TERISSA: 'Plug and Play' to Improve Assessment and Feedback

Iouri Belski
Royal Melbourne Institute of Technology, Melbourne, Australia
iouri.belski@rmit.edu.au

Abstract: The Task Evaluation and Reflection Instrument for Student Self-Assessment (TERISSA) offers a way to improve student satisfaction with feedback by engaging them in self-assessment and reflection. TERISSA is an easy-to-learn procedure which a student needs to follow while resolving problems, conducting project work, preparing assignments, etc. This study explores the outcomes of the TERISSA trial by RMIT educators conducted in the second semesters of 2007 and 2008. The study found TERISSA to be effective in engaging students in self-assessment and reflection. It has been discovered that a significant number of students applying TERISSA were able to generate valuable educational feedback on their own learning. Educators found that TERISSA can be 'plugged-and-played' into their courses effortlessly. It provided RMIT educators with valuable information on student knowledge during the semester and has also helped them achieve significant and sustainable improvements in student satisfaction with educational feedback.

Keywords – self-assessment, reflection, educational feedback, student satisfaction.

Introduction

The recent Report from the Department of Education, Science and Training (DEST) has shown that assessment and educational feedback is still a big challenge for educators (Scott, 2005). This finding has been supported by the data collected at the Royal Melbourne Institute of Technology (RMIT). The Course Experience Survey (CES), which has been conducted at RMIT on a compulsory basis every semester since early 2006, has identified that student satisfaction with assessment and educational feedback had always been the lowest among all the evaluated areas of teaching quality. Similar student opinions were reported for courses at the University of Melbourne (Søndergaard & Thomas, 2004).

Although it is usually anticipated that educational feedback needs to be provided to the students by their lecturers, it is well known that students can produce valid educational feedback both for themselves and for their peers (Heron, 1981). This can be achieved by engaging students in self-assessment and/or peer-assessment and has been demonstrated as a valid approach in engineering education (Boud & Holmes, 1981; O'Shea & Bigdan, 2008)). Well implemented self- and peer-assessment can notably improve educational feedback and simultaneously save significant time and effort of educators. While there are many effective practices of self- and peer-assessment to choose from (Hammond & Collins, 1991; Anderson, Boud & Sampson, 1994; Boud, 1995; Turns, 1997; Falchikov, 2005), implementation of these strategies in engineering classes is challenging. Usually engineering students consider reflective journals, learning essays and learning contracts as well as other activities that force them to generate educational feedback on their own learning and to reflect on it in writing as boring and worthless. Although such student attitudes to reflection may be attributed to the specifics of "the engineering mindset", they are not uncommon. Boud noticed that introduction of self-assessment often faces scepticism from both students and educators (Boud, 1995).

This paper discusses a novel approach to engage students in self-assessment and reflection – the Task Evaluation and Reflection Instrument for Student Self-Assessment (TERISSA) (Belski, 2007). It is an easy-to-learn procedure a student needs to follow while resolving problems, conducting project work, preparing assignments, etc. TERISSA can be added to an existing course without any course reconfiguration – simply as a 'plug-and-play' module. Hundreds of students have used it under the author's supervision from 2004 to 2007. This paper analyses the efficacy of TERISSA for other

educators. It presents the outcomes of the TERISSA trial undertaken by six educators that took place at RMIT in the second semesters of 2007 and 2008.

The TERISSA procedure

TERISSA provides a procedure for students to follow while resolving problems, conducting project work and preparing assignments. It requires students to conduct two evaluations of task complexity on a Likert scale from 1 to 5. These evaluations are undertaken when the task is first presented and after the task has been resolved. Students then reflect on each of these evaluations and on the reasons for any discrepancy between them. TERISSA also requires students to devise and plan the actions needed to improve learning outcomes. Once the use of TERISSA has been perfected, it normally requires around five minutes to conduct. The following is a general procedure for using TERISSA that a student is expected to follow while involved in active learning:

Step 1. (*To be conducted before you start work*)

Evaluate and record the complexity of the question, problem, assignment, etc. using the following scale: 1-very simple; 2-simple; 3-so-so; 4-difficult; 5-very difficult.

Give reasons (in writing) why you have not evaluated it as one level **less** difficult.

Step 2. (*To be conducted after the work has been concluded*)

Evaluate and record the complexity of the question, problem, assignment, etc. once again using the scale from Step 1.

Reflect (in writing) why you have not evaluated the question as one level **more** difficult this time.

Also reflect on the reasons for any discrepancy between the original (Step 1) and the final (Step 2) evaluation. Decide on the actions you need to undertake to become more confident with a similar task next time and write them down.

Over the past eight years, TERISSA has been successfully used in tutorial classes, home and class activities, individual and group exercises, various home assignments and practical laboratory work. Since 2004, hundreds of students enrolled in courses on electronic engineering coordinated by the author, have evaluated TERISSA as effective in providing them with valuable feedback on their learning. Student opinions as well as numerous student comments on TERISSA, presented in (Belski, 2007), clearly demonstrate that TERISSA works well in the author's hands. Would TERISSA be effective when used by other educators? In 2007, RMIT supported a trial of TERISSA by other RMIT educators with the Learning and Teaching Investment Fund (LTIF) Grant. The outcomes of this trial are analysed in this paper.

The TERISSA trial: 2007 and 2008

In semester 2 of 2007 (13 teaching weeks from July to November), six RMIT lecturers decided to trial TERISSA in their courses and joined the TERISSA Activity Group (TAG). As a result, over 500 RMIT students utilised TERISSA in semester 2 of 2007. TAG members were briefed on the TERISSA process and the outcomes achieved during 2004-2007 (Belski, 2007) a month before the semester. The TAG lecturers made their own decisions on the best way to deploy TERISSA in their courses.

Course 1 taught engineering design to first-year engineering students. Students enrolled in Course 1 used TERISSA in class assignments (summative assessment), during tutorials and while preparing their weekly homework (formative evaluation). Course 2 taught statistics to first-year health science students. These students used TERISSA in weekly home assignments (formative). Courses 3 and 4 belonged to the electrical engineering degree. Students enrolled in Course 3 (year 3) used TERISSA during weekly tutorials (formative). Course 4 combined postgraduates and undergraduates (year 4). They used TERISSA in four home assignments (summative). Course 5 was presented to postgraduate students enrolled in a degree in building and construction and deployed TERISSA in two home assignments (summative). Course 6 was a university-wide elective devoted to problem solving methods. In semester 2 of 2007 it included students from engineering and science, who were in the 2, 3 or 4 year of their degrees. Students used TERISSA in four home assignments (summative).

TERISSA use: tutorials

Students enrolled in Courses 1 and 3 followed the TERISSA procedure during weekly face-to-face tutorials under the supervision of TAG academics. Every time students were presented with a problem to resolve, they were asked to evaluate the complexity of the problem, as outlined in the general TERISSA procedure, and to record the complexity score together with their reflections on the reasons behind this score. In addition they were asked to raise their hands, indicating the complexity score they recorded, when a tutor named the appropriate score. One or two students were involved in counting hands of the 'voters', recording results and calculating the average complexity score for the problem. This average complexity score was recorded on a whiteboard.

After this first evaluation students were involved in resolving the problem. Once the problem was solved, they were asked to re-evaluate its complexity using the five-level scale and then to record the score and to indicate the new complexity score by raising their hand. After that students were asked to reflect in writing on the reasons behind this final evaluation and on the discrepancy between the final and the original scores. Usually final reflections were followed by a short discussion of the reasons for individual discrepancies and the actions students could undertake to improve their individual study outcomes. TAG lecturers initiated and actively participated in these discussions.

The TERISSA procedure had not been enforced as compulsory in tutorials. Nevertheless, TAG members, coordinating Courses 1 and 3, noticed that almost all the students were recording the complexity scores and indicating them to the rest of the class and to the tutor by raising their hands. Around two thirds of the students were also writing reflections on their evaluations in their notebooks.

TERISSA use: home and class assignments

In order to engage students in using TERISSA outside face-to-face activities, students were provided with the TERISSA pro-formas, which they could utilise while learning on their own. Various pro-formas – ready to use templates – were prepared by the lecturers involved in the trial (see www.terissa.com). TAG members simply adjusted the general TERISSA procedure to suit the needs of their individual courses. The pro-formas were deployed in all courses except Course 3. Its coordinator used TERISSA only in tutorials. Usually a pro-forma appeared on the first page of a home work/assignment paper.

Using TERISSA during class and in home assignments was not compulsory, and students who followed the TERISSA procedure were not obliged to return their scores and reflections with their completed assignments. Nevertheless, 40 to 60 per cent of them returned their assignments with complexity scores and reflections entered into the pro-formas. Course coordinators analyzed this data and shared individual student reflections and evaluations of task complexity with all students during lectures and tutorials. Usually these 'group reflections' occupied five to ten minutes of class time and really interested most of the students. Such 'group reflections' typically took place one to two weeks after the assignment's submission deadline, as soon as all assignments were graded and returned to students.

Outcomes of the TERISSA Trial

The efficacy of TERISSA has been evaluated in two ways: (1) by utilising student responses to the compulsory RMIT Course Experience Survey (CES), as well as (2) by analysing student answers to the TAG survey that was developed by the TAG lecturers. The TAG survey was conducted in all six courses of the TERISSA trial during the lecture classes in the last week of the semester. It was administered by the TAG project officer, who was employed to support TAG educators during the semester. The CES was conducted at the end of the semester by RMIT administrative officers. Both the TAG survey and the CES were paper-based.

Results of the TAG Survey

Students from all six courses evaluated TERISSA as helpful in providing them with valuable educational feedback. Table 1 depicts the overall opinion of all the students (205 respondents) enrolled in the six courses of the trial to three statements from this survey that are similar to the questions used by the author in the surveys from 2004-2007.

TABLE 1: Student Opinions of TERISSA after the trial in semester 2 of 2007

Question/Answer	Strongly Agree 5	4	3	2	Strongly Disagree 1
TERISSA provided me with immediate feedback on my knowledge of the course.	13%	42%	27%	16%	2%
TERISSA has helped me to identify the learning area which required my immediate consideration.	16%	48%	25%	9%	2%
I will continue using TERISSA while resolving problems.	9%	33%	31%	18%	9%

Sixty five percent of the students taught by the author, who used TERISSA in 2004-2007 (Belski, 2007) were positive on the immediacy of feedback they received deploying TERISSA. Fifty five percent of the participants of the TAG survey had the same opinion. Student opinions on TERISSA's ability of pinpointing their weak study areas scored even better: 68% of the students in the author's classes of 2004-2007 and 64% of students surveyed during the TERISSA trial had a positive response. The number of students planning to use TERISSA in their own study matched a little less – 53% from the author's classes were positive; and just over 42% of the students involved in the 2007 trial thought the same way.

The opinions depicted in Table 1 are further supported by student written responses. The following are some student answers (chosen from all the six courses involved in the trial) to the question presented to the students in the TAG survey "Which aspect of the TERISSA do you find the most helpful?": *"Identify the learning areas that I am not good at". "Analysing the problem and realising how far you have understood the subject". "It makes me understand the areas I need (to) study harder". "Which tasks are difficult and whether I need to review them to learn the concept". "Helped me understand areas I need help with". "Recognising the knowledge area I do not have expertise on; allowing me to observe what I need to accomplish". "Self evaluation and getting back the feedback". "Thinking about the problems and getting immediate feedback". "The immediate feedback allows me to focus on areas which I am having difficulty with". "Gives you an understanding of what other students are at". "Offers an indication of my progress in comparison to the rest of the class".*

These student statements compare well with student statements collected in the 2004-2007 surveys (Belski, 2007). Once again, this demonstrates that students who used TERISSA under different course supervisors thought alike – they all judged TERISSA as effective for self-generation of timely and valuable educational feedback.

TAG academics have also expressed positive opinions of TERISSA. Table 2 depicts their views (6 respondents), recorded by the TAG survey of academics. The data presented in Table 2 shows that educators judged TERISSA as easy to deploy and capable of providing them with valuable information on student learning during a semester.

TABLE 2: Staff Opinions on TERISSA after the trial in semester 2 of 2007

Question/Answer	Strongly Agree 5	4	3	2	Strongly Disagree 1
Using TERISSA in my course has taken significant amount of my time.	0%	0%	0%	83%	17%
It was difficult to convince students to use TERISSA.	0%	0%	0%	17%	83%
I would recommend TERISSA to other teaching staff.	83%	17%	0%	0%	0%
TERISSA helped me discover areas of student knowledge, which required my urgent attention.	67%	33%	0%	0%	0%

RMIT CES Results

All the courses involved in the TERISSA trial were of one semester duration and, for a number of years, have been conducted on an annual basis. Therefore, to ascertain the impact of TERISSA on student satisfaction with educational feedback, the results of the RMIT CES from three consecutive years were compared. In order to get a valid comparison of these CES results and to make meaningful judgment of the impact of TERISSA, the following three requirements were established for a course to satisfy to be included in this evaluation: (1) A course must be coordinated by the same academic in both 2006 and 2007; (2) TERISSA must not be in use in a course in 2006; (3) Minimal changes to the course have been made for the 2007 run. Only Courses 1 to 4 satisfied all of the above requirements. Although, significant improvements in student opinions on educational feedback were recorded in Courses 5 and 6 from 2006 to 2007, they were excluded from the formal comparison.

While responding to the CES, students had five choices to make for every statement (Likert scale from 1 to 5): they could choose only one response from 'strongly agree' (identified as '5' in the CES) to 'strongly disagree' (identified as '1'). RMIT Course Evaluation Surveys in both years were identical and consisted of 21 statements (questions). Only the following two of these 21 statements were closely related to educational feedback: (1) Question 5 (Q5): *The teaching staff normally give me helpful feedback on how I am going in this course;* (2) Question 20 (Q20): *The staff put a lot of time into commenting on my work.* Table 3 depicts the mean values of student responses to the above two statements received in the second semesters of 2006, 2007 and 2008 respectively for the four courses involved in the TERISSA trial that satisfied the abovementioned criteria.

TABLE 3: Changes in student opinions for Q5 and Q20 from 2006 to 2008

Course	Q5			Q20		
	2006	2007	2008	2006	2007	2008
Course 1	3.62	**4.02**	**3.51**	3.21	**3.62**	**3.10**
Course 2	3.97	4.27	4.52	3.51	**3.92**	4.14
Course 3	3.11	**3.81**	*3.07*	3.16	3.50	*2.88*
Course 4	3.30	**3.76**	3.83	3.21	**3.64**	3.87
College	3.26	3.37	3.48	3.07	3.17	3.26

The mean values shown in Table 3 in the bold font indicate that the difference in opinions of students enrolled in the course that year and the year before are statistically significant. To establish a reference point, Table 3 also displays the overall response of all the students enrolled in the degrees of the College of Science Engineering and Technology (SET), to which all four individual courses of Table 3 belonged. It is clear from Table 3, that the changes in student opinions for the statements related to educational feedback for the College of SET were small. All four courses utilising TERISSA in 2007 showed significantly bigger improvements in student satisfaction. Changes for both questions Q5 and Q20 for Courses 1 and 4, as well as Q5 for Course 3 and Q20 for Course 2 were statistically significant (the Mann-Whitney test). Such significant statistical differences imply that the students enrolled in these four courses in 2007 experienced different educational feedback to the students learning the same courses in 2006. As it has been stated already, coordinators of all four courses had used TERISSA as a 'plug-and-play' module. They did not implement other significant changes to their courses in 2007. Therefore, the application of TERISSA is likely to be the main reason for the notable increase in student satisfaction with educational feedback that occurred in 2007.

In order to judge the sustainability of improvements brought on by the application of TERISSA, Table 3 also presents student opinion for the same four courses in semester 2 of 2008. The TAG member, responsible for Course 1 decided to evaluate the impact of TERISSA on the improvements achieved in 2007 and did not use TERISSA in 2008. The TAG member, who coordinated Course 3 in 2006 and 2007 was assigned to take on different duties in 2008 and the new coordinator of Course 3 did not use

TERISSA. Coordinators of Course 2 and Course 4 continued using TERISSA in 2008 and further perfected its use.

The changes in student opinions from 2007 to 2008 presented in Table 3 undoubtedly support the impact of TERISSA achieved in 2007. Courses 2 and 4, which continued deploying TERISSA, showed further improvements, which were not statistically significant. At the same time, Courses 1 and 3 experienced statistically significant reduction in student satisfaction – actual values for 2008 dropped below the 2006 levels. Furthermore, Course 1 experienced statistically significant changes in student satisfaction with educational feedback under the same course coordinator twice: it went up in 2007, when TERISSA was added and then dropped to under the 2006 levels in 2008, when TERISSA was removed.

Conclusion

The results of the 2007 TERISSA trial have shown that TERISSA can be effectively used by educators from different disciplines in both formative and summative assessment. Moreover, student opinions recorded in 2008 have further supported its effectiveness and have shown that its use can result in sustainable and significant improvements in student satisfaction with educational feedback.

Educators, who trialled TERISSA in 2007 found it easy to 'plug-and-play' TERISSA into their courses. In addition, all TAG educators have agreed that TERISSA helped them in discovering areas of student knowledge which required urgent attention.

Acknowledgement

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