AAEE 2012 CONFERENCE
Melbourne, Australia
www.aaee.com.au/conferences/2012/

A Comparison of On-line and 'In-class' Student Feedback Surveys: Some Unexpected Results

Alexander Mazzolini, Scott Daniel and Llewellyn Mann.
Engineering & Science Education Research group, Swinburne University of Technology,Victoria, Australia
Corresponding Author Email: amazzolini@swin.edu.au

BACKGROUND
To facilitate a cost-effective approach to Learning and Teaching (L&T) quality assurance for units or subjects offered, some universities have replaced, or are moving towards replacing, their paper-based, 'in-class' Student Feedback Surveys (SFS) with 'out-of-class' on-line surveys. Swinburne University moved to on-line surveys several years ago; in the Faculty of Engineering and Industrial Sciences (FEIS) at Swinburne, response rates in these on-line SFS surveys are very low (typically around 10% of students enrolled) and consequently some staff reasonably contest the validity of these surveys as a measure of the L&T quality in their units. This study investigates whether the 'out-of-class' on-line SFS surveys (with their low response rates) correlate well with the equivalent 'in-class' surveys (which typically had higher response rates of around 50%). The study will provide some research-based evidence that will assist university administrators in making an informed choice on whether to continue with on-line SFS surveys or whether to explore cost-effective options for 'in-class' SFS surveys, including the use of electronic audience polling devices (clickers).

PURPOSE
Are there any significant differences between student feedback survey responses solicited by an 'out-of-class' on-line survey and the responses solicited via electronic audience polling devices (clickers) from students participating in a lecture class?

DESIGN/METHOD
The preliminary phase of this study, which is reported here, analyses data obtained from voluntary and anonymous on-line and 'in-class' SFS results for 6 FEIS units of study (semester 1 of 2011) that cover the introductory, intermediate and senior levels in engineering and science fields. The 'in-class' surveys were solicited via electronic audience polling of students who agreed to participate and were attending the lecture class in the last week of semester, and the equivalent on-line results were obtained from official university surveys, where students voluntarily participated out-of-class over a 5-week period (4 weeks before the end of semester until the beginning of the examination period).

RESULTS
This preliminary study suggests that there are some clear differences in average SFS responses between students who participated on-line (N=148) and students who participated in-class (N=325), at least for the 6 units under investigation. For the 8 questions common to both surveys, the students who participated in the on-line survey responded considerably more positively than the students who participated in the 'in-class' survey in the last week of semester.

CONCLUSIONS
Six unit conveners volunteered to have their unit SFS (on-line and in-class) analysed for this study, and the results of the comparison were surprising. The authors of this paper expected that students who go on-line to complete SFS surveys would be a small and non-representative sample who may be highly dissatisfied with some aspect of their teaching experience, but the results suggests that the opposite is true, and that students who are motivated to do on-line SFSs often report a more positive teaching experience than those students who complete the SFS in class. The study has reported a significant difference between on-line and in-class SFS results, at least for the 6 FEIS units investigated. This difference suggests that the university needs to consider ways of increasing participation rates in their on-line student feedback surveys or alternatively needs to develop an efficient and cost-effective 'clicker-based' in-class survey instrument.

KEYWORDS
Student feedback survey, on-line, in-class, comparison

Introduction

Student evaluations of teaching

Student evaluations of teaching are a well-established university tradition. The accompanying research literature dates back almost a century (Remmers, 1928), with the sum of published articles numbering well into the thousands (Marsh & Dunkin, 1992). Although various investigators have questioned the meaning and validity of these student evaluations (Dunegan, 2003; Naftulin, Ware, & Donnelly, 1973), they have been widely endorsed by the research community (Wachtel, 1998), and now universities routinely utilise some form of Student Feedback Survey (SFS) in their Learning and Teaching (L&T) quality assurance process.

Changing from paper-based to online

In an effort to reduce costs, many universities are considering ways to automate their L&T quality assurance processes for the units or subjects that they offer. Some universities have replaced, or are considering replacing, their paper-based, 'in-class' Student Feedback Surveys with equivalent 'out-of-class' on-line surveys. This automation in SFS procedures results in considerable financial savings as universities now no longer need to employ staff to both collect the SFS data (during a short but very intensive period around the end of semester) and translate the data into an electronic form that can be statistically analysed. Swinburne University switched to on-line surveys in 2007. In Swinburne's Faculty of Engineering and Industrial Sciences (FEIS), response rates in these on-line SFS surveys are very low (typically between 5-20% of the students enrolled).

Because of these low response rates, some staff reasonably contest the validity of these surveys as a measure of the L&T quality in their units. In general, staff feel that the small percentage of students that go on-line to respond to the SFS are not representative of the majority of students who attend class. The perception is that perhaps the students who are motivated to respond to the on-line survey have a very strong opinion about their learning experience; an opinion that is often very negative (Laubsch, 2006).

In FEIS, prior to the change from the 'in-class' paper-based SFS to an equivalent 'out-of-class' on-line system, the 'in-class' survey response rates were typically around 50-60% of the students enrolled. These 'in-class' rates were considerably higher than the on-line SFS response rates after 2007. Similar reductions in response rates when switching to on-line surveys have been reported elsewhere (Ballantyne, 2003).

The study outlined in this paper investigates how well the 'out-of-class' on-line SFS surveys (with their low response rates) correlate with the equivalent 'in-class' surveys. The results discussed in this paper are of some preliminary data collected from 6 FEIS units of study during semester 1 of 2011.

Method

As an ongoing assessment of the quality of learning and teaching, FEIS students are asked to complete the SFS for each of their units of study. The SFS consists of two parts: one that relates to the L&T quality of the particular unit of study (Part A) and another which relates to teacher evaluation (Part B). These two parts of the SFS survey seek student responses to various questions via multiple-choice answers and for some questions via free-form answers. This study investigated student responses only for the 'Part A' component of the SFS, and in particular, student responses to 8 multiple-choice, Likert-scale (6-point) questions (see Table 1). The study compared student responses for these questions from the official SFS on-line surveys to those from 'in-class' surveys of the same units. The SFS results (for these 8 questions solicited both by the on-line and 'in-class' surveys) were analysed for 6 FEIS units

of study. These units covered a range of teaching levels and teaching delivery modes. Three of the units were taught at the introductory level (first year) via a traditional coursework (lecture, tutorial and laboratory) mode. Two units were taught at the intermediate level (second or third year level) via a traditional coursework mode. One unit was taught at the senior level (fourth year) via a project-based learning mode.

Table 1: SFS questions and preliminary questions

SFS questions (6-point Likert scale) used in the study	Answer range
Q1. This unit is well organised	1 = strongly agree 2 = agree 3 = slightly agree 4 = slightly disagree 5 = disagree 6 = strongly disagree
Q2. I receive helpful feedback on the assessment in this unit	
Q3. Learning materials and resources for this unit meet my learning needs	
Q4. I have learned a lot in this unit	
Q5. I am given opportunities to apply my learning in this unit	
Q6. The assessment tasks in this unit assist my learning	
Q7. I find this unit difficult compared with other units in my program	
Q8. Overall, I am satisfied with this unit	
Preliminary questions seeking consent and SFS on-line status	**Answer range**
PQ1. Do you give your consent to participate in this study?	1 = yes 2 = no
PQ2. Have you completed the on-line SFS for this unit during the last few weeks?	

Following an email request to FEIS academics early in semester 1 of 2011, 6 unit conveners volunteered to have their units' SFS data used in the study. During a regular class in the last week of semester, all students attending class in each of the units were asked to respond to the 8 SFS questions during a short 15 minute survey. The survey was conducted under an approved university ethics protocol and the study was introduced to all students so they were in a position to give their informed consent to participation. The class teachers were not present during the introduction and survey phases of the study. Audience polling devices (ie clickers) were distributed at random to students and used to record their responses to the 'in-class' survey questions uniquely but anonymously. At the start of the survey, the students were asked two additional preliminary questions (see Table 1). One of these questions asked students to consider giving their consent to having their responses used in this study, and the other questions asked students whether they had already completed the on-line SFS prior to doing the 'in-class' survey. After these 2 preliminary questions, students then answered the 8 'official' SFS questions. Only the data from those students who gave their consent to participate were used in this study. For the 6 FEIS units compared in this study, a total of 148 students contributed to the SFS on-line surveys and 325 contributed to the equivalent in-class surveys.

The results for the 'in-class' surveys was compiled from the clicker responses, and the results for the on-line surveys were generated from official data from the university's Strategic Planning and Quality unit. All data have been de-identified as per the ethics protocol approved by the university.

Results and Discussion

The first part of this section describes the student response rates for the SFS for one unit of study both before and after the university's transition to an on-line survey format. Subsequent parts of the section explore the comparison (from various perspectives) of SFS results for 6 units of study for on-line surveys and for their equivalent 'in-class' surveys.

Decrease in student response rates for SFS

Figure 1 shows the *true* SFS student response rate (ie the number of students responding to the survey compared to the number of students who attempted the final or supplementary exams) over the last 11 years, for an introductory-level unit in FEIS with a large student cohort. The data are for the semester 2 cohort of students in this unit. Additional data from the semester 1 cohort of this unit (for 2010 and 2011) are also shown in Figure 1. The 2011 semester 1 cohort was the group (introductory-level 'unit C') that participated in the current SFS comparison study. As can be seen from Figure 1, there is a sudden drop-off in student response rate at the time the SFS transitioned from a paper-based 'in-class' survey to the on-line survey. The response rates shown in Figure 1 are typical for many other units in FEIS, and the on-line rates have remained at around 10% even with strong university and faculty promotions (including chances to win iPods etc.). The Swinburne experience suggests that expecting students to voluntarily go on-line to complete an L&T quality feedback survey for each of their units (normally 4 per semester) results in very low response rates. Unless there is some clear research evidence to support the premise that those students voluntarily responding to the on-line SFS are representative of the students that regularly attend classes, there will be little FEIS academic support for the results derived from the existing on-line SFS system.

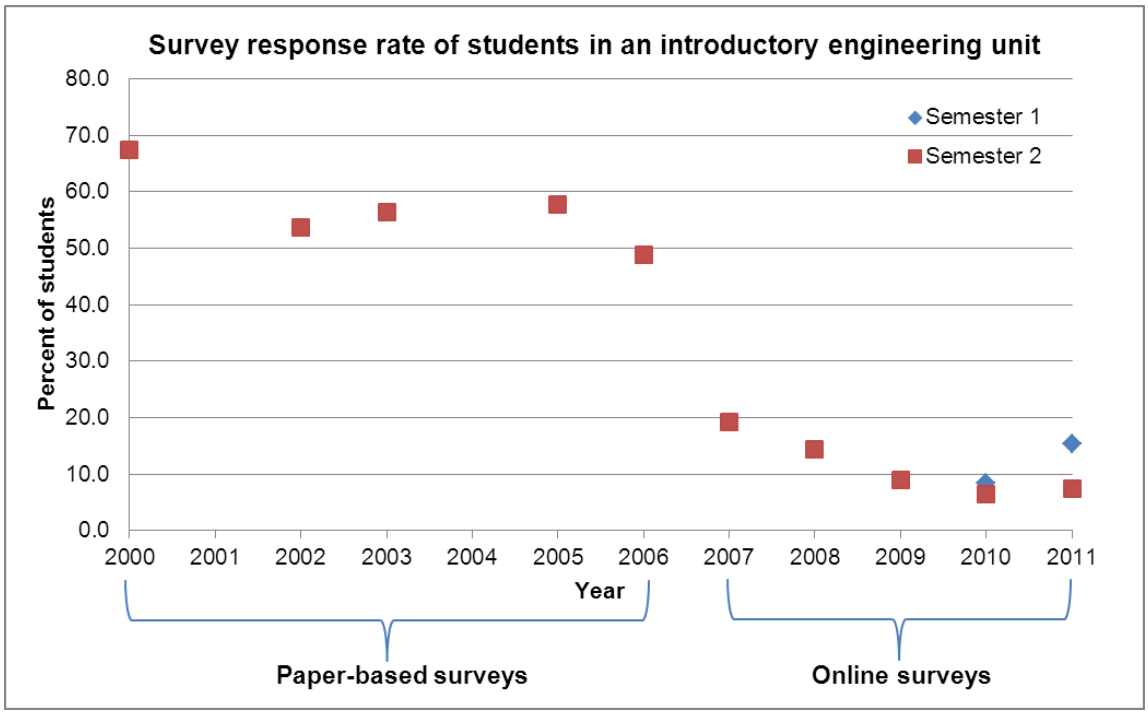

Figure 1: True student response rate for SFS as a function of time

Comparison of on-line and in-class aggregated results

Figure 2 shows the aggregated Likert-scale responses for the on-line official SFS and the equivalent 'in-class' clicker surveys for all students answering all 8 questions in all 6 FEIS units participating in this study. The data indicates that while both distributions are broadly peaked within the 'strongly agree' to 'agree' range, the shapes of the distributions are quite different for the 'in-class' and on-line surveys. For the on-line SFS, the distribution is shifted more towards the 'strongly agree' part of the spectrum when compared to the distribution for the 'in-class' surveys.

This result indicates that, at least in the 6 units participating in this study, students who responded to the on-line SFS on average reported a *more positive* learning experience than those who responded to the same survey questions in-class. This is at odds with many reported comparisons of on-line and 'in-class' survey modes in which *no* significant ratings differences were found (Avery, Bryant, Mathios, Kang, & Bell, 2006; Ballantyne, 2003; Dommeyer, Baum, & Hanna, 2002; Donovan, Mader, & J., 2006; Fike, Doyle, & Connelly, 2010; Thorpe, 2002).

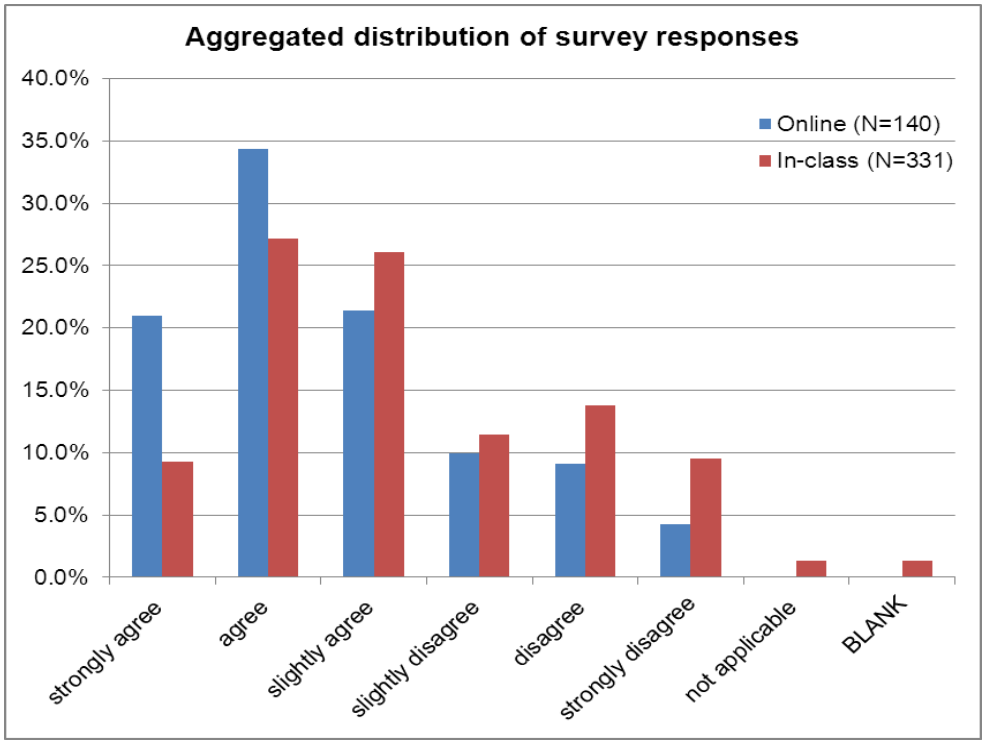

Figure 2: Aggregated data for all student and all questions for the on-line and in-class SFS

Another way to quantify how benevolently questions were answered by students participating in the two surveys is to compare the proportion of positive responses ('Strongly Agree' and 'Agree') to the negative responses ('Strongly Disagree' and 'Disagree'). The ratio of positive to negative responses can be used as a semi-quantitative measure of student benevolence in answering a particular question relating to their L&T experience. Note that the more neutral categories of 'Slightly Agree' and 'Slightly Disagree' are excluded from this analysis.

Figure 3 shows the ratio of positive responses to negative responses for the on-line and 'in-class' surveys for each of the 8 questions aggregated over all units. In all questions, students who responded on-line appeared to answer more benevolently than those who responded in-class. In 6 of the 8 questions, the ratio of positive responses to negative responses was more than doubled for the on-line survey compared to the 'in-class' survey, and in the other two

questions (Q3 & Q7) it was still considerably higher. These results indicate that the SFS student responses via on-line surveys do *not* correlate well with their equivalent 'in-class' surveys. Indeed students responding on-line appeared to answer the same survey questions about their learning experience much more benevolently than when they answered the same questions 'in-class'. This conclusion, at least in our small sample of 6 units in FEIS, seems very clear. From discussions with many FEIS academics, it would appear that this result, although clear, is counter-intuitive. Many academics believe that students who bother to go on-line to complete the SFS usually do so because they feel strongly about their L&T experience in the unit, and that usually these students wish to relate a negative experience. Some of the reasons why this study has indicated the opposite are discussed further in the 'Further reflections' section.

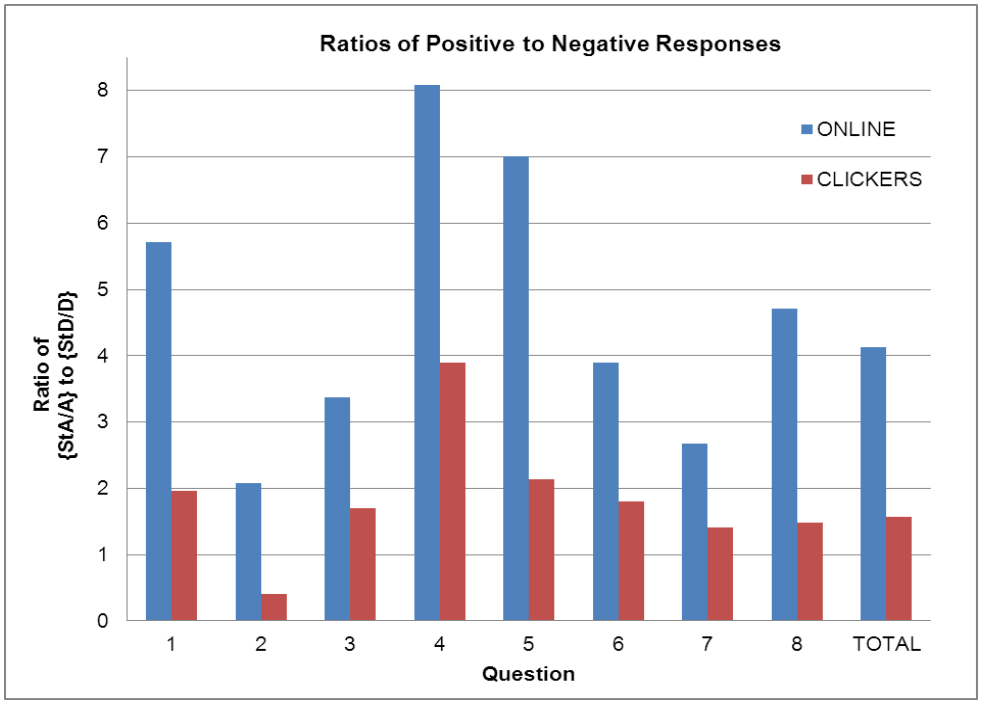

Figure 3: Ratio of positive to negative responses for each question aggregated over all units

It is interesting to note that Q2 received the lowest ratio of positive to negative responses regardless of the feedback survey medium. The statement students are responding to in this question is "I receive helpful feedback on the assessment in this unit". Clearly addressing students' negative perceptions to this statement should be a priority for the units in this study, and indeed many other units in FEIS, who consistently receive similar responses to this question. The second lowest ratio of positive to negative responses regardless of the feedback survey medium occurred with Q7. With this question, students are responding to the statement "I find this unit difficult compared with other units in my program". Although the university treats this question identically to the other ones that directly refer to the learning experience (ie that 'Agree' responses are desirable), there is a level of ambiguity in how this question can be interpreted. For example, a class on general relativity could justifiably be described as very difficult regardless of the quality of the instruction, good or bad. Without further information, the meaning of how a student responds on a Likert scale to this question cannot be necessarily interpreted as praising or criticising the quality of the instruction. But since the question *is* included in the university's statistical analysis of the on-line SFS, it has been included also in this SFS comparison study.

Comparison of on-line and in-class individual unit results

Figure 4 shows the ratio of positive to negative responses for the on-line and 'in-class' surveys for each unit aggregated over all of the 8 questions. Most of the units, with the exception of the intermediate-level 'unit D', showed the same trend: students responding on-line appeared to answer the same survey questions about their learning experience more benevolently than when they answered the same questions in-class. In three of the units, introductory-level 'unit B', 'unit C' and intermediate-level 'unit E', the difference between on-line and in-class results was quite pronounced. Intermediate-level 'unit D' was the only exception to the general trend of online responses being more benevolent than those from the 'in-class' survey. Interestingly in the on-line survey, this unit attracted the highest proportion of negative responses and by far the lowest proportion of positive responses, whereas the in-class clicker survey responses were slightly more positive.

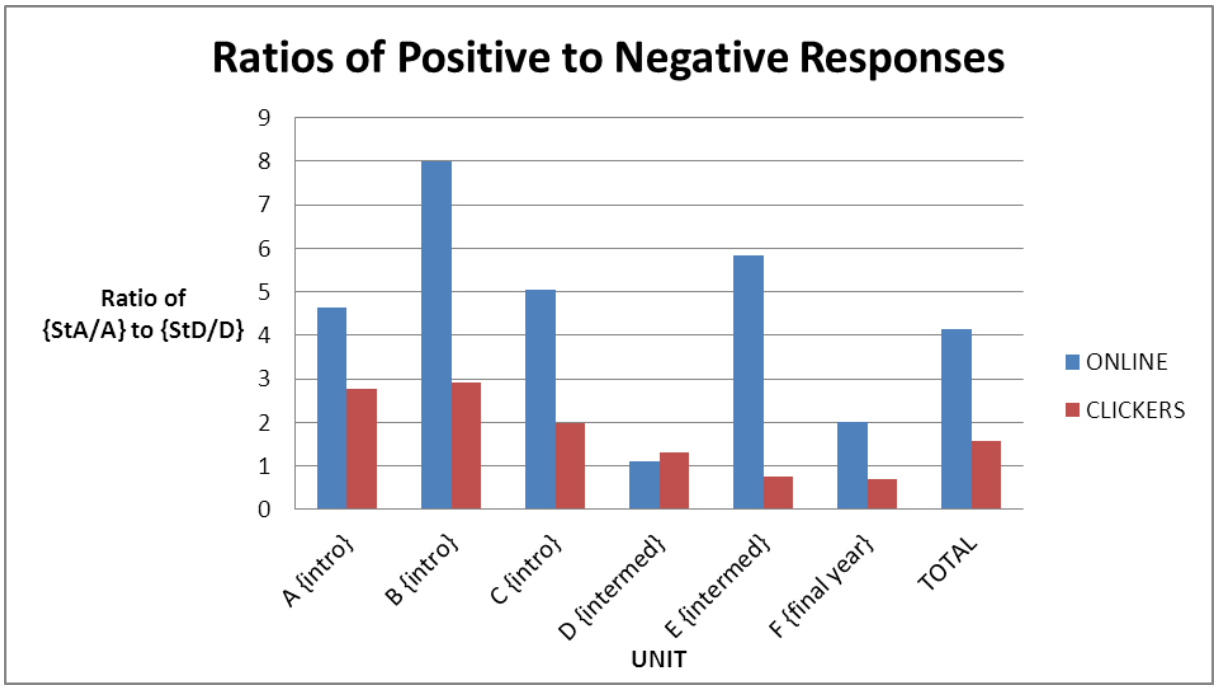

Figure 4: Ratio of positive to negative responses for each unit aggregated over all questions

Further reflections

From the results of this study, there are 4 important points that warrant further discussion.

(a) There is a possible self-selection bias in this data as only conveners who volunteered to have their units investigated in the research study have been considered. Perhaps these conveners were more confident that their students have been taught well and hence that the students who were sufficiently motivated to complete the survey on-line would report a strong positive experience. While the data from most units show a high ratio of positive to negative responses, there is one unit where this in not the case. Unit D had an approximately a one-to-one ratio between positive and negative comments, and also went against the trend with in-class responses being somewhat more favourable than those reported on-line. While the motivation for why unit conveners volunteered their units is unknown, it is apparent that there is a large range for the ratio of positive to negative student responses: from approximately 8 to 1 for the on-line survey, and from approximately 3 to 0.5 for the 'in-class' survey.

(b) There is also a possibility that the action of running the 'in-class' survey significantly affects the number of students who participate on-line. It could be that by holding the survey in class, the number of students who subsequently go online to complete the SFS is significantly reduced, thereby biasing the results. Figure 1 certainly seems to contradict this assertion, at least in the case of the 'Unit C' semester 1 group. In 2011, when this group participated in the comparison study, the true response rate for students completing the official on-line SFS was 15.4%. This response rate was approximately twice the response rate for the same unit (semester 2, 2011; semester 1, 2010; semester 2, 2010) but of similar groups of students who did *not* participate in the survey.

(c) In the in-class survey, students were asked if they had already completed the on-line survey. Table 2 shows a comparison of the ratio of positive to negative responses for all students who responded to the official SFS on-line (N=140) compared to students who reported in-class that they had already responded on-line (N=54). All official on-line responders are still more benevolent (by more than a factor of two) than the significant subset of in-class responders who reported also responding on-line. The population of students that respond on-line is seemingly different to the population of students in the lecture theatre that say they have responded on-line. A possible reason that could contribute to this somewhat unusual result is discussed in the next section.

Table 2: Ratio of positive to negative responses for on-line students and 'in-class' students who reported also responding on-line

Responder type	StA/A	StD/D	Ratio
Online completers (N=140)	55.3%	13.4%	4.1
Reported online completers (N=54)	37.7%	20.8%	1.8

(d) Further analysis of the data showed that more neutral responses (slightly agree or disagree) were more frequent in the 'in-class' survey responses (38%) compared to the on-line survey responses (31%). This can probably be explained by the satisficing phenomenon, where under time pressure survey respondents tend toward a middle ground (Krosnick, 1991). During the in-class surveys, a countdown timer was displayed on the screen for a few seconds before closing off each successive question to responses, and this time pressure may have motivated satisficing. Researchers (Ernst, 2006) have observed a similar phenomenon, in which in-class respondents had more neutral responses, even though the mean ratings showed no significant differences to the same questions answered on-line. What satisficing does not explain, however, is the disparity between the stronger positive and negative responses.

Conclusion

For the 6 FEIS units we surveyed, the on-line survey questions were consistently answered more positively than the same questions answered in class. This disparity, and the substantially reduced response rates of on-line compared to 'in-class' surveys, calls into question the validity and merit of the on-line survey as an instrument to accurately represent the feedback of students who attend 'in-class' sessions. Further research is needed to understand if this phenomenon also occurs with other units, lecturers, and disciplines, and why the bias is so consistently positive. In any case, the need to increase participation rates in Swinburne University's SFS has been acknowledged and FEIS is piloting a new SFS instrument that is embedded in the university's learning management system.

References

Avery, R. J., Bryant, W. K., Mathios, A., Kang, H., & Bell, D. (2006). Electronic Course Evaluations: Does an Online Delivery System Influence Student Evaluations? *The Journal of Economic Education, 37*(1), 21-37. doi: 10.3200/jece.37.1.21-37

Ballantyne, C. (2003). Online Evaluations of Teaching: An Examination of Current Practice and Considerations for the Future. *New Directions for Teaching and Learning, 2003*(96), 103-112.

Dommeyer, C. J., Baum, P., & Hanna, R. W. (2002). College Students' Attitudes Toward Methods of Collecting Teaching Evaluations: In-Class Versus On-Line. *Journal of Education for Business, 78*(1), 11-15. doi: 10.1080/08832320209599691

Donovan, J., Mader, C., & J., S. (2006). Constructive student feedback: Online vs. traditional course evaluations. *Journal of Interactive Online Learning, 5*(3), 283-296.

Dunegan, K. (2003). Characteristics of Mindless Teaching Evaluations and the Moderating Effects of Image Compatibility. *Journal of management education, 27*(3), 280-303.

Ernst, D. (2006). *Student evaluations: a comparison of online vs. paper data collection*. Paper presented at the Educause 2006, Dallas, TX.

Fike, D. S., Doyle, D. J., & Connelly, R. J. (2010). Online vs. paper evaluations of faculty: When less is just as good. *The Journal of Effective Teaching, 10*(2), 42-54.

Krosnick, J. A. (1991). Response Strategies for Coping with the Cognitive Demands of Attitude Measures in Surveys. *Applied Cognitive Psychology, 5*(3), 213-236.

Laubsch, P. (2006). Online and in-person evaluations: A literature review and exploratory comparison. *Journal of Online Learning and Teaching, 2*(2), 62-73.

Marsh, H. W., & Dunkin, M. J. (1992). Students' evaluations of university teaching: A multidimensional perspective. In J. C. Smart (Ed.), *Higher Education: Handbook of Theory and Research* (Vol. 8, pp. 143-233). New York: Agathon Press.

Naftulin, D. H., Ware, J. E., & Donnelly, F. A. (1973). Doctor Fox Lecture - Paradigm of Educational Seduction. *Journal of Medical Education, 48*(7), 630-635.

Remmers, H. H. (1928). The relationship between students' marks and students' attitudes toward instructors. *School and Society, 28*, 759-760.

Thorpe, S. W. (2002). *Online Student Evaluation of Instruction: An Investigation of Non-Response Bias*. Paper presented at the 42nd Annual Forum of the Association for Institutional Research, Toronto, Canada.

Wachtel, H. K. (1998). Student Evaluation of College Teaching Effectiveness: a brief review. *Assessment & Evaluation in Higher Education, 23*(2), 191-212. doi: 10.1080/0260293980230207

Copyright statement