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## **DISCOVERING THE VALUE THAT THE LIBRARY CAN CONTRIBUTE TO QUALITY TEACHING AND LEARNING THROUGH STUDENT EVALUATION DATA**

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### **ABSTRACT**

Large surveys of library user service quality perception are common. However, student evaluation of teaching (SET) data often show a disparity between ratings of library service quality and library resource quality. In this situation, perhaps SET data can also provide insights into what contributes to the perception of library resource quality, and hence identify leverage points for quality improvement interventions. This paper documents an analysis of available Deakin University SET data relating to student interaction with, and evaluation of, library resources. It highlights significant correlations associated with library-related SET items, and from them infers actions that the library could undertake to improve the value and perception of the quality of library resources. The following results were observed. High ratings for library resources were likely to be associated with high general ratings of teaching and unit quality. Postgraduate coursework students rated library resources significantly higher than students in the first three years of undergraduate programs. Students in one faculty (Health) rated library resources significantly higher than students in all other faculties. There was a strong correlation observed in Australasian Survey of Student Engagement data for both 2009 and 2010 between the two items "Used library resources on campus or online" and "Worked on an essay or assignment that required integrating ideas or information from various sources". These findings suggest the following conclusions. Well-planned learning environments are likely to integrate meaningful student interaction with the library. Initiatives to improve the value and perception of the quality of library resources should be focussed on the specific characteristics and needs of particular student cohorts to have maximum impact. More sophisticated assessment tasks that require students to interact with the library have the potential to result in higher student ratings of the value of library resources.

### **INTRODUCTION**

Internationally, university libraries have embraced quality evaluation to a significant degree, and large surveys of library user service quality perception are frequently employed. Internationally the LibQUAL+ survey run by the US Association of Research Libraries (ARL) is commonly used (Cook, Heath, Kyrillidou & Webster, 2001; Thompson, Cook & Kyrillidou, 2006; Walters, 2003), and in the UK the Society of College, National and University Libraries (SCONUL) satisfaction survey has been commonly used (Crawford, 2003). In Australasia the Council of Australian University Librarians sponsors the use of the Insync survey (Horn, Calvert & Ferguson, 2009; Zauha & Potter, 2009). These surveys are based on identified domains of service quality, and within these domains users provide ratings of both their expectations and their actual experiences. The 'gap' between the expectation and performance is suggested as an indicator for action to improve performance, and absolute performance ratings can be used as a point of comparison to benchmark against other libraries. The comparative ranking of performance results of service quality surveys, while potentially useful for benchmarking, doesn't actually guarantee anything about the absolute level of service quality – i.e., the top ranked performance in a comparison set may still be deficient in an absolute sense.

In the case of Deakin University, a 2010 overall satisfaction rating in the top quartile of the Australasian Insync survey (Deakin University Library, 2010) suggests a high level user satisfaction with the Deakin University Library. However, as shown in Figure A1 (see Appendix), the mean rating (consolidated at the whole university level) for item 6 ('The library resources met my needs for this unit') in Deakin University's student evaluation of teaching and units (SETU) survey is amongst the lowest rating items historically. This situation reflects a national dichotomy that can also be observed in the results of the course experience questionnaire (CEQ). The optional student support scale (SSS) of the CEQ includes item SSS34 ('The library services were readily accessible'). Figure A2 shows that SSS34 has historically been the highest rating (percentage agreement) item in the SSS and, in fact, one of the highest rating items in the entire CEQ. The optional Learning Resources Scale (LRS) of the CEQ includes item LRS12 ('The library resources were appropriate for my needs'). In contrast, Figure A3 shows that LRS12 has, in recent years, been one of lowest rating items in the LRS, and significantly lower than SSS34 in absolute terms.

There is no doubt that the library plays an important part in the student experience of university life. Theoretical constructs of university quality derived from reviews of the literature often explicitly include satisfaction with library service (Arambewela & Hall, 2006; Gruber & Voss, 2010). While service quality measurements are always likely to be important for a library, libraries have moved beyond being solely service and support providers, and now play a direct role in student learning (Owusu-Ansah, 2004). If student evaluation of teaching (SET) data are suggesting a disparity in ratings between library service quality and library resource quality, then perhaps SET data can also provide insights into what contributes to the perception of library resource quality, and hence identify leverage points for quality improvement interventions. The use of data relating to the library from existing SET instruments is not a new idea – examples can be found in the literature (Brookes, 2003; Symons, 2004). This paper documents an analysis of available Deakin University SET data relating to student interaction with, and evaluation of, library resources. It highlights significant correlations associated with library-related SET items. It also presents a case study outlining the integration of library activities into a unit of study, and the SET data obtained in response to this. Finally, from this work, actions are suggested that the library could undertake to improve the value and perception of the quality of library resources.

## METHODS

The SETU instrument, as a standardised, centrally administered questionnaire, was first introduced at Deakin University in 2003, and its current form was introduced in 2006, with item 10 added in 2010. It consists of ten core items:

1. This unit was well taught.
2. The course materials in this unit were of high quality.
3. The workload in this unit was manageable.
4. Requirements for completing the assessment tasks in this unit were clear.
5. The teaching staff gave me helpful feedback.
6. The library resources met my needs for this unit.
7. I would recommend this unit to other students.
8. The technologies used to deliver the online content in this unit performed satisfactorily.
9. The on-line teaching and resources in this unit enhanced my learning experience.
10. This unit challenged me to learn.

SETU respondents rate each core item on a five point scale (1=strongly disagree; 2=disagree; 3=neutral; 4=agree; 5=strongly agree) with a 'not applicable' option included.

Following the completion of the SETU survey period and collation of results, SETU data are reported via a public website (Deakin University, 2011); anyone with an interest can query the results for the ten core SETU items, based on a selection of evaluation period, faculty, school, unit and student enrolment location. The data reported for a unit include total enrolment, total number of responses and computed response rate for the enrolment

location(s) selected, and, for each of the ten core SETU items, number of responses, mean rating and standard deviation of the mean rating. The mean ratings for SETU items 1, 7 and 9 take on a particular significance, as these items are reported to the University Council as overall teaching quality indicators for a unit of study.

Mean ratings for the ten core SETU items for all units reporting data via the Deakin University SETU web site were collected for the whole year period, including trimester 2 2009, trimester 3 2009/2010 and trimester 1 2010. Based on the systematic coding convention used for identifying units of study at Deakin University, it was possible to identify the nominal year level and the 'owning' Faculty (used as a proxy for broad discipline area) for each unit and add these data to the SETU data record for that unit. The data extracted from the SETU reporting web site and used in the analysis here included mean rating sets for 1432 units of study, and represented 74498 sets of SETU ratings, 188391 individual student enrolments and 58.5 percent of all units listed in the Deakin University handbook (Deakin University, 2010) for the period under consideration. The SETU data were analysed to identify significant correlations between the mean rating for item 6 (relating to the Library), other SETU item mean ratings, and other related data items.

In 2009 and 2010 Deakin University participated in the Australasian Survey of Student Engagement (AUSSE). In particular, a stratified sample of first and third year students were invited to complete the student engagement questionnaire (SEQ) (Australian Council for Educational Research, 2011). Through seeking (generally quantitative) responses to a large number of items, the SEQ seeks to measure six different aspects of student engagement, seven student outcomes scales, and a range of information on individual demographics and educational contexts from students (Coates, 2010). A number of additional items are included, including the library-related item "Used library resources on campus or online". The Deakin University AUSSE data for 2009 and 2010 were analysed to identify significant correlations between the mean rating for the item relating to the Library and the mean ratings for other AUSSE items.

## RESULTS AND DISCUSSION

A comparison of the correlation between mean ratings for SETU item 6 and all other SETU items is given in Table 1. Correlation is given as Pearson linear correlation coefficient (Lewis-Beck, Bryman & Liao, 2004, p. 808), and the computed statistical significance is also provided. It is observed that the mean ratings of all other SETU items are significantly and strongly positively correlated with item 6. In fact, the mean ratings of all SETU items are strongly inter-correlated; with correlation coefficients ranging from 0.278 (between items 3 and 10) to 0.883 (between items 1 and 7). The observation of strong correlation for item 6 with other SETU items suggests that teachers/units that have carefully considered curriculum, learning resources, learning activities, assessment, workload, etc. are also likely to have thought about meaningful integration with university academic support services – good teaching and learning is likely to include the library.

Table 1 – Correlation between SETU item 6 mean rating and all other SETU items.

Item	Correl.	Signif.	Item	Correl.	Signif.	Item	Correl.	Signif.
1	$r=0.564$	$p<4\times 10^{-121}$	2	$r=0.589$	$p<2\times 10^{-134}$	3	$r=0.438$	$p<4\times 10^{-68}$
4	$r=0.511$	$p<5\times 10^{-96}$	5	$r=0.547$	$p<2\times 10^{-112}$	7	$r=0.585$	$p<3\times 10^{-132}$
8	$r=0.560$	$p<4\times 10^{-119}$	9	$r=0.589$	$p<3\times 10^{-134}$	10	$r=0.513$	$p<2\times 10^{-46}$

Looking further into the full data set associated with the collected SETU mean ratings, two further significant correlations with SETU item 6 were observed – with the year level of the unit ( $r = 0.206$ ;  $p < 4\times 10^{-15}$ ) and with the owning faculty ( $r = 0.170$ ;  $p < 1\times 10^{-10}$ ). Both of these variables are strictly categorical (though year level has an implied ordinal sequence),

so the correlation coefficient is only indicative of an association. The exact nature of the association can be explored using an analysis of variance (ANOVA) test (Lewis-Beck et al., 2004, p.13). Here, a year level of 1-4 applies to units in undergraduate programs and represents the nominal year sequence in which a student would enrol in the unit. A year level of 5 is associated with a small set of units specifically for education students returning to obtain a 'fourth year qualification', and a year level of 7 is associated with coursework Master level studies.

For SETU item 6, a one-way ANOVA was attempted for the mean rating as the dependent variable against year level grouping. Levene's test of homogeneity of variance (Lewis-Beck et al., 2004, p. 564) failed, so a robust ANOVA test using the Welch test statistic (Lewis-Beck et al., 2004, p. 1192) was performed instead. A significant difference in mean rating between year level groupings was observed for SETU items 6 ( $F = 11.01$ ;  $p < 6 \times 10^{-7}$ ). Figure 1 shows the mean SETU ratings for the year level groupings. Note that a compressed vertical scale is used and 95 percent confidence intervals are estimated (Lewis-Beck et al., 2004, p. 168) – the very wide confidence interval on year level 5 is due to the relatively small number of units at this level. The confidence intervals in Figure 1 suggest that not all of the observed differences in mean rating between year pairs are significant. To establish which year pairs have significant differences in mean rating, post-hoc pair-wise testing was performed using Tamhane's T2 post-hoc test (Cramer & Howitt, 2004, p. 169). Based on a significance level of  $p < 0.01$ , the significant differences in mean rating by year level are limited to level 7 compared to levels 1, 2 and 3.

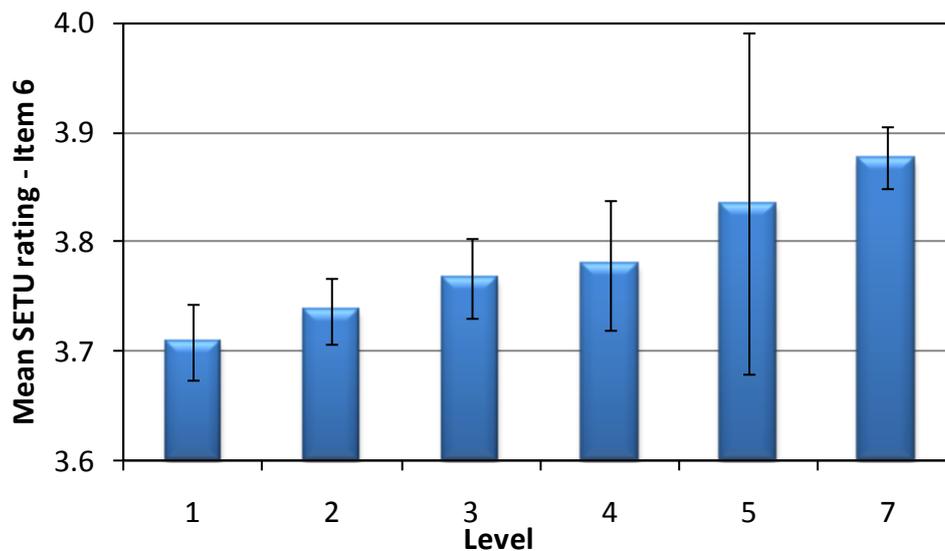


Figure 1 – Mean ratings for SETU item 6 by year level grouping.

For SETU item 6, a one-way ANOVA was attempted for the mean rating as the dependent variable against faculty grouping. Levene's test of homogeneity of variance failed, so a robust ANOVA test using the Welch test statistic was performed instead. A significant difference in mean rating between faculty groupings was observed for SETU items 6 ( $F = 29.15$ ;  $p < 9 \times 10^{-18}$ ). Figure 2 shows the mean SETU ratings for the faculty groupings. Note that a compressed vertical scale is used and 95 percent confidence intervals are estimated. The confidence intervals in Figure 2 suggest that not all of the observed differences in mean rating between faculty pairs are significant. To establish which faculty pairs have significant differences in mean rating, post-hoc pair-wise testing was performed using Tamhane's T2 post-hoc test. Based on a significance level of  $p < 0.01$ , the significant differences in mean rating by faculty are limited to the Faculty of Health compared to all other faculties.

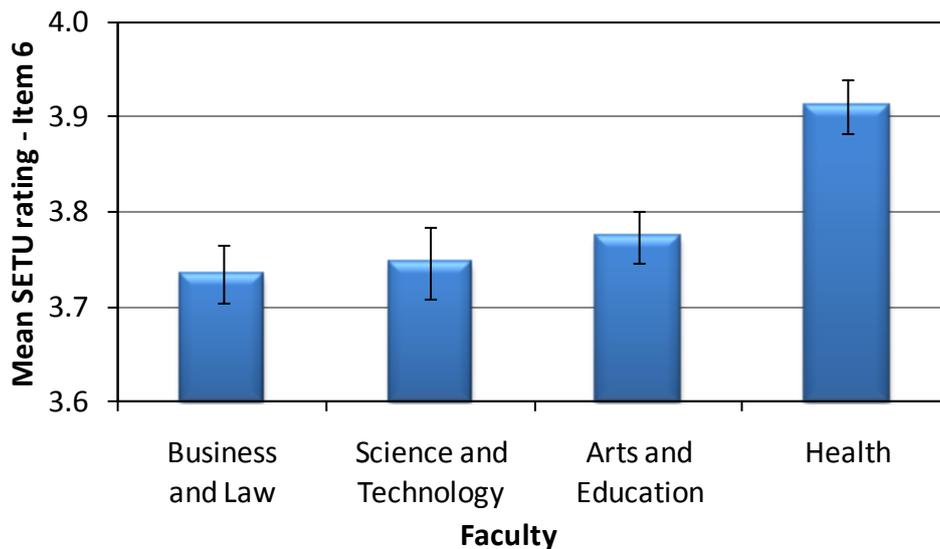


Figure 2 – Mean ratings for SETU item 6 by year faculty grouping.

The significant differences observed in mean rating for SETU item 6 by year and faculty tend to be limited to the extremes (i.e., year level 7 compared to 1, 2 and 3, and a single faculty compared to the other three). Also, the strong inter-item correlations observed for all SETU items mean that these two observed associations may be, at least in part, due to underlying differences in other SETU ratings on the basis of year level and/or faculty. Additionally, the Pearson linear correlation coefficients noted above for these two associations provide an indication of the effect size of the associations, and they are relatively small. Finally, it could be argued that year level and owning faculty are both factors beyond the control of the library. However, these findings lend support for the differentiated/customised approach most university libraries would have for dealing with different student groups; for example different services for undergraduate and postgraduate students, and nominated faculty liaison librarians to deal with the particular needs of different discipline areas. These findings also suggest that some initiatives to improve the value and perception of the quality of library resources should be focussed on the specific characteristics and needs of particular student cohorts to have maximum impact.

A comparison of the correlation between mean ratings for the AUSSE item “Used library resources on campus or online” and all other AUSSE items, for both 2009 and 2010 Deakin University AUSSE data, revealed a number of significant, though largely minor, correlations. However, a single pair-wise correlation stood out as having approximately twice the explanatory association with the AUSSE ‘library’ item than all others – that item was “Worked on an essay or assignment that required integrating ideas or information from various sources”. If a linear association is assumed, then the square of Pearson linear correlation coefficient is referred to as the coefficient of determination, and it provides a measure of the variation in one variable explained by the other variable. Table 2 gives the correlation, determination and statistical significance of the association between the ‘library’ and ‘integrating ideas’ items for both the 2009 and 2010 AUSSE data sets.

Table 2 – Correlation between AUSSE ‘library’ and ‘integrating ideas’ items.

Year	Correlation	Determination	Significance
2009	$r = 0.476$	$R^2 = 0.227$	$p < 8 \times 10^{-41}$
2010	$r = 0.517$	$R^2 = 0.267$	$p < 5 \times 10^{-40}$

The significant, strong and repeated correlation observed between these two items lends weight to the existence of an underlying meaningful association. Taking each item at face value, it is perhaps not surprising that an association is observed between these two items – the library is one likely source for locating ‘ideas or information from various sources’. Without claiming a precisely quantified and causative influence, this finding suggests a key leverage point for enhancing the perceived value and contribution of the library in SET ratings – units of study that employ more sophisticated assessment tasks that require students to engage with multiple sources of information are more likely to lead students to interact with the library. Students are strongly (and rationally) motivated by what is assessed (James, McInnis & Devlin, 2002), and assessment tasks that incorporate opportunities to interact with the library in substantial, meaningful and authentic ways have the potential to result in higher student ratings of the value of library resources. An additional benefit is that authentic and complex assessment tasks are a key element of a learning environment that supports the development of quality learning outcomes (McDowell et al., 2006).

### CASE STUDY – INTEGRATING THE LIBRARY INTO A UNIT OF STUDY

A previously presented case study described the design, delivery and evaluation of information literacy training for engineering students at Deakin University (Palmer & Tucker, 2004). In partnership with the School of Engineering liaison librarian, a range of academic content, student learning activities and assessment were incorporated into an engineering unit (SEB121 Fundamental of technology Management) as core elements, with the aims of:

- exposing and orientating students to the facilities and services offered by, and accessed through, the Deakin University Library;
- exposing students to the rationale for, and the practice of, citing their information sources;
- providing general information literacy training;
- providing training and practice in using specific, discipline-relevant, online databases;
- encouraging students to become systematic and habitual users of the information sources available to them; and
- providing easy access to information sources.

Figure 3 summarises the various information literacy elements of SEB121.

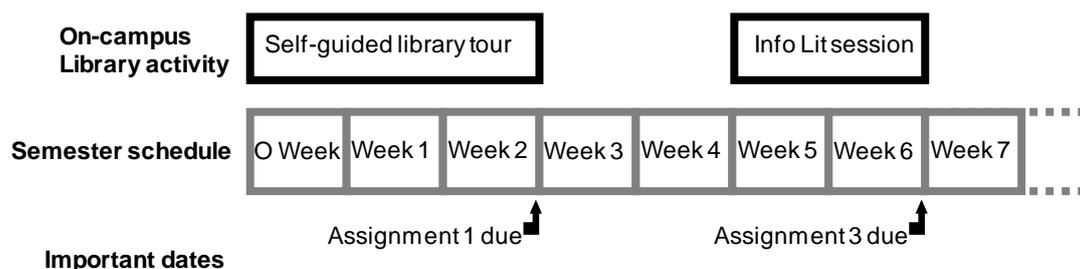


Figure 3 – Information literacy elements of SEB121.

During orientation week (O week) and the first two weeks of the teaching period, students were invited/encouraged to participate in a self-guided tour of the Library. This tour incorporated the completion of an online interactive tutorial which included information required for the completion of the first assignment. The second unit assignment was a topical written report, and while it was not directly related to the information literacy aspects of SEB121, many students would have used the Library to source their material. Concurrently, the course materials covered topics including quality/validity of reference sources, intellectual property, academic integrity and plagiarism. The requirements for acknowledging sources of information were explicitly covered. The third item of assessment for SEB121 required on-campus students to attend a ‘Library Information Literacy Skills Session’ where students met in small groups in the Library with the School’s liaison librarian.

This session focused on information resources specifically for engineering students and was based around hands-on use of online databases in a computer lab. The assessment element required students to individually produce a formatted bibliography of references that they could use in the completion of the fourth item of assessment for SEB121 (which was a topical/informative report on any issue relating to engineering/technology). Equivalent resources and activities were provided for off-campus students.

An evaluation of this initiative found that students valued the activities, and identified the need for additional exposure to more complex reference types (such as chapters in books) (Palmer & Tucker, 2004), however no investigation of the impact of this initiative on SETU ratings was conducted at that time. SETU data are publicly available for the final two years (2005 and 2006) that the author was unit chair for SEB121 (Deakin University, 2011). Figure 4 shows the mean ratings of the three 'council indicator' SETU items (1, 7 and 9) and SETU item 6, for both SEB121 and the whole university overall, for both years. Note that a compressed vertical scale is used and 95 percent confidence intervals are estimated. Based on a significance level of  $p < 0.01$ , there was no significant difference in the mean ratings between SEB121 and the whole university for SETU item 1 and item 9 in both years, and there was no significant difference in the mean ratings between SEB121 and the whole university for SETU item 7 in 2005. There was a significant difference in the mean ratings between SEB121 and the whole university for SETU item 7 in 2006, but in this case the SEB121 mean rating was significantly lower. Note that in 2006 the author was absent for the SEB121 teaching period, and while the general format of the unit was the same, the classroom teaching was performed by a sessional replacement.

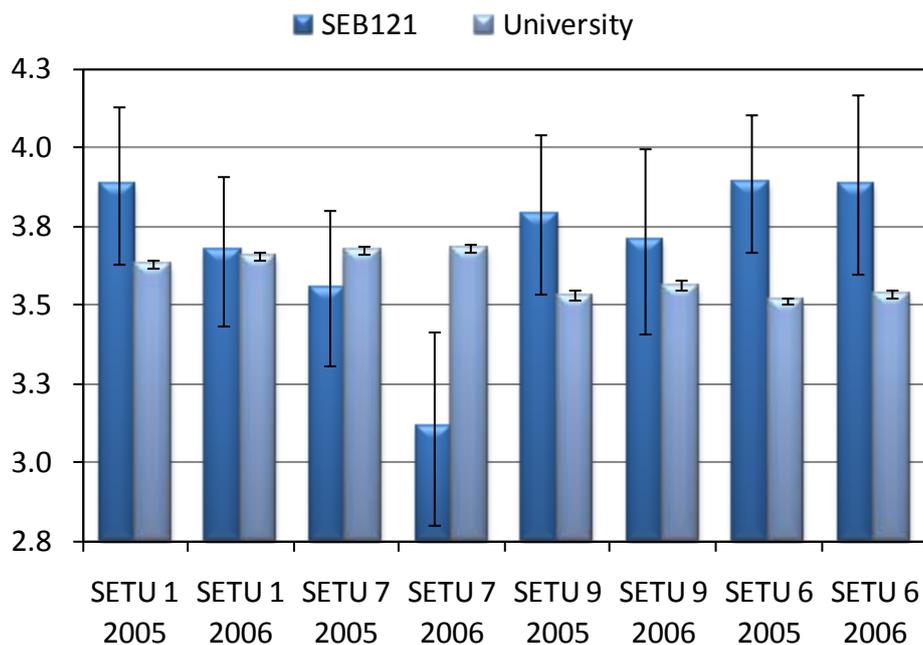


Figure 4 – SETU data for SEB121 versus whole university for 2005 and 2006.

So, for the key SETU items taken to represent overall teaching quality, in 2005 and 2006, SEB121 was either not significantly different to the whole university or, in one case, was significantly lower. However, the mean rating for SETU item 6 (the 'library' item) for SEB121 was significantly higher in both 2005 ( $F = 11.93$ ;  $p < 0.0012$ ) and 2006 ( $F = 6.99$ ;  $p < 0.0081$ ) compared to the whole university. These results provide some evidence that the purposefully designed integration of library resources and interactions into the content and assessment of SEB121 contributed to students differentially rating the library resource quality higher than other aspects of the unit, when compared to all other units. This finding lends support to the conclusion suggested above, based on the AUSSE data, that

assessment tasks that require students to interact and engage with the library in academically meaningful ways have the potential to result in higher student ratings of the value of library resources.

## CONCLUSIONS

As is apparent in the national consolidated CEQ results, Deakin University has also observed a disparity in the way students perceive/rate library service quality and library resource quality, with library resource quality receiving comparatively lower evaluation ratings by some measures. An analysis of available SET data relating to student interaction with, and evaluation of, library resources indicated that:

- high ratings for library resources were likely to be associated with high general ratings of teaching and unit quality;
- postgraduate coursework students rated library resources significantly higher than students in the first three years of undergraduate programs;
- students in one faculty (Health) rated library resources significantly higher than students in all other faculties; and
- there was a strong correlation observed in AUSSE data for both 2009 and 2010 between the two items “Used library resources on campus or online” and “Worked on an essay or assignment that required integrating ideas or information from various sources”.

Retrospective analysis of the SET data for a unit of study that incorporated the purposefully designed integration of library resources and interactions into the unit content and assessment found that the key SETU items taken to represent overall teaching quality, in 2005 and 2006, were either not significantly different to the whole university or were significantly lower. However, the mean rating for SETU item 6 (the ‘library’ item) was significantly higher in both years compared to the whole university.

These findings suggest that:

- well-planned learning environments are likely to integrate academically meaningful student interaction with the library;
- initiatives to improve the value and perception of the quality of library resources should be focussed on the specific characteristics and needs of particular student cohorts to have maximum impact; and
- more sophisticated assessment tasks that require students to interact with the library have the potential to result in higher student ratings of the value of library resources.

Taken collectively, the findings support the library participating in, singly and/or jointly with academic development groups, initiatives that aim to develop the sophistication of learning and assessment activities used in units of study to engage students with rich and diverse sources of information. This could include direct participation in the unit curriculum and assessment, as described in the SEB121 case study presented above, or it could be through the provision of resources that document case studies, options and benefits of more sophisticated methods of assessment. Further, such development activities might gain most impact from being attuned to the traditions of different academic groupings – the ‘signature pedagogies’ of the various disciplines.

Although Deakin University no longer participates in the AUSSE survey, it does include the SSS and LRS optional scales in the CEQ survey, as well as having a ‘library’ item in the SETU instrument. Many Australian universities do not use the CEQ optional scales and do not include a reference to the library in their internal SET instruments, and hence may receive no direct SET data relating to their library. While the work presented here concentrated on quantitative SET data, most SET instruments also collect qualitative responses from students – typically in the form of open-ended comments. An exploratory study at Deakin University in 2008 found that, over the period 2004-2007, approximately 3%

of all CEQ open-ended student comments related to the Library. This finding provides further evidence of the value for libraries to be found in existing sources of SET data, and suggests that would be significant value for the Deakin University Library in exploring qualitative sources of SET data as well.

**APPENDIX**

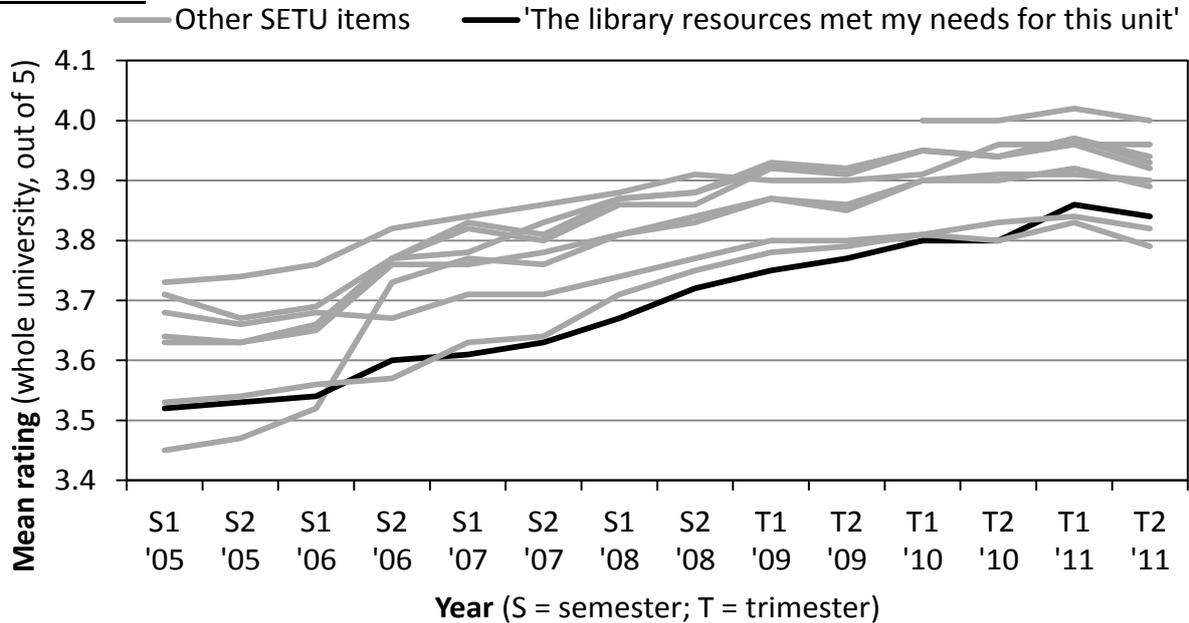


Figure A1 – Comparison of SETU item 6 (Library item) with all other SETU items. Source: data from (Deakin University, 2011).

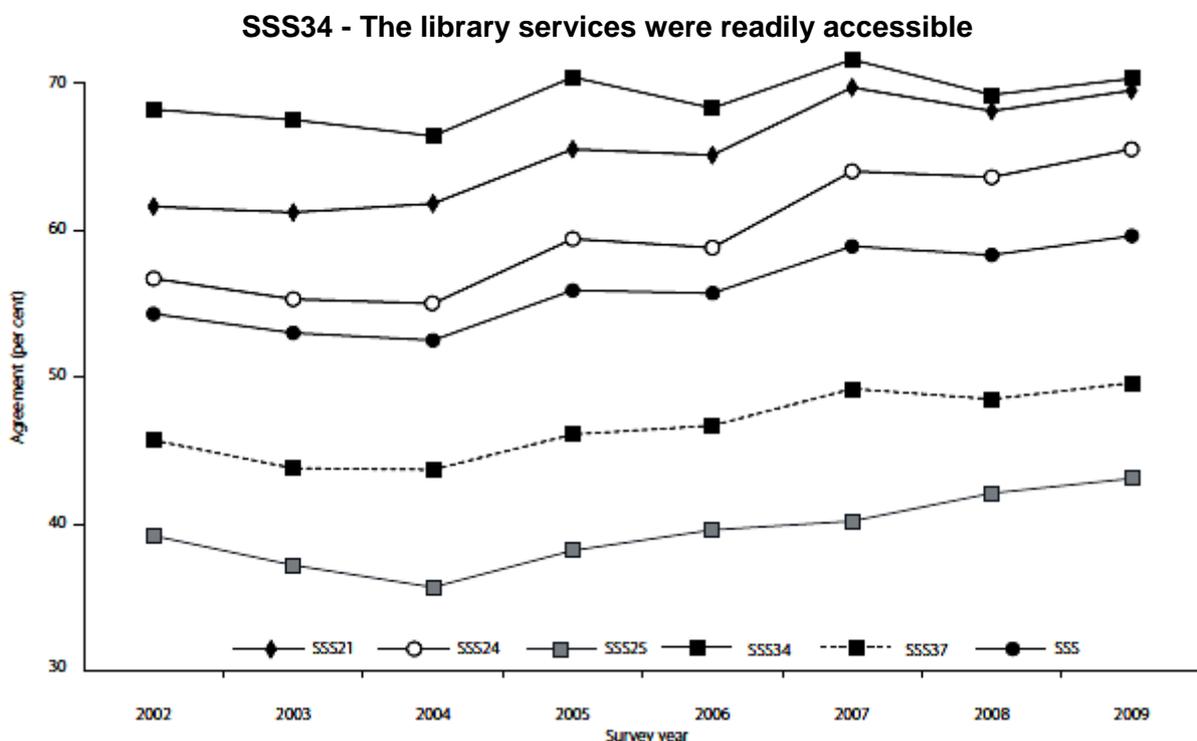


Figure A2 – CEQ Student Support Scale percentage agreement time series. Source: Figure 21 (Graduate Careers Australia, 2010, p. 32) reproduced with permission.

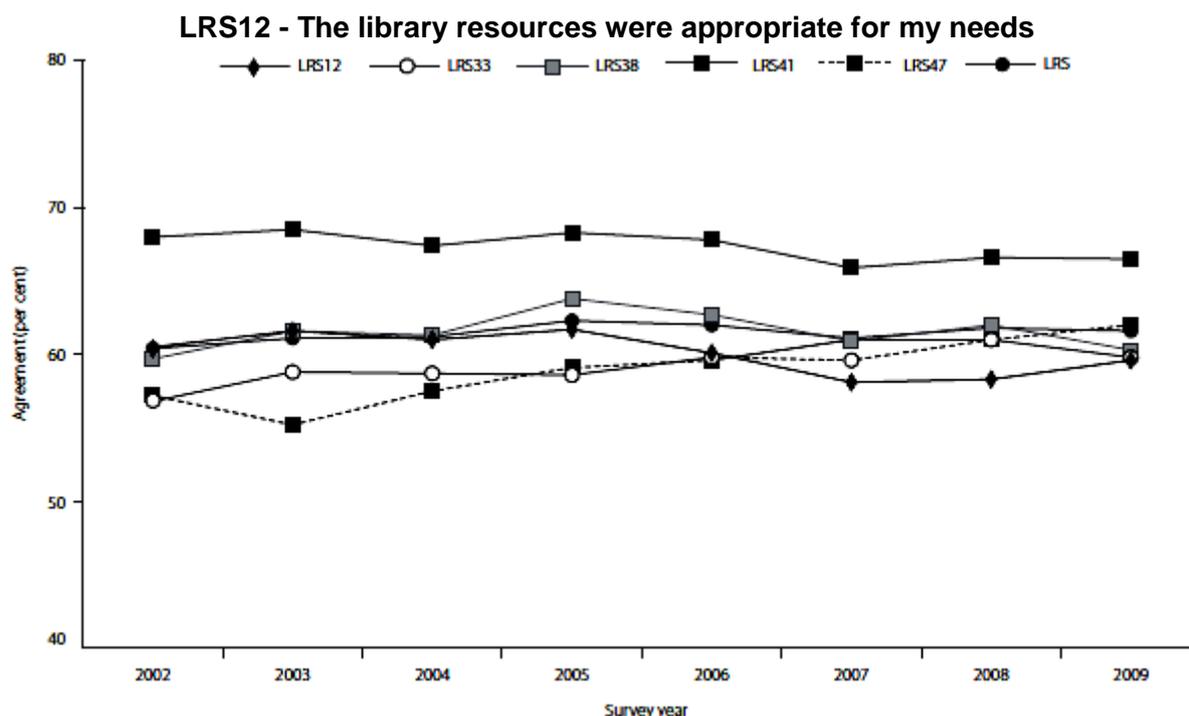


Figure A3 – CEQ Learning Resources Scale percentage agreement time series.  
 Source: Figure 23 (Graduate Careers Australia, 2010, p. 33) reproduced with permission.

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