Contextualizing institutional strategies for technology enhanced learning

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An analysis of strategic planning documents for public universities in Australia identifies some patterns in institutional strategies for technology-enhanced learning (TEL). Institutional size, location and social mission are among some of the characteristics that shape TEL support. This study was part of a project to develop guidance on how institutions could contextualize use of the ACODE TEL benchmarking process. Text from publicly available documents was analysed to identify contextual characteristics that appear to be influencing institutional strategies and priorities for TEL. International studies identify a need for rethinking how institutions work. This study provides a snapshot of these rethinking processes in 2016, and some preliminary suggestions on how benchmarking might support these.

Keywords: institutional strategic context; technology enhanced learning; text analysis.

Background and context

There is international recognition of the need for the Higher Education sector to rethink how learning and teaching is done in 21st century technology-rich environments. This includes not only learning designs, assessments and learning spaces, but also 'rethinking how institutions work' (Adams Becker, Cummins, Davis, & Yuhnke, 2016; Johnson et al., 2016).

The starting point for any institution's strategic plan is the context and mission, which will shape priorities for technology-enhanced learning (TEL). So how will the interpretation of institutional performance criteria related to TEL support vary? A large city-centre research-intensive institution with mainly full-time students might be expected to have different priorities from a smaller regional university with large numbers of part-time distance students. For example, an article on the Chronicle of Higher Education website noted of US universities that:

> "… it appears as if online education for undergraduates at 'elite' colleges will mostly be dictated by individual professors introducing digital teaching techniques, such as video lectures and online quizzes, at their discretion."(Kolowich, 2015)

One implication from this quote could be that in an elite institution, TEL support may focus on services for individual voluntary adopters, and on technologies such as MOOCs for showcasing teaching beyond the campus. On the other hand, an institution that is seeking to enhance retention and progression for a large and diverse student cohort is more likely to invest in systemic institution-wide facilities for all their current students. Forward-looking studies such as Adams Becker et al. (2016) identify projects where technologies can transform the learning experience; introducing authentic assessment supported by redesigned learning spaces and interactive digital environments. Yet a survey of students in two Australian universities (Henderson, Selwyn, & Aston, 2015) found that digital technologies are "clearly not transforming the nature of university teaching and learning, or even substantially disrupting the 'student experience'".

The ACODE (Australasian Council for Open, Distance & E-learning) benchmarks, revised and updated in 2014, provide a framework for institutions to self-assess their support for TEL (ACODE, 2014). The first of the eight benchmarks provides performance indicators and guidance on standards for institution-wide policy and governance for TEL. The others deal with specific aspects of how the policy is enacted – such as planning, quality improvement processes, application in the curriculum, support for staff and support for students.

Methodology and methods

All publicly funded universities in Australia and New Zealand make their strategic plans and annual reports available on their websites. So it is possible to examine these to find out how universities have been articulating their thinking about the role of TEL in achieving their goals. There is also public information about objective characteristics of each university – student profiles, staff, locations, study modes offered, disciplines, etc.

As part of a project to provide evidence-based guidance on how to contextualize the ACODE benchmarking for different types of institution, the texts from 32 Australian public universities' 2015 annual reports were analysed. The aim was to identify what factors in higher education institutions' strategic contexts are most relevant and influential in their priorities for TEL, and to relate these to the benchmarking process and its value for the institution. Neuendorf (2002) characterizes this method as establishing links between the source of a message and its content. The aim in this case is to identify where patterns in the strategic 'messages' related to TEL are associated with institutional characteristics. The document analysis is a text mining exercise. Broadly, the methodology follows the 6-step cyclic CRISP-DM process (Cross-Industry Standard Process for Data Mining) outlined by Miner et al. (2012, Chapter 5). This paper covers steps 1-5 as shown in Figure 1.
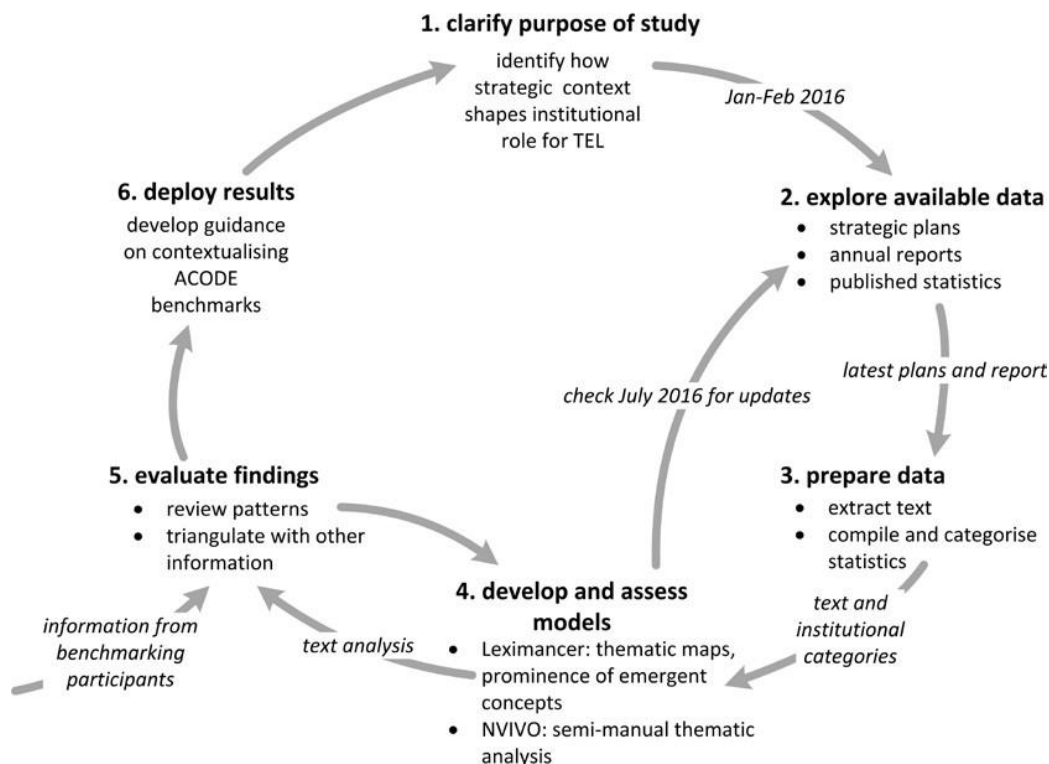
Figure 1: The CRISP-DM cyclic process as used in this study

Data preparation involved:

1. listing all the institutions and compiling a spreadsheet of potential characteristics that might be used to identify groups with common features
2. downloading the latest available institutional strategic plan and annual report for each institution, and extracting the text describing strategic plans and actions
3. creating groups of these documents corresponding to the characteristics in the spreadsheet (such as small, medium and large in terms of student numbers in Equivalent Full Time Student Load or EFTSL; regional or city-based; membership of formal university groupings; substantial distance education activities).

The main development of the models used Leximancer software, which searches the texts for words that occur frequently together, as the basis of concepts. After several iterations, it is possible to identify vocabulary related to TEL concepts and to build a thesaurus. The same thesaurus can be used to compare how concepts and themes occurred in different groups of documents. By assembling the texts into groups representing different institutional categories, the TEL-related language patterns can be compared. The automated thematic analysis using Leximancer relies on algorithms to cluster concepts around themes (Leximancer, 2011). Trial and error adjustments to the settings may be needed to suit the text format. For example the length of text blocks analysed could be too short (separating related words) or too long (linking unconnected words).

A first iteration (carried out in January-February 2016) used all the Australian universities' strategic planning documents as a single group; examining and editing the automatically generated thesaurus to focus on TELrelated concepts. The thematic maps would then show how these TEL concepts are linked into other concepts emerging in the texts, as part of broader themes. At that point the latest annual reports available were for 2014, and the current strategic plans had various dates, some being several years old.

By July 2016 all the annual reports for 2015 were available. These would have been compiled in the same period (early 2016) that the ACODE benchmarking self-assessment was taking place, so they provide a consistent and timely overview of institutional strategies and priorities. The results presented here are from analysis of the 32 Australian public university annual reports for 2015 that were available in a format suitable for processing through the text analysis software. (A few were only available as locked pdf files.) Before analysis, all financial and most of the other quantitative sections were removed, leaving only the statements of strategic intent and qualitative accounts of institutional activities and performance.

For the analysis, the text files were grouped in various different ways, to find out which institutional characteristics seemed to be most influential for TEL strategies. The groupings were based on data from the Department of Education & Training online database ("Ucube," 2016).

> **Distance education**: 13 universities with over 5000 distance enrolments and 19 with fewer than 5000 distance enrolments.
>
> **Size**: small (10 universities with < 10k EFTSL); medium (12 universities with 10-17k EFTSL); large (10 universities with > 17k EFTSL)
>
> **Location**: 18 universities in major city locations (where there are other universities) and 14 regional. **Affiliation to a formal Australian university grouping:** Australian Technology Network (ATN);
>
> Group of Eight (Go8); Innovative Research Universities (IRU); Regional Universities Network (RUN); or unaffiliated.

After mapping the emergent TEL-related concepts and themes across the whole dataset, further runs explored the various university characteristics. Leximancer can produce a dashboard report that compares the prominence of concepts between different categories. It can also generate examples for the most prominent concept links. The complete analysis shown in Figure 1 is still work in progress at the time of writing. However, it is possible to present a preliminary evaluation using information from the ACODE 2016 benchmarking.

Results

Text analysis

Leximancer has several ways of representing patterns in the texts. It creates maps of how the concepts are related, grouping them into themes. It also analyses the strength (connectedness) and frequency of concepts and in relation to document groups. Figure 2 shows the overall Leximancer thematic map for the 32 Annual Reports.
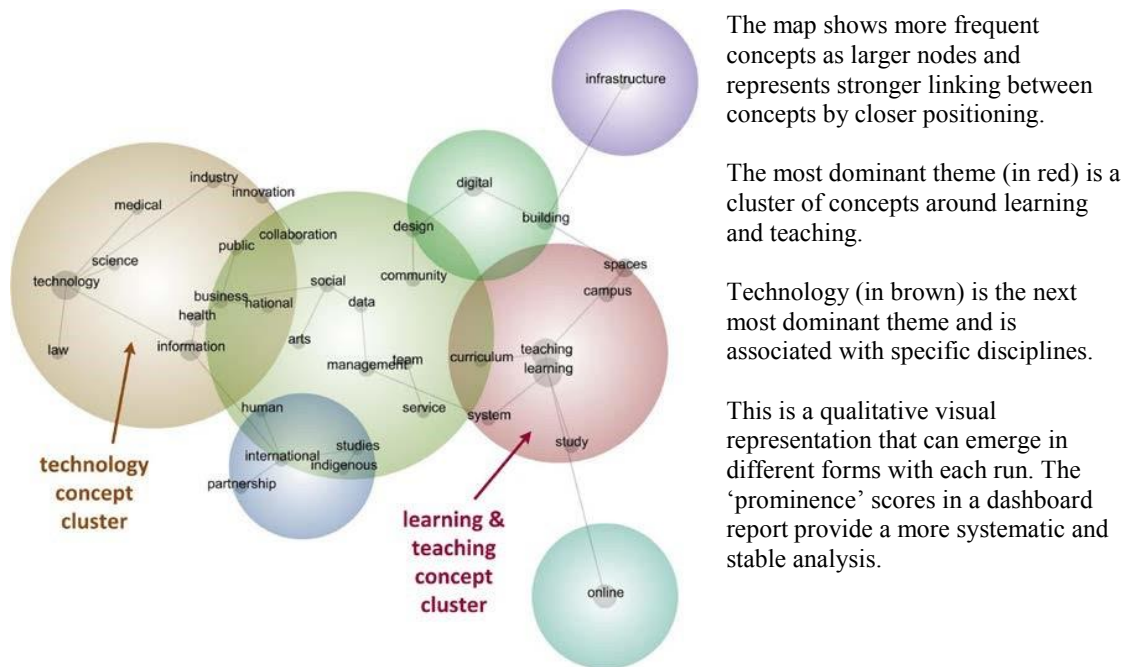

The map shows more frequent concepts as larger nodes and represents stronger linking between concepts by closer positioning.

The most dominant theme (in red) is a cluster of concepts around learning and teaching.

Technology (in brown) is the next most dominant theme and is associated with specific disciplines.

This is a qualitative visual representation that can emerge in different forms with each run. The 'prominence' scores in a dashboard report provide a more systematic and stable analysis.

Figure 2. A Leximancer map of text in Australian university annual reports for 2015.

In Leximancer, the prominence scores for a concept combine its frequency and its connectedness with other concepts. Table 1 lists the most prominent concepts for each of the university groupings, both for all mapped concepts and only those concepts related to learning and teaching (LT).

Table 1. Ranked concepts by category

Institutional characteristic	concept 1	concept 2	LT concept 1	LT concept 2
>5k distance students	online	study	community	campus
<5k distance students	health	digital	digital	management
Small	study	information	study	community
Medium	business	information	collaboration	digital
Large	building	campus	building	campus
City	building	mechanical	design	building
regional	study	business	service	community
ATN member	technology	industry	design	building
Go8 member	building	campus	building	campus
IRU member	teaching	learning	teaching	learning
RUN member	online	study	online	study
unaffiliated	campus	community	service	campus

The annual reports from distance providers and members of the Regional Universities Network (RUN) had 'online' and 'study' as their most prominent (i.e. frequent and strongly connected) concepts. References to 'community' and 'campus' are generally associated with online study too. Text examples:

"Distance education provides students with the flexibility to undertake a university qualification without needing to visit a campus and the program content can be studied through a number of means including the use of online discussion forums, electronic library resources, by contacting lecturers, and receiving all study materials online."

"… has capitalised on the opportunities of digital change to deliver premium courses wherever students are geographically (at home, on campus, in the workplace or in the community) …."

The institutions with fewer distance students refer most often to health-related discipline activity, and many of the references to 'digital' are in relation to 'digital manufacturing' or 'digital creative businesses'. Larger universities and Go8 members appear to focus most on 'campus' and 'building' concepts – mostly references to campus infrastructure projects, with online study references often citing MOOCs. Text examples:

"…entailing a mix of office and open-plan accommodation, 3rd Year Teaching Laboratories, flatfloor teaching laboratories in highly transparent spaces, … and infrastructure services upgrades."

"In late 2014, [the university's] Massive Open Online Courses (MOOCs) provider … and [a local] School began a collaboration to develop a MOOC to inspire students entering secondary school to study Science, Technology, Engineering and Maths (STEM) subjects. "

Overall the analysis of the annual reports does show some identifiable patterns of variation in strategic priorities that relate to the external context of the institution. From this analysis, the institution's size, distance education activity, location and identification with a particular grouping/institutional role all appear to be associated with differences in priorities for TEL as reflected in the annual reports for 2015.

Benchmarking activity
The benchmarks chosen by 15 Australian universities participating in the 2016 ACODE benchmarking exercise may provide a preliminary evaluation of the relevance of these findings. Table 2 shows the numbers choosing each aspect of institutional TEL support to benchmark, broken down by institutional characteristics.

While these numbers are too low to claim any statistical significance, it does appear that regional and distance education institutions in 2016 are checking out their central IT service support for TEL more than other groups. This is consistent with the larger-scale online learning activity in these groups. The most used benchmarks overall are related to staff support.

Table 2. numbers of institutions benchmarking each aspect of TEL support, by type of institution

Institution characteristic [number in group]	Strategy, planning, QA	IT services	use in curriculum	staff support	student support
>5000 distance students [5]	2	4	3	3	2
<5000 distance students [10]	5	3	3	6	4
Small [5]	3	3	1	3	3
Medium [8]	4	3	4	5	1
Large [2]	0	1	1	1	2
City [8]	3	1	2	5	3
Regional [7]	4	6	4	4	3
ATN member [2]	0	0	0	2	1
IRU member [1]	1	1	1	0	0
RUN member [4]	2	3	2	4	1
Unaffiliated [8]	4	3	3	3	4

Discussion and conclusions

The analysis of Australian university annual report texts shows some patterns in how TEL is represented. These patterns can be related to the universities' external contexts, represented by location, size and distance learning activity. From the 2016 ACODE benchmarking activity, the same factors also appear have influenced participants' choice of benchmarks. The broader project to develop practical guidance for ACODE benchmarks included visits to 13 different institutions in Australia and New Zealand, of which ten were in the midst of selecting benchmarks and planning how to compile evidence of performance. A separate publication will provide a more complete account including other data, such as the New Zealand university annual reports.

At this stage, discussions with 2016 benchmarking participants indicate that they are influenced not only by external strategies but also by internal change. Institutions usually selected benchmarks where they had relatively stable arrangements in place. The annual reports and the benchmarking self-assessment are both snapshots at one point in time. The snapshots may not be fast enough to capture the moving parts in a complex university system. Nevertheless, the benchmarks are a tool for institutions to assess how well they are adapting to TEL. This study shows how the benchmarks can be linked with institutional priorities – adding weight to arguments for acting on the resulting recommendations within each institution.

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