HIGHER EDUCATION

The Learning Improvement Strategies Questionnaire

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Abstract: *This paper describes the structure, origins, evolution, validity and reliability, administration, and appropriate uses of the Learning Improvement Strategies Questionnaire (LISQ). The LISQ was designed to monitor the quality of the learning environment of courses (taught units or components of a programme of study). The LISQ is shown to be a relatively quick, reliable and valid method of monitoring courses. It is suggested that it could also assist with formative evaluation should teaching teams develop learning improvement strategies from response distributions.*

Background

AMONG THE MANY global issues facing higher education, the evaluation of teaching and learning has retained saliency across the decades. One reason is that universities have long been aware that the quality of pedagogy is a key determinant of student choice regarding course, programme and institution in organisational cultures characterised by 'academic freedom' (Clark, 1996). Another is that increased accountability demands on universities now compete with the traditional practice of good teachers who sought feedback from students to help improve teaching and learning, creating tension between academic staff and their leaders (Ramsden, 1992). Summative purposes compete with formative. A third is that a move from collegial and bureacratic systems to entrepreneurial and corporate managerialism (McNay, 1995) has created a need for quantitative data on teaching performance for quality assurance purposes. This article could well contribute to the associated debates. It sets aside a traditional research report structure to report and interpret events chronologically.

The students' evaluations of courses and teaching (SECAT) system had became very controversial at the University of Auckland by 1996. SECAT surveys were originally designed solely for formative purposes. Staff could self-select questions from item banks and build their own questionnaires. Although the system lacked construct validity and scale reliability, it had been seen as reasonably effective until gradually co-opted for summative purposes.

The SECAT Working Party established in 1997 recommended that a range of evaluation processes be identified to serve a specific range of summative and formative purposes. Fast Feedback was recommended as an effective and primary method of gaining and giving feedback on teaching and learning. Many other qualitative and quantitative data collection and feedback methods were also recommended for evaluation and assessment purposes (Macpherson, 1999a).

The development of a relatively quick method of monitoring the quality of courses was then given priority to serve the monitoring needs of Heads of Departments, especially to reliably indicate the need for general learning improvement strategies in a leading national research-orientated

university. Donald's (1997) in-depth case studies had been conducted in four US universities that are both leading recipients of US federal research grants, and famous for their commitment to teaching development. It was found that Pennsylvania State University, Syracuse, Northwestern and the University of Arizona commonly use five strategies to improve the quality of teaching. They all

- foster students' motivation for learning,
- improve teaching by focusing on learning,
- provide institutional support for the improvement of learning,
- use assessment to define learning tasks and to measure learning, and
- refine academic staff responsibilities, rewards, and assessment.

These findings also cohered strongly with international research into the improvement of learning and quality systems in higher education (eg. Brown, Collins and Duguid, 1989; Banta, 1992; Ramsden, 1992; Ratcliffe, 1992; Biggs, 1993: Centra, 1993; Pintrich, 1995; Woodhouse, 1995).

The five strategies identified were then used to develop five closed items for the first section of the LISQ. They ask students to rate the extent to which 1. the teaching helps motivate them to learn, 2. the teaching helps deepen their understanding, 3. the physical environment assists their learning, 4. the assessment measures their learning fairly, and 5. academic staff take their teaching responsibilities seriously. The second section of the LISQ uses three open-ended questions to ask students 1. what they like best in the course, 2. how the course could be improved, and 3. how the physical environment could be improved. Students were assumed to have direct experience of, and therefore, able to make reasoned judgements about each of these areas, with one exception. The third strategy Donald identified refers to the provision of institutional support for the physical and cultural environment in which learning occurs. Since part of the ideal cultural environment is the setting in which academic staff discuss and design learning, and develop and train as teachers, and further, that these activities are not directly experienced by students, the LISQ refers only to the physical environment.

The open-ended items in the second section invite each student to contextualise their experience and offer ideas that might assist with interpretation. Early versions of the LISQ also invited feedback on the instrument itself and asked respondents to indicate their ethnicity and gender to check them as possible sources of bias. None were found here.

The first version of the LISQ was known as the Teaching and Learning Environment Questionnaire (TALEQ). It was first distributed in June 1997 for comment to all Departments, and to many colleagues as part of the Interim Report of the SECAT Working Party. Feedback regarding the first version of the TALEQ requested psychometric properties, the rewording of some items, and asked that academic teachers not be blamed for conditions beyond their control (such as aspects of student motivation and the environment). Others suggested sampling methods to discourage over-surveying, asked Deans not to become involved in approving departmental evaluation policies and practices, and that the Centre for Professional Development (CPD) have responses machine-read and statistically analysed.

A modified version of TALEQ was trialed in the Faculty of Engineering in Second Semester 1997. The sample included five first year classes of 48, 43, 47, 48, and 42 students, totaling 228, and four second-year classes of 9, 51, 23 and 39 totaling 122. Of all 340 responses, three were found to be unusable. The statistics by item were very similar across all classes. There were satisfactory item discrimination and high internal reliability coefficients on all five items (Cronbach's alphas for all

First Year students averaged 0.82, Second Years 0.85). The qualitative data from students and feedback from colleagues collected by interview were then used to make further minor improvements to layout and items. The instrument was then renamed the Learning Improvement Strategies Questionnaire (LISQ), to more accurately reflect its purposes, and restyled to be machine-read.

Development of the LISQ

First Trial

The first trial of the LISQ involved a cross-faculty sample of 130 students. The classes surveyed were from three faculties; Arts, Medicine and Science. Demographic categories were added - to see if responses were biased by ethnicity or gender. Unpaired t tests established that there were no statistically significant differences between any of the groups on any of the items. Some non-significant differences were traced to the variance between Maori and all other ethnic groups' perceptions on most items. This minor relationship was monitored in subsequent trials without change.

Cronbach's alpha coefficient of inter-item reliability across the five items was 0.738. This was considered to be satisfactory at this stage of the research. The low standard deviations by item across the groups suggested that each of the five items were reliably measuring their respective constructs. In practical terms, this was taken to mean that the scores and distributions by item could be interpreted independently.

Much was learned about teaching and learning at the University of Auckland from this first trial. The groups surveyed agreed that the quality of the physical environment was relatively poor. 46% of the sample rated this item as 5, the mid point of the scale. The other surprising finding was that 29% rated item 4 as 5. Item 4 states that "assessment methods measure my learning fairly". In sharp contrast, 67% rated item 1, that "the teaching helps motivate me to learn", as 7 (Agree). Item 2, that "the teaching helps deepen my understanding", was rated 7 by 65%. Above all, 85% rated item 5, that "teaching responsibilities are taken seriously" as 7.

The analysis of the open-ended items reinforced the patterns found in the quantitative data. When asked "what did you like best about the teaching" there were many references to the clarity of explanation, student involvement, and the enthusiasm of lecturers. When asked "how could the teaching be improved" and "how can the physical environment be improved?" the overwhelming theme in the responses was that the lecturing facilities had to be upgraded.

A colleague in the School of Medicine reported that, while Fast Feedback methods were very useful at identifying matters that were immediately correctable, the LISQ provided a more objective and comparable overview of the students' perceptions of the learning environment. He added that the LISQ helped limit subjectivity during interpretation by program managers and had proved a useful analytical tool when colleagues teaching a course met to discuss outcomes. It was decided that the LISQ trials should be extended on demand and to conduct further analyses as the data sets grew.

The Second Trial

The second trial was conducted at the end of second semester, 1997. Members of the SECAT Working Party agreed that a bigger sample was required to further establish the reliability of the closed items of the LISQ. Colleagues volunteered courses from Architecture, Arts, Engineering, Medicine, and Science. This led to another 1,090 responses being analysed. The Cronbach alpha

was 0.812. The patterns of the data captured by the second trial concerning the perceived quality of courses were very similar to those found in the first trial.

Given the advice obtained during the first trial, the feedback to academic teachers was provided on overhead masters to assist with reporting to students. Each master featured a histogram of the distribution of responses to an item. It also provided a table of counts by scale point and percentages. In addition to the item response masters, each teacher was provided with three other masters that summarised responses to open-ended items. Presenting results in graphical form was intended to overcome the problem of numerical means and norms being misinterpreted (McKeachie, 1997).

How academic teachers might interpret and use the histograms was developed initially in the Faculty of Engineering. A researcher and the Associate Dean of Engineering met with each course's coordinator or teaching team. These academic staff invariably used the histograms and the related open-ended responses to interpret the items to do with teaching (motivates learning, deepens understanding, takes teaching seriously). All teaching teams were pleased to see their teaching efforts rated highly by students. A team whose results were markedly better than all others attributed this to their use of problem-based learning.

The data to do with assessment were interpreted separately by all teaching teams and staff, suggesting that most did not fully realise the extent to which assessment practices influence learning. This suggests the broader need for institutional policies to relate the assessment of student learning to effective teaching. The high level of student dissatisfaction with regard to the physical environment was echoed by these academic staff. Anecdotes suggested that this has been a long-term problem that has not been addressed adequately due to the modest and worsening funding base of New Zealand universities. Academic teaching staff stressed the need for many and immediate low-tech solutions (such as putting the overhead projectors alongside the lecterns, reorganising display surfaces, providing chalk and marker pens that work, providing radio microphones) rather than waiting indefinitely for major infrastructure upgrades.

More generally, this process of providing feedback to each course's teaching team, in the presence of a senior colleague responsible for the quality of teaching, highlighted the potential of the LISQ for monitoring and improving the delivery of courses. It also showed that the items achieved high face validity through use.

The Third Trial

The third trial was conducted in the Faculty of Commerce in early 1998. Doubts had been expressed about the quality of courses taught by Summer School mode and it was decided to mount a rigorous evaluation. The LISQ survey was one of five methods selected to evaluate the Summer School. First, an evaluation was conducted by teachers of the learning expected and achieved (examining syllabus content and the distribution of grades by using parallel tests). Second, an evaluation was conducted by students of the quality of each course taught using a LISQ. Third, student demographics, motives, intentions, attitudes and preferences, their use of support services and the perceived quality of Summer School organisation were surveyed. The CPD designed and administered a cross-faculty generic survey in consultation with Faculty representatives. Fourth, participating staff were invited to provide personal reports of their teaching, learning and organisational experiences. Fifth, and finally, Summer School organisers were asked to report on the challenges encountered and any broader policy issues requiring attention. The Education Committee of the University appointed a cross-Faculty committee to collate these data and report.

With regard to the LISQ, students' perceptions of courses were analysed to compare the quality of each course against all Commerce courses taught at Summer School, and against all courses

that had been surveyed using the LISQ to that point across the University of Auckland. Perceptions of Stage 1 and Stage 2 courses were also compared against all data collected by the LISQ in previous trials.

Although course enrolment numbers were not given, the numbers of respondents in each course well exceeded standard minima. It was also assumed that any sampling of students in courses was unbiased. As requested by colleagues, against the advice of the CPD, numeric values were assigned to nominal responses so that means and standard deviations could be calculated. Staff soon found that these statistics were not particularly useful. They gained a more useful picture when CPD expressed frequency counts as percentages of responses. This enabled comparisons across samples.

There were five main findings. First, students' perceptions of the quality of Stage 1 courses at Summer School were very similar to perceptions of Stage 2 courses. Second, 63% of respondents (n=773) that took Commerce courses at Summer School shared the view that the teaching they encountered motivated them to learn. 73% indicated that the teaching deepened their understanding. 77% took the view that that their teachers took their teaching seriously. These levels of satisfaction are very similar to those of all respondents at that time across the University (n=1,968); 63%, 73%, 83% respectively. Third, there were small groups of students in some courses that did not share the perception that the teaching motivated them to learn, or deepened their understanding. There was a small but a significant group in one course that did not see that their teaching was being taken seriously. Fourth, 62% of Summer School respondents agreed that assessment processes were fairly measuring their learning. 19% were not sure if this was the case, and 19% disagreed. The comparable figures across the University were 63%, 16% and 21%. Small groups of students disagreed with the proposition in some courses. Fifth, although 52% of Commerce Summer School students agreed that the physical environment helped them to learn, 24% were unsure, and 24% disagreed. The comparable figures across the University at the time were 50%, 24% and 26%. While the responses to the open-ended questions indicated that the main problem was to do with some classes being over-chilled by the air conditioning, the more generic dissatisfaction across the University concerning the physical environment raised widespread concern.

Three general conclusions were drawn by teachers concerning students' perceptions of Commerce Summer School courses. The overall quality of courses compared favourably with the perceptions of quality of all courses being taught across the University. There were courses where teaching apparently could be improved by better motivating learners and deepening their learning, teachers taking teaching responsibilities more seriously, and by teachers reviewing assessment practices. The most serious impediment to the improvement of learning identified by Summer School students, and by students across the University, was, again, the quality of the physical environment.

The Fourth Trial

The fourth trial of the LISQ was held in First Semester 1998 as part of trials of the new Evaluation of Teaching system (University of Auckland, 1998), as requested by the Education Committee. In this period 87 LISQs were ordered, mostly by 19 Heads of Departments (HODs) wanting to monitor the quality of specific courses. This fourth sample had 3,233 student respondents. The interim conclusion drawn from this trial was that the LISQ is a reliable (overall alpha = 0.815) and valid method of quickly monitoring the quality of the learning environment in courses. It will be suggested below that there is also substantial formative potential to the LISQ.

Interpretation and Validation

The LISQ was one of many data gathering processes recommended to serve a number of evaluation purposes. For example, to monitor and improve the quality of an individual's *teaching*, the Working Party recommended in-class fast feedback mechanisms, mentoring, colleague feedback, teacher-designed formative feedback questionnaires (FFQs), and the judicious use of the internationally standardised Students' Evaluation of Educational Quality (SEEQ) instrument (Marsh and Roche, 1992; 1994).

With regard to the quality of semester-length courses, the Working Party recommended that teaching teams and Departments plan evaluation processes. They suggested the use of customised FFQs, assessment reviews, and monitoring of courses by Heads of Departments using the LISQ. To monitor and improve the quality of programmes of study leading to an award, the Working Party encouraged Boards of Study in faculties to plan evaluation processes to include self-designed FFQs, assessment reviews, course reviews, and systematic monitoring of the programme using a standardised Australian instrument, the Course Evaluation Questionnaire (CEQ) (Rixon & Ramsden, 1996). The transition from the solely SECAT system to the more comprehensive system is evident in Table 1 below:

Table 1. Numbers of Survey Instruments Ordered, 1997-2000

Semester, Year	*SECATs, then FFQs*	*LISQs*	*SEEQs*	*CEQs*	*Totals*
1, 1997	1793	-	-	-	1793
2, 1997	987	trials	trials	-	987
1, 1998	696	112	108	2 trials	918
2, 1998	593	219	177	-	989
1, 1999	644	415	282	2 trails	1343
2, 1999	537	323	228	-	1088
1, 2000	710	157	140	-	1007
2,2000	821	191	183	-	1195

Table 1 shows that the runaway growth in student surveys was stabilized from 1997, and has been followed since by a pattern of more careful and targeted use of survey instruments (particularly in the Faculties of Science and Arts). It is important to note that the SECAT/ FFQ column contains about 150 surveys per semester of short courses run by Executive Programmes, and about 100 Tutors' and Demonstrators' FFQs. It also includes the Maths Education Unit evaluation surveys. Overall, the data in this column suggested that the use of the old SECATs had settled back into its original formative role, with LISQs emerging as the Heads of Departments' (HODs) tool of choice regarding monitoring. SEEQs were being used for diagnostic or comparative purposes by staff, including in applications for promotion. The CEQ was not institutionalised by faculties despite the need for international benchmarking.

The bulge in the number of LISQs ordered in first semester 1999 was the result of many more Heads of Departments assembling an Evaluation Plan with their colleagues, and in some cases, establishing base line data on the quality of the courses for which they are responsible for. More even and cyclical sampling has become evident since in those Departments, with some fall off becoming evident as HODs changed. On the other hand, the rising overall total of surveys ordered

is a reminder of the need for a number of events to be planned to happen simultaneously:

- individuals need to plan the evaluation and the improvement of their own teaching,
- Heads of Department need to plan the monitoring, evaluation and improvement of the courses they are responsible for,
- Boards need to plan the monitoring, evaluation and improvement of the programmes of study they are responsible for, and
- these plans then need to be put together, probably at Faculty level, the conflicts reconciled and surveying planned, so that the imposition on students is minimised.

Further evidence of the face and construct validity of the LISQ is available in detail (Macpherson, Pashiardris, and Frielick, 2000). To illustrate, all responses to the open-ended questions from the 331 LISQ surveys conducted across the University in 1998 were aggregated. The 9,919 responses to the LISQ Question 6 were then classified using the SEEQ's scales and items, and the counts are presented in Table 2.

Table 2. What do UoA Students Like Best about the Teaching? (LISQ Q. 6, 1998)

SEEQ Scales	*UoA Students' References*	*Total (%)*
LEARNING/ ACADEMIC VALUE	Knowledgeable lecturer(s) 491 'Real world' knowledge 282 Practical information in the area 203 Easily understood 400 Knowledge gain 65	1441 (14)
INSTRUCTOR ENTHUSIASM	Lecturer's enthusiasm 423 Varied activities 61 Use of humour 469 Interesting presentation 946 Voice 72	1971 (20)
ORGANISATION CLARITY	Clear explanations 719 Overall clarity 640 Overheads 321 Examples 801 AV 200 Labs 100 Seminars 74 PowerPoint 31 Well structured 376 Well organised 187 Handouts given 965 Good pacing 216	4630 (44)
GROUP INTERACTION	Participative approach 223 Tutorials/ workshops 207 Group work 28 Class discussion 144	602 (6)
INDIVIDUAL RAPPORT	Friendly/ approachable lecturer(s) 547 Attitude toward students 170 Helpful lecturer(s) 309	1026 (10)
BREADTH OF COVERAGE	Range of topics 46 Guest speakers 181	227 (2)
EXAMINATION GRADING	Feedback given 29 Fair assessment 100	129 (1)
ASSIGNMENTS READINGS	Notes on server 36 Quality text 27 Useful assignments 100	163 (2)
Total		9919 (100)

The LISQ's Question 7 is "How Can Teaching be Improved?" The responses from all 1998 LISQs were almost the negative image of the answers to Question 6, except that nearly 60% of students indicated that, where improvement is needed, it should focus on basic presentational methods. The data counts are evident in Table 3 below.

Table 3. How Can Teaching be Improved? (LISQ Q. 7, 1998)

SEEQ Scales	*How to Improve Teaching?*	*Total (%)*
LEARNING/ ACADEMIC VALUE	Greater depth/ detail 99 Relate content to 'realworld' 99 More practical emphasis 103 Make more easily understood 138	439 (7)
INSTRUCTOR ENTHUSIASM	More enthusiasm 97 Speak up 82 Use more varied activities 86 More humour 30 Make it more interesting 300 Vary tone of voice 45	640 (10)
ORGANISATION CLARITY	Clearer presentation 326 Explain more clearly 363 More examples 615 Improve overheads 220 Better AV 175 Clearer structure 379 Better organisatn 144 More time/ lectures 23 Handouts 650 Slower 581 Faster 50	3626 (59)
GROUP INTERACTION	Involve students more 162 More tutorials/ workshops 225 Better tutorials 90 More discussion 34	511 (8)
INDIVIDUAL RAPPORT	Improve attitude toward students 133 Be more helpful to students 80	213 (3)
COVERAGE	More info on web 60	60 (1)
EXAMINATION GRADING	More positive feedback 58 More consistent marking 100	158 (3)
WORKLOAD/ DIFFICULTY	Reduce workload 164	164 (3)
ASSIGNMENTS READINGS	Better text 140 Clarify assignment requirements 98 Better assignments 87	549 (9)
Total		6136

Clearly, a similar mapping on to the CEQ scales of Good Teaching, Clear Goals and Standards, Appropriate Workloads, Appropriate Assessment, Generic Skills and Overall Satisfaction is also possible, but since the LISQ is designed to work at the level of a semester-length course, it was more appropriate to use the SEEQ.

The final issue examined was how a learning environment can be improved? Table 4 summarises the responses.

Table 4. How Could the Physical Environment be Improved? (LISQ Q. 8, 1998)

Students' Advice	*Number of References (%)*
Smaller classes	404 (24)
Better airconditioning	363 (21)
Keep students quiet	300 (18)
Better room	192 (11)
Better lighting	117 (6)
Larger room	104 (6)
More comfortable seating	84 (5)
More computers	60 (4)
Better desks	48 (3)
Improve AV equipment	40 (2)
Total References	1712 (100)

It is notable that the University of Auckland, despite a very difficult financial context, deployed substantial capital expenditure in 1999 and 2000 to boost the quality of the learning environment. In 2001, at further considerable cost, standard electronic lecturns are to be installed in all major lecture theatres with appropriate professional development available.

Concluding Reflections on Policy and Process

The overall policy framework is summarised in Figure 1 below.

Figure 1. The Evaluation Policy Framework at the University of Auckland

Unit of Analysis	*Responsible*	*Planning and Evaluation Processes*
Teaching	Teacher HOD	Teaching Evaluation Plans Fast Feedback in-class Mentoring Colleague feedback Formative Feedback Questionnaires (FFQs) Students' Evaluation of Educational Quality (SEEQ)
Course	Teaching Teams HOD	Course Evaluation plans Formative Feedback Questionnaires Reviews of Assessment and Departments Learning Improvement Strategies Questionnaire (LISQ)
Programme	Boards of Study Dean of Faculty	Programme evaluation plans Formative Feedback Questionnaires Moderation of Grades Awarded Reviews of Programmes and Faculties Course Evaluation Questionnaire (CEQ)

It proved important throughout the trial processes to both provide supportive service to colleagues and to sustain advocacy for the use of the LISQ. The CPD provided 28 briefings to Departments in 1998, with many prior and follow up consultations for individuals. Generic workshops were also provided. Given the University of Auckland's standing as a research-led university of national pre-eminence and international eminence, advocacy focussed on the relative rigor of past and currently used instruments, and the comparability of results.

Advocacy also promoted parity of esteem between research and teaching and coherence between the criteria, standards and categories of evidence used in the new Evaluation of Teaching scheme and the new Human Resources policies introduced in 1998 and 1999 (concerned with appointment, continuation, research and study leave, and promotion). How this wider policy research process related to quality audit has been reported elsewhere (Macpherson, 1999c).

Finally, at the time of revising this paper in early 2001, the University of Auckland was moving again into a policy review process. It was actively considering the University of Melbourne's adaptations of the CEQ to strengthen benchmarking, and ways of further enhancing its comprehensive system.

NOTE

1. Many colleagues at the University of Auckland contributed to the development of the LISQ, especially the members of the SECAT Working Party chaired by Professor Peter Lovell in 1997, and various Faculty Staff-Student Consultative Committees. Development was initially guided the LISQ Working Group comprising Hannah Brodsky, Jenny Brown, Stanley Frielick, Errol Kelly, Claudia Marquis and Reynold Macpherson (Convenor). It was advanced by the lead author in February 1998 when more trial data on the LISQ became available. It was further developed by the authors in March 1998 when Summer School data became available, and again in August 1998, when First Semester data were analysed. Use of the LISQ has stabilised since, as indicated above.

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