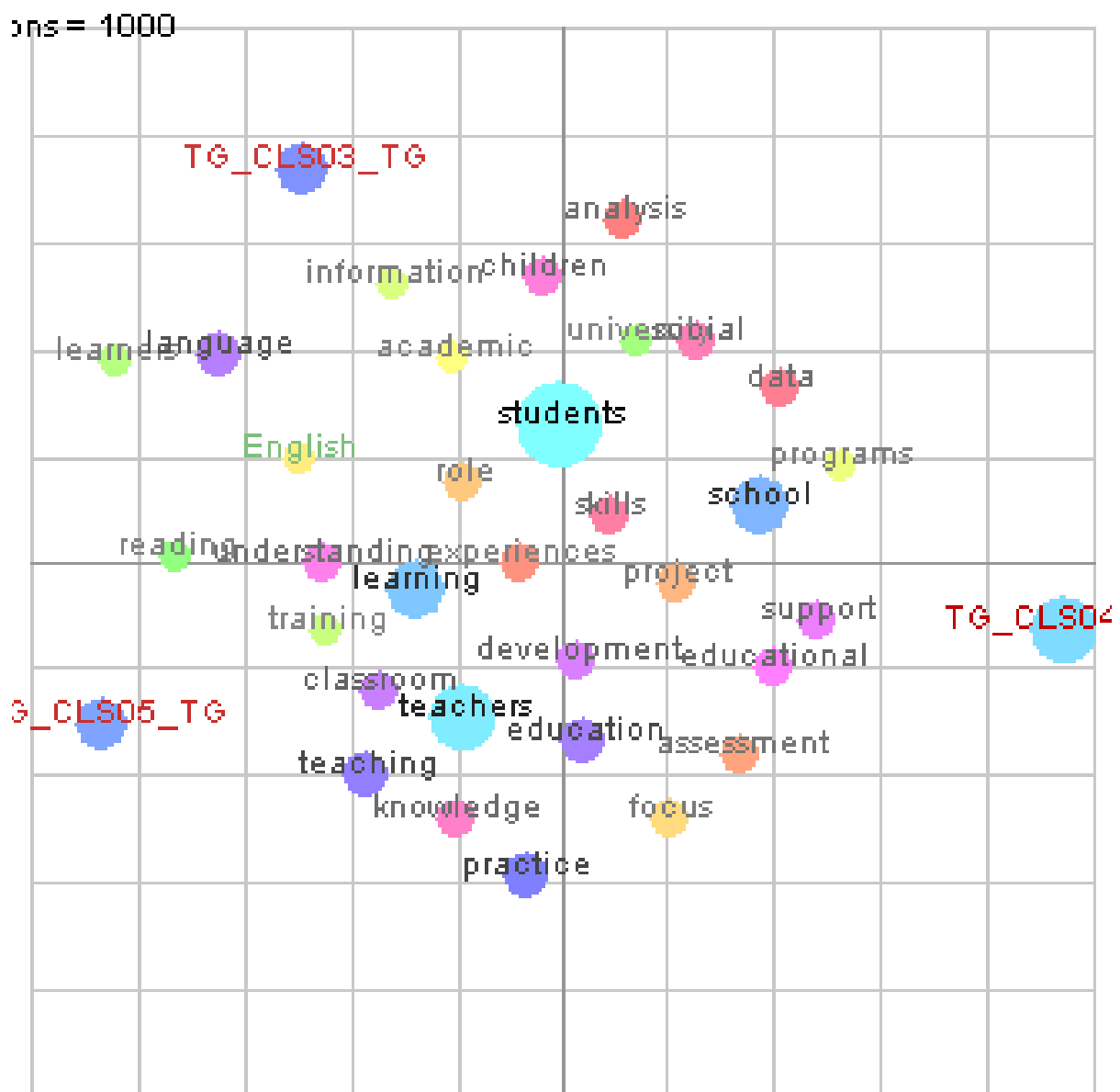

Figure 7. Concept map for 3 years of conference abstracts, with file tags included

These descriptive analyses have been focused on the aggregate of three years of abstracts, but a specific tool in Leximancer made it feasible to tag files or folders year by year (e.g., Year

2003 abstracts = CLS03 tag) and, thus, to locate these "annual" portions of abstract text within the corpus of concepts. The concept of *study* was excluded from this analysis, because it did not help to differentiate the annual focus of abstracts. Figure 7 shows that abstracts presented at each of the conferences differed somewhat, with the tag for CLS03 in the top-left hand quadrant, the tag for CLS04 in the lower right-hand quadrant, and the tag for CLS05 in the lower left-hand quadrant. The ranked concepts list indicated that the most frequent concepts included *students*, *teachers*, *learning*, *school*, and *practice.*
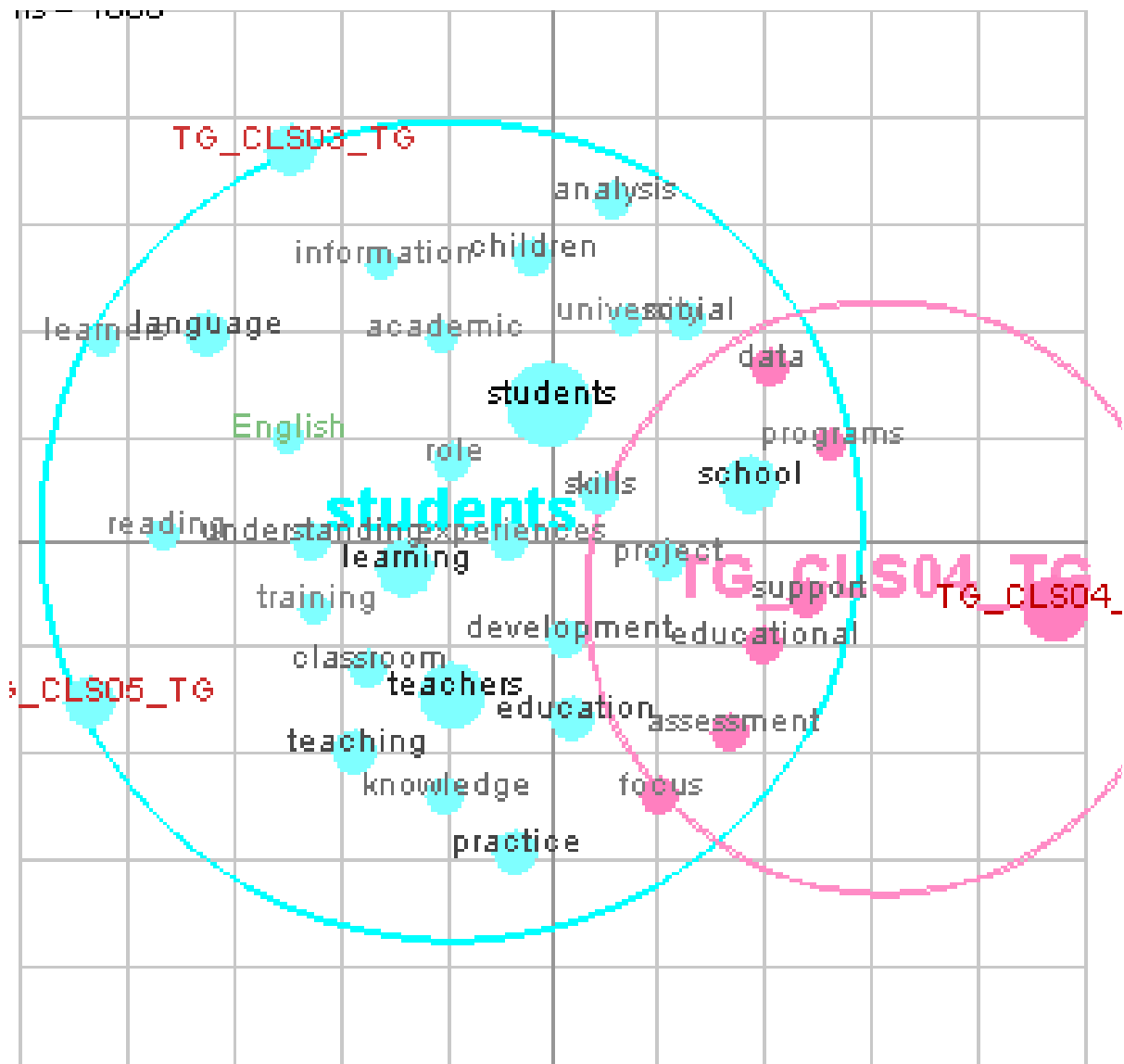

Figure 8. Concept map for 3 years of conference abstracts, with file tags included and with thematic circling at maximum setting

The two thematic circles in Figure 8 were related to *students* and *CLS2004*. This spatial and thematic differentiation of the Year 2004 conference suggests that it differed from those in 2003 and 2005. Figure 9 supplements the impression produced by Figure 8. That is, an

intermediate slide bar setting was used to reveal locally distinct concepts that would clarify features contributing to this CLS2004 differentiation. Regardless of year, abstracts included concepts related to *students*, *school*, *practice*, and *teachers* and, to a lesser extent, *English* and *learners* (ESL students). However, the Years 2003 and 2005 abstracts were more closely aligned with the major themes of *teachers* and *students,* whereas the Year 2004 abstracts were more closely aligned with *school* and *practice*.
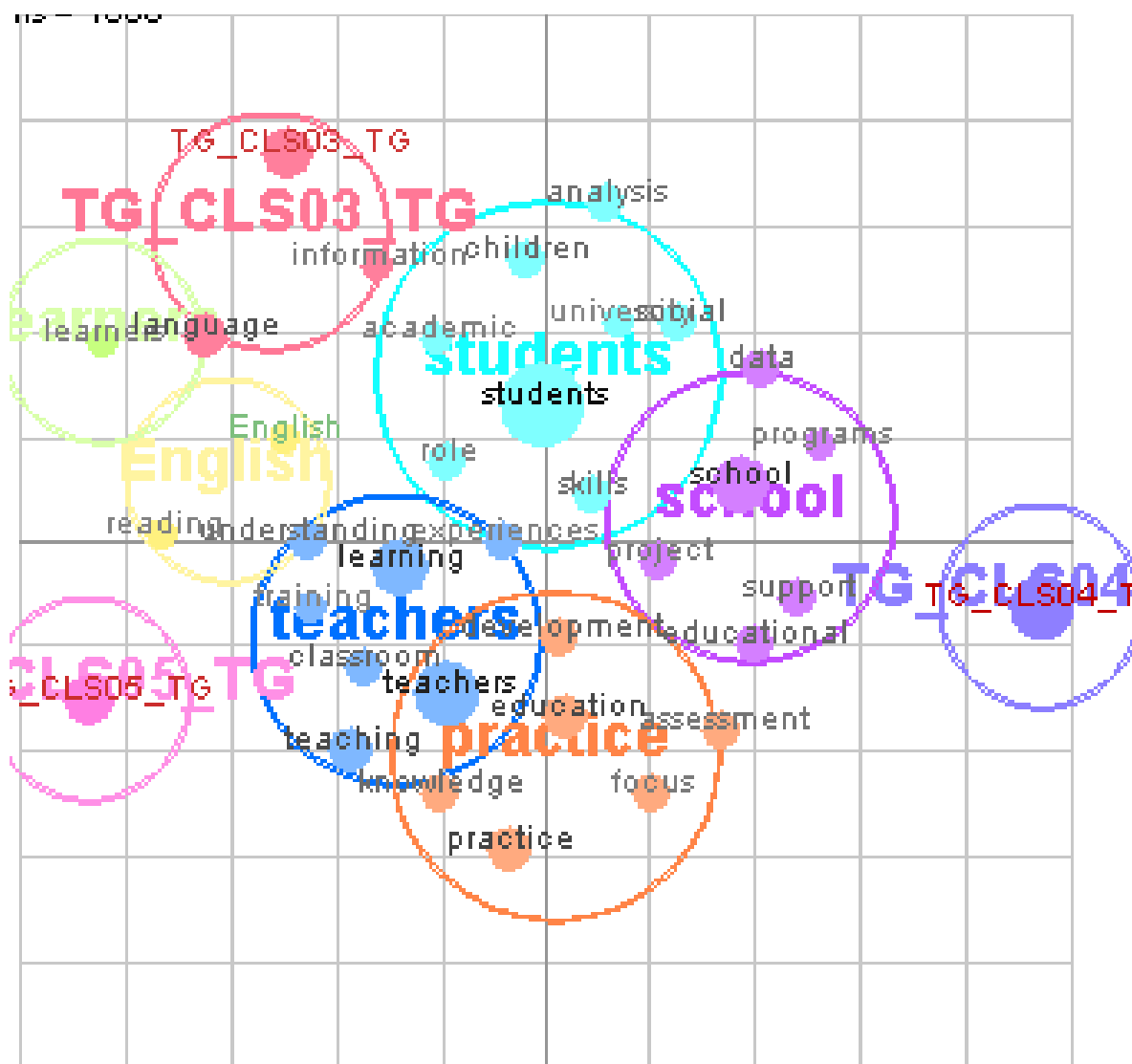

Figure 9. Concept map for 3 years of conference abstracts, with file tags included and with thematic circling at an intermediate setting

Discussion

An initial question posed for this content analysis was whether successive conferences would canvas uniform content or whether they would differentiate themselves as indicated by content analysis of conference abstracts. Based on descriptive analysis of Figure 9 as compared to Figure 5, it seems to be the case that the 2003 and 2005 abstracts canvassed

themes more closely related to *students* per se, whereas abstracts presented in 2004 canvassed themes related to *schools* and *practice*. This shift in emphasis in 2004 was accompanied by an increase in the number of abstracts. It is possible that the 2004 conference attracted a broader demographic of presenters and that some of this broader fringe did not return in 2005. That is, changes in the content of abstracts at successive years of this conference might have been seasonal rather than evolutionary.

An accompanying question for this analysis concerned the relevance of conference themes and the possibility that distinct research-on-practice titles shaped the shifting tide of contributions across the 3-year period. The theme of the inaugural conference was *Re-imagining Practice, Researching Change*; that of the 2004 conference was *Educating: Weaving Research into Practice*; and that of the current 2005 conference is *Stimulating the 'Action' as Participants in Participatory Research*. Because the most frequent concept across the 3-year period was *students,* it could be concluded that, regardless of the title of the event, these conferences did indeed attract educational researchers with a common interest in student learning. Tagging files containing abstracts from each of the 3 years (see Figures 7-9) did identify a connection between thematic titles and abstract contents, to the extent that the Year 2003 and 2004 themes both included the concept of *practice*. Yet, inspection of Figure 9 made it clear that the 2004 abstracts was the most clearly aligned with the notion of practice, when the conference title was focused on implementing research-based practice in school settings. Moreover, the syntactic prompt of "weaving research *into* practice" (our italics) in 2004 might have invited more practice-oriented scholarship. The shift in the Year 2005 conference theme to *Stimulating the Action as Participants in Participatory Research*, with its clear allusion to action research on educational practice, seems linked to a return of abstract content—away from formally applying evidence-based *practice* in schools—to the common ground of observing and stimulating changes in *students* and *teachers*, in a more individualistic and informal way.

Additional analyses considered whether the framing of the conference call for papers, through the lists of topics relevant to the conference theme, affected seasonal variation across the 3 years. Because there was insufficient text to perform a separate analysis on the content of the Call for Papers, these files were entered into the Leximancer abstract analysis. The results of this analysis were largely consistent with those for the abstracts per se. That is, Year 2004 was somehow mysteriously different.

There is scope for a deeper level of conceptual analysis of these data files, in order to explore the kind of research methodology being used by these researchers. The spread of concepts in Figure 2 suggested that authors adapted their conceptualisation of research activities in alignment with their disciplinary affiliations and the nature of their educational investigations. That is, *study (*co-occurring with *language* and *learning)* and *analysis (*co-occurring with *knowledge)* were concepts that featured in specific locations on the Figure 2 concept map. However, these terms could refer to the study being reported and to analysis described in the abstract. Figure 8 showed a changed configuration of *analysis*, *data*, and *information* after merging of concepts involving study. The spread of specialisations in Figure 9 suggests that *students* and *children* in the *students* theme were focused on special education, whereas the *learners* and *English* theme appeared to reflect ESL concerns. Further analysis of these abstracts after turning off the conceptual phase of Leximancer analysis might clarify the presence of research-related concepts and spread of topic specialisation among subgroups of researchers in the school.

Conclusion

In summary, changes in conference abstracts seem to have been associated with changes of two kinds, one seasonal and the other driven by thematic settings. One might predict that a second year of motifs related to action research would spark further increase in this kind of content. Further analysis of conference abstracts across a fourth year would also enable revisiting of the accepted Year 2005 abstracts after abstract substitutions and additions have been finalised for the fully written manuscripts in the proceedings. Moreover, documentation of the richness and variety of participants inside and outside the CLS community (e.g., their affiliations, research on established or new projects, and publication histories) might further clarify (a) the nature of the influence of this particular conference on scholarly activity and research practice in this school, faculty, and broader educational systems and (b) the associations, if any, between disciplinary affiliations of authors and differential research language expression (e.g., analysis, study).

It can be noted that the conference has facilitated international academic networking. For example, 2006 conference program will feature an international extension activity for CLS staff and students to engage in research exchanges with Vanderbilt University, through the medium of discussions between the CLS head of school, Associate Professor Brendan Bartlett and one of the CLS03 keynote presenters, Professor Stephen Elliott and a 2005 preparatory visit by the head of school and Dr Michael Davies. Continuing analysis of

conference abstracts will be able to explore the effect of this conference-related activity on the Year 2006 conference themes and patterns.

Changes being made to tertiary education policy and associated commonwealth funding of university research may reduce the future external "value" of an E1 publication and, hence, erode the benefits of an E1 proceedings. The introduction of the Research Quality Framework over the next 18 months (Roberts & Expert Advisory Group for an RQF, 2005) may concentrate universities' corporate attention on journal publication (i.e., C1 category of DEST, 2004): Allocation of research block funds, the Institutional Grants Scheme (IGS) and Research Training Scheme (RTS), has significant implications for research funding across universities and for ranking of research groupings within universities. It can be argued, however, that faculty investment in this conference has positioned CLS academics to make a smooth transition into a higher rate of submission of manuscripts for journal refereeing and publication. A complementary tracking of author progressions from conference manuscripts to journal publications also needs to be explored.

At the same time, the ongoing value of the conference lies in its internal benefits to the quality of life and collaborative culture within this academic community of teacher educators. The conference process provides staff and students with specific academic goals and social supports to write manuscripts about their research. Thus, they are able to acquire advanced skills in academic writing, practice these with confidence and clarity, and coach one another in these skills. These activities then provide a "stepping stone" to C1 category publications, which are critical to entry into an academic career for RHD students and to normal progress in an academic career for staff. Moreover, the conference enriches the research basis of undergraduate and postgraduate teaching and supervision of research students. Furthermore, the conference also recognises and values community outreach from academic research to classroom practice and fosters application of research to meaningful educational practice for students and teachers in their school settings.

References

Bryer, F. (2005, September). Introduction: Making meaning by dissemination and visual analysis: Creating connections that value diversity. In F. Bryer (Ed.), *Making meaning: Creating connections that value diversity* (pp. v-viii; CD of Proceedings of the 30th Annual Conference of the Australian Association of Special Education). Brisbane, Australia: AASE.

Faculty of Education Review Submission. (2005, September). Brisbane, Australia: Griffith University, Faculty of Education.

Innovation and Research Systems Group, Department of Education, Science, and Training. (2005, February). *Higher education research data collection: Specifications for the collection of 2004 data*. Canberra, ACT: Higher Education Division, Department of Education, Science and Training. Retrieved June 23, 2005 from http://www.dest.gov.au/NR/rdonlyres/DE3A5B2E-A277-4424-8A39-35ACBBD338BF/2717/specs2005.pdf

Roberts, G., & Expert Advisory Group for an RQF. (2005, March). R*esearch quality framework: Assessing the quality and impact of research in Australia* (Issues Paper). Canberra, ACT: Department of Education, Science, and Training, Commonwealth of Australia. Retrieved September 7, 2005 from http://www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/research_quality_framework/issues_paper.htm

Smith, A. (2005). *Leximancer* (Vsn. 2.21). Brisbane, University of Queensland, Centre for Human Factors and Applied Cognitive Psychology.

Smith, A., & Humphreys, M. (in press). Evaluation of unsupervised semantic mapping of natural language with leximancer concept mapping. *Behavior Research Methods*.