

The Development of Critical Thinking Skills in Undergraduate Supervisory Management Units: efficacy of student peer assessment

KAREN MACPHERSON, *Faculty of Communication, University of Canberra, Australia*

ABSTRACT *Well-developed critical thinking skills are essential to good management, yet the fundamentals of critical thinking are often not taught explicitly to management students. This paper reports on the efficacy of a module designed to develop students' critical thinking skills in the context of peer evaluation in a second-year supervisory management unit. The module comprised a lecture and a seminar on the nature of critical thinking, followed by a series of seminars in which students practiced the skills taught. Sixty-eight student oral literature reviews were delivered and evaluated over the first two semesters in 1997. Each presentation was graded by several small groups of students, with the assistance of a detailed marking guide. Results indicate that tuition in critical thinking strategies and skills may influence both peer/tutor grading agreement, and literature review content.*

Introduction

The challenge that has always faced management educators is how best to equip students to function optimally in their environment. In today's 'new era', with environmental complexity perhaps the only constant in any decision-making equation, the broad range of subjects students need to master necessitates more than ever the teaching of thinking strategies which can be used to make sense of them.

A perusal of recent management education literature supports this view; Professor Jerry Wind (1996) of the Wharton Business School, for example, stresses the need for business schools to focus on teaching critical thinking skills, to enable both effective evaluation of management literature, and to facilitate creative problem solving. McKenna and Williams (1997, p. 35) also argue for a paradigm shift in business education, commenting that "the goal of tertiary education should be to change students' inter-

pretations of their world by increasing their understanding of it". Critical thinking skills are central to such a goal. Further, critical thinking skills comprise an important element of the transferable 'management competencies' which are thought to be essential to effective management.

Critical thinking is often discussed in the context of problem solving, but needs to be clearly distinguished from the problem-solving process. Whereas the goal of critical thinking is to arrive at a judgement, problem solving is a process, which comprises many decision points at which judgements must be made. The effectiveness of this process hinges on the quality of the critical thinking strategies and skills which have been brought to bear on the issues pertaining to the problem. Beyer, for example, believes that critical thinking "begins with a previous claim, conclusion or product and considers the question, 'Of what truth or worth is it?' " (1987, p. 33). The ability to reach a sound judgement as to the significance of an idea or other information, whether it presents in the form of a new management technique, a business proposal, or a financial markets crisis, is fundamental to a manager's success, as sound judgement underpins decisions made in any problem-solving process, and the achievement of optimal problem-solving outcomes is arguably the central function of management.

In the context of higher education generally, Donald (1992, p. 428) observes that "if we are to promote thinking in our students, our teaching strategies must reflect that intention". In this paper, a teaching module designed for a second-year supervisory management unit at the University of Canberra, Australia, is described. The module was designed to develop students' critical thinking skills in the context of two key management applications: the analysis and evaluation of information; and the evaluation of the work of one's superiors, subordinates and peers. In order to increase the relevance of this material to students, reviews of current journal literature were used to develop information analysis skills, and group peer assessment of individual oral literature reviews was used to introduce coworker evaluation. In today's workplace, where teamwork is emphasised, the ability to assess the work of oneself and one's peers is essential (Brown & Knight, 1994; Oldfield & MacAlpine, 1995). Indeed, Boud (1986, in Somervell, 1993) suggests that peer assessment is the prelude to self-assessment.

Peer assessment is a method of evaluation that has received some attention in the academic literature over recent years, due in part to the paradigm shift in higher education toward student-centred learning, and a desire to improve student motivation through increased engagement in classwork and assessment tasks. Of course, the increasingly commercial imperative which drives universities to seek maximum student throughput per academic hour is another consideration, and it has been suggested (Kelmar, 1993), that peer assessment can produce significant time savings in tutor marking. The literature also suggests that peer assessment can be reliable (Falchikov, 1995). Yet there would appear to be a general lack of interest on the part of lecturers to include peer evaluation in their assessment repertoire, based on a number of perceptions of the technique.

The first perception is that students cannot grade as effectively as academic staff, and that therefore grades awarded by students will not be reliable (Boud, 1989 in Stefani, 1994). Certainly, an untrained student could not be expected to grade work with the same expertise as an experienced lecturer.

Another perception is that students themselves do not trust a grade awarded by their peers. Of course, if peer assessment is used, mechanisms must be put in place to ensure accuracy; Freeman (1995), for example, reminds us of the importance of university certified results to the future of students. However, it is a straightforward matter to

ensure that students receive an appropriate grade by combining the benefits of student-centred learning (peer assessment), with a mark determined by the lecturer.

A third problem is the phenomenon of the central tendency of student scores (Freeman, 1995; Kelmar, 1993; Stefani, 1994). Students tend to mark peers' work within a narrower range of scores than do lecturers. Further, students tend to award slightly higher grades for their peers than do lecturers (Kelmar, 1993; Kuisma, 1995). All of these studies, however, concentrated on the use of peer assessment techniques over the short term.

The author believes that the key to addressing these issues is to teach critical thinking skills in general, and then to model the application of these skills to the analysis of journal literature, and to the evaluation of oral reviews of that literature. The aims of this approach are first, to make students aware of critical thinking as the process through which sense is made of knowledge; and second, to demonstrate the utility of the process in a familiar learning environment. The literature supports this approach. It has been suggested that if peer assessment were introduced in earlier subjects (i.e. allowing more practice), reliability of peer-awarded scores would improve (Freeman, 1995; Stefani, 1994). Other means by which reliability can be improved are to ensure that students are given detailed guidelines as to how to grade work (Oldfield & MacAlpine, 1995), and to explain the assessment criteria which need to be considered (Falchikov, 1995).

The Present Study

The purpose of the module designed for this study was to teach students critical thinking skills. The module addressed the problems with peer assessment identified in the literature in a number of ways. First, detailed information on the nature of thinking, and thinking strategies and skills, was provided in a lecture format. This material was supplemented by a seminar in which examples were worked through.

Second, the module was delivered in a year-long second-year supervisory management unit. This enabled data from first and second semesters to be compared, in order to address the question raised by Freeman (1995) as to whether earlier and longer practice with peer assessment would make it more reliable.

Third, students were provided with a detailed marking sheet which itemised the criteria relevant to a successful oral literature review. It was thought that these guidelines would focus students' attention on the content of the presentation, rather than on its entertainment value, and would encourage them to utilise extreme scores where appropriate.

Small groups were chosen as the appropriate level of aggregation for the peer marking for pedagogical reasons (the benefits of working in small groups have been amply documented). Moreover, feedback provided by third-year students in second semester 1996 (who had completed a peer assessment component) indicated that discussing grades with others made students more confident in their judgement. The tutor grade was the one actually awarded to the presenting student. The tutor grade was determined after taking into consideration the mean peer grade. This system addressed issues of student anxiety about expertise and fairness (in the case of student presenters) and fear of being too critical or too generous to peers (in the case of peer marking).

The research questions addressed in this study may be summarised as:

- (1) Does critical thinking instruction improve skills in analysis and evaluation? Assessment items used as measures for improvement included: peer-awarded grades for

oral literature reviews; performance in the oral literature reviews themselves; and performance in an essay, which necessitated substantial review of journal literature.

- (2) Is there a central tendency in peer-awarded grades?
- (3) Are peer-awarded grades reliable?
- (4) Does practice at peer assessment improve performance?
- (5) Does using peer assessment result in tutor time savings in marking?

Method

Sample

With regard to the impact of the critical thinking module on peer assessment, subjects comprised the full student cohort of 68 for a year-long second-year supervisory management unit. Five tutors taught in that unit; all contributed full data to the study.

With regard to the impact of the critical thinking module on oral and written literature reviews, subjects comprised an unmatched sample of students from that same second-year unit; 22 from the 1996 cohort, who did not receive the critical thinking module; and 31 from the 1997 cohort, who did receive the module.

Variables

Variables controlled in the study included the content of the unit in 1996 and 1997, which with the exception of the critical thinking module was substantially the same; and teaching staff. Five tutors, including the researcher, allocated grades to the 68 students on their oral literature reviews, thus reducing the possibility that any differences between student-awarded grades and tutor grades was a result of an individual tutor's marking style. Second, with regard to grades for the 1996 and 1997 comparison groups, all students were from the classes taught by the researcher; grading can therefore be assumed to be consistent across the two groups. It was not known at the time of marking the 1996 and 1997 essays that the data would be included in this study.

As the sample size for the peer assessment component of the study was quite large (68), for the purposes of statistical analysis intervening variables such as age, gender, intelligence, other subjects studied, and tutor were not likely to have influenced results substantially.

The researcher notes that the smaller, unmatched samples of 1996 and 1997 students from which data for the oral literature review and the essay was compiled necessitates the drawing of very tentative conclusions only about the relationship between critical thinking instruction and performance on these reviews.

Module: Lecture

In a 70-minute lecture, the relationship between cognitive operations, knowledge and attitudes was explained, and a taxonomy of the major cognitive operations (Beyer, 1987) was described. The taxonomy includes first, the 'thinking strategies' of problem solving, decision-making and conceptualising; second, 'critical thinking skills' such as distinguishing relevant from irrelevant, determining factual accuracy and identifying faulty logic; and third, 'micro thinking skills' such as recall, evaluation and reasoning.

Module: Tutorial

The following week, in small group tutorials (15 students), the major thinking strategies were reviewed. Critical thinking skills were modelled by the lecturer, who analysed a short research article with the students, going through the process step-by-step. These skills were then discussed in the context of applying them to evaluating reviews delivered by other students. A detailed comment/feedback grid was supplied to each student as a guide to the relevant criteria for evaluation of the reviews (logical structure; relevance and use of evidence; balanced reporting; reasonable conclusions etc.) and its use discussed.

Student Presentations

Tutorial groups met weekly in first and second semesters. Each tutorial had up to 15 students; each student presented one five-minute review of empirical literature during the course of the unit. Feedback grids were distributed to all students prior to each oral review, and students made notes on the presentation as it proceeded.

After the presentation, students were encouraged to provide oral feedback on the presentation. Finally, students formed small groups (of three or four students) and discussed for several minutes the grade which that group would award the presenter. The grade was recorded on a feedback sheet, and all feedback sheets for the group were then handed to the tutor. Names were included on all feedback sheets, as it was felt that in the workplace, managers need to take responsibility for their judgements, for example, in performance appraisal situations. It is also important to be able to formulate and deliver constructive criticism in an appropriate manner. Student identity, however, was revealed only to the tutor.

The tutor completed her own feedback sheet during the presentation. Before the next seminar, the tutor reviewed the peer-awarded grades and allocated her own grade (worth 10% of overall assessment for the unit) for the presentation. As the module was considered a learning experience for students, rather than an exercise in teaching how to award a grade as such, the peer-awarded grades were not formally combined with the tutor grade. The three or four group peer-awarded grades for each presentation were averaged, and that grade analysed for reliability.

Results

Results suggested that the teaching of thinking skills may have influenced student performance in both peer assessment tasks, and in oral and written literature reviews. On the peer assessment task, tutor/peer marking agreement increased with the number of presentations assessed. In the oral and written literature reviews, higher average grades were achieved by the student cohort which had received the critical thinking module (1997) than those achieved by students completing similar assessment tasks in the previous year (1996) who did not receive the module.

Critical Thinking and Peer Assessment

Table 1 sets out the mean peer mark, and the tutor mark, for each of the 68 student presentations in 1997. The mean peer mark was determined by averaging the peer-awarded grades given to each of the 68 presentations. Although tutors and students

TABLE 1. Second year 1997—comparison of mean group-determined peer marks, and tutor mark, for 68 student presentations

Month	Presenter no.	Mean peer mark	Tutor mark	Difference (P-L)	% equivalent	Month	Presenter no.	Mean peer mark	Tutor mark	Difference (P-L)	% equivalent
3	27	7.5	7	+0.5	+5	6	23	7.1	7.5	-0.4	-4
4	25	6.7	6.5	+0.2	+2	6	24	7.37	8	-0.625	-6.25
4	26	6.75	6	+0.75	+7.5	6	37	7.5	7.5	0	0
4	28	6.83	7	-0.166	-1.6	6	38	6.25	5	+1.25	+12.5
4	29	7	6.5	+0.5	+5	7	11	6.37	6	+0.37	+3.7
4	30	6.5	6.5	0	0	7	12	7.5	7	+0.5	+5
4	31	6.75	7.5	-0.75	-7.5	7	14	6.5	6	+0.5	+5
4	32	6.87	7	-0.125	-1.25	7	16	7.25	7	+0.25	+2.5
4	33	6.1	6	+0.1	+1	7	17	6.8	6.5	+0.3	+3
4	34	6.12	6	+12	+1.2	7	18	7.33	7	+0.33	+3.3
4	35	6.9	6	+9	+9	7	19	7.33	7	+0.33	+3.3
4	36	7	7	0	0	7	63	6.66	6.5	+0.16	+1.6
4	49	7.37	7.5	-0.125	-1.25	8	1	7.8	7.5	+0.3	+3
4	51	6.8	6	+0.8	+8	8	3	6.8	6.5	+0.3	+3
4	52	7.37	7	+0.37	+3.7	8	5	6.3	7	-0.6	-6
4	53	7.16	7.5	-0.33	-3.3	8	6	7.16	7.5	-0.3	-3
4	54	7.7	8	-0.3	-3.3	8	7	6.5	6.5	0	0
4	55	7.8	8	-0.2	-2	8	8	7.6	7.5	+0.1	+1
4	56	6.8	6.5	+0.3	+3	8	9	7.12	7	+0.12	+1.2
4	57	7	7	0	0	8	10	7.16	7.5	-0.33	-3.3
5	20	7.25	7	+0.25	+2.5	8	13	6.85	7	-0.16	-1.6
5	21	7.8	8	-0.2	-2	8	15	8.1	8	+0.1	+1
5	39	7	7	0	0	8	60	7.12	7.5	-0.37	-3.7
5	40	6.4	6.5	-0.1	-1	8	61	6.66	7	-0.33	-3.3
5	41	7	7.5	-0.5	-5	8	62	7.66	8.5	-0.83	-8.3
5	42	7.2	8	-0.8	-8	8	64	7.62	8	-0.37	-3.7
5	43	7.37	7	+0.37	+3.7	8	65	6.8	6.5	+0.3	+3
5	44	7.3	7.5	-0.2	-2	8	66	6.1	6.5	-0.4	-4
5	45	7.2	8	-0.8	-8	8	67	6.87	7.5	-0.62	-6.2
5	46	6.33	6	+0.33	+3.3	8	68	6.66	6.5	-0.16	-1.6
5	47	7.16	8	-0.833	-8.3	9	2	8.1	8.5	-0.4	-4
5	48	7.33	7.5	-0.166	-1.66	9	4	6.6	7	-0.3	-3
5	50	7	7	0	0	9	58	6.75	6	-0.25	-2.5
6	22	7.1	7	+0.1	+1	9	59	7.1	7	+0.1	+1

TABLE 2. Second year students 1997—frequency of grades given by tutors and peer groups

Grade	Tutor	%	Peer group	%
Pass	1	1.4	2	0.74
Pass +	9	13.2	20	7.49
Credit	12	17.64	63	23.5
Credit +	21	30.9	86	32.08
Distinction	14	20.6	64	23.88
Distinction +	9	13.23	29	10.86
High Distinction	2	2.94	4	1.49
Total	68	100	268*	100

Note: *268 grades awarded by peer groups assessing 68 presentations, averaging 4 peer groups per presentation.

allocated grades to the presentations, these grades were converted to marks to enable statistical analysis. The cut-off percentages allocated to the grades were: High Distinction: 85%; Distinction plus: 80%; Distinction: 75%; Credit plus: 70%; Credit: 65%; Pass plus: 60%; Pass: 50%; and Not Pass: 45%. In all, 268 peer-awarded grades were given for the 68 presentations, an average of four peer-awarded grades per presentation. The number of peer-awarded grades for each presentation sometimes differed due to student absences from class.

Table 2 indicates that as a percentage, tutors awarded extreme grades more frequently than did peer groups. Tutors awarded a Pass grade once (1.47%), and a High Distinction twice (2.94%), out of 68 presentations. Peer groups awarded a Pass on two of the 268 group grades (0.37%), and a High Distinction four times (1.49%). Looking at the 68 presentations as a whole, these results add weight to the literature (Freeman, 1995; Stefani, 1994), which suggests that a problem with student peer assessment is the central tendency of student scores.

However, an analysis of the tutor and peer marks between first semester presentations and second semester presentations suggested that the central tendency of student scores decreased over time. Data relating to the mean, standard deviation and variance for six different conditions are summarised in Table 3. Tutor marks in first and second semester, and overall, and peer marks for first and second semester, and overall, are recorded.

Levene's test for equality of variances was performed to compare tutor marks (first and second semester); peer marks (first and second semester); tutor and peer marks (first semester); and tutor and peer marks (second semester) to determine whether variances in each of these four cases were significant.

Results indicated that the only significant difference in variance was between tutor marks and peer marks in first semester ($F = 7.581$; $p = 0.007$). There was no significant difference in variance between tutor marks in first and second semester, between peer marks in first and second semester, or between tutor and peer marks in second semester. In other words, even though there was a significant difference in variance between tutor and peer marks in first semester, there was no significant difference between tutor and peer marks in second semester.

Further, Spearman's rank order correlation for tutor mark and peer marks was 0.7134 ($p = 0.000$) for first semester, and 0.7910 ($p = 0.000$) for second semester; which

TABLE 3. Second year students 1997—comparison of tutor mark with mean group-determined peer marks for 68 presentations

	Tutor mark/10 1st semester	Tutor mark/10 2nd semester	Tutor mark/10 overall	Mean peer mark/10 1st semester	Mean peer mark/10 2nd semester	Mean peer mark/10 overall
Mean	7.013	7.050	7.029	7.018	7.039	7.027
SD	0.740	0.661	0.701	0.428	0.517	0.466
Variance	0.547	0.437	0.492	0.183	0.267	0.217
Range	3	2.5	3.5	1.7	2	2
Minimum	5	6	5	6.1	6.1	6.1
Maximum	8	8.5	8.5	7.8	8.1	8.1
No. cases	38	30	68	38	30	68

indicated that student-awarded marks more closely approximated tutor-awarded marks over time.

In summary, correlation between student and tutor marks increased over time, a finding which is consistent with Freeman's suggestion (1995) that practice may improve peer assessment performance.

Critical Thinking and Literature Reviews

The impact (if any) that instruction in critical thinking had on student oral and written literature reviews was determined by comparing student performance on several assessment items over two years: 1996, in which students ($N = 22$) had not received the critical thinking module, and 1997, in which the module was taught ($N = 31$).

Grades for 1996 (no critical thinking instruction) and 1997 (critical thinking instruction) were compared for:

- (1) An oral literature review given by students (two per student in 1996, and one per student in 1997); and
- (2) A 2000 word essay, which required a review of current literature.

Effective analysis of journal literature was central to satisfactory achievement in the oral presentation. Analysis of journal literature had been discussed and modelled in the critical thinking module. The essay also required a substantial review of journal literature, but other elements were required; therefore essay grades were not solely a reflection of critical thinking ability.

Grades for 1996 and 1997 students for oral literature reviews (which comprised a five minute summary of a current empirical article) are summarised in Table 4.

The results suggested that performance in the oral presentation in 1997 (students had received the critical thinking module) was better than performance in the first presentation in 1996 (students had not received module). Results for the second presentation in 1996 (no module) were very similar to the results for the presentation in 1997 (with module). In all of these presentations, the modal grade was a Credit, but the distribution of scores was skewed towards a Pass grade for the first presentation in 1996; distribution for all literature review results was essentially normal.

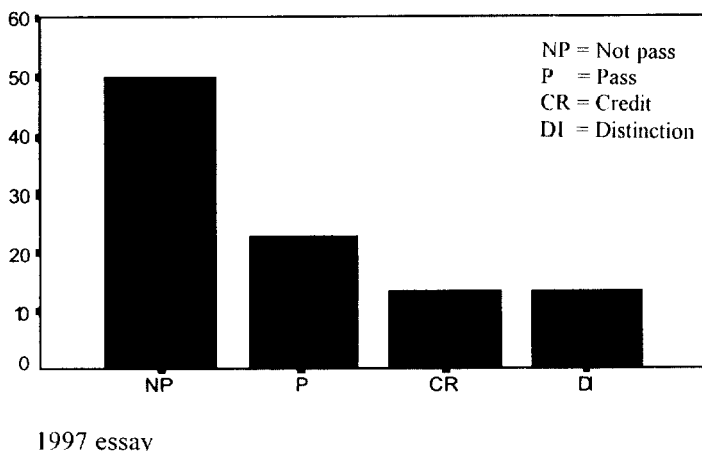
TABLE 4. Second year students—comparison of literature review grades: 1996 and 1997

	Oral Literature Review 1996 No. 1		Oral Literature Review 1996 No. 2		Oral Literature Review 1997	
	Count	%	Count	%	Count	%
NP	1	4.5	0	0	0	0
P	8	36.4	2	8.7	3	11.1
CR	10	45.5	15	65.2	16	59.3
DI	3	13.6	6	26.1	7	25.9
HD	0	0	0	1	3.7	
Total	22	100	23	100	27	100

A *t*-test for independent samples was performed to determine whether there were significant differences in performance on the three literature reviews. Results indicated that there was a significant difference between Literature Review 1, 1996 and Literature Review 2, 1996 ($t = -2.53$; 2-tailed significance = 0.16; $p = 0.003$); and between Literature Review 1, 1996 and the Literature Review in 1997 ($t = -2.59$; 2-tailed significance = 0.013; $p = 0.042$). There was no significant difference between Literature Review 2, 1996 and the Literature Review in 1997. These results may suggest that the critical thinking module assisted students to more quickly grasp what was expected of them in a literature review, as the analysis of journal literature was modelled in the module.

With regard to the essay assessment, Figure 1 shows the distribution of essay grades for 22 students in 1996. Approximately 50% of students failed this essay; no student received a High Distinction grade.

Figure 2 shows the distribution of essay grades for 31 students in 1997, which is quite different from the 1996 pattern. There is a 50% drop in the number of fail (Not Pass) grades from the previous year; the modal grade is a Credit, and 10% of students gained a High Distinction. As the samples were unmatched, and the distribution of grades did

FIG. 1. Second year 1996—distribution of grades for essay ($N = 22$) as a percentage.

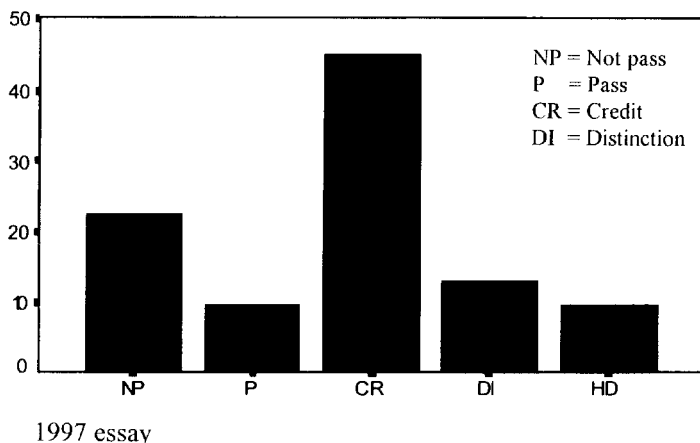


FIG. 2. Second year 1997—distribution of grades for essay ($N = 31$) as a percentage.

not follow the normal curve, a Mann-Whitney U test was used. Results indicated that there was a significant difference in performance on the essay between 1996 and 1997 ($z = -2.4624$; $p = 0.0138$). Of course, there may be other factors apart from the critical thinking module which explain this much improved result; for example, different student cohort (i.e. unmatched sample), small sample size, individual differences in student abilities, or even better grasp of topics.

With reference to the research questions posed earlier in this paper, results may be summarised as follows:

- (1) On the issue of central tendency of student scores identified in the literature, results suggested that variance in peer-awarded scores increases with practice; that is, central tendency decreases.
- (2) With regard to the reliability of student scores, results suggested that correlation between tutor mark and mean peer marks is quite good, and increases with practice. No evidence was suggested by this study to support the perception that students award higher marks than do tutors.
- (3) Results suggested that practice may improve peer assessment; central tendency decreased, and correlation with tutor grade increased, over first and second semesters.
- (4) As to the question of time savings in tutor marking, in this study time savings were made through the availability of a number of comparison grades and comments, which helped to reduce 'agonising' time with, for example, borderline Credit/Distinction grades.

It is possible that the decrease in central tendency of peer-awarded marks between first and second semester 1997 was the result of practice. This is also possible in the case of the increased correlation between tutor and peer marks over the same period. Even if practice was the only reason for the improvement, these results suggest that after one semester's practice in peer assessment, there is no significant difference between tutor marks and mean peer marks.

With regard to oral and written literature reviews, results suggested that, although

there was a significant difference between performance in the first and second oral literature reviews in 1996, and the first review in 1996 and the only review in 1997, there was no significant difference between the second 1996 review and the 1997 review. This finding could support a tentative conclusion that the critical thinking module may have assisted students to more quickly understand the requirements of literature analysis and review. This conclusion is further supported by the results on the essay comparisons: the 1997 essay results were better than the 1996 results.

Conclusions

Results from this study suggest that, although peer-determined grades do exhibit a central tendency, this central tendency may only occur in the short term, and may reduce with practice. In this study, by second semester there was no significant difference between tutor grade and mean peer-awarded grades, or in variance of tutor and peer grades.

Further, results suggest that critical thinking instruction may help to improve student grades in oral literature reviews, and in more complex essay format literature reviews. As different student cohorts were used for the comparison of 1996 and 1997 grades, conclusions as to the efficacy of the critical thinking module are very tentative. However, some observations can be made. There was a significant difference in grades between the first 1996 oral presentation and the second, and between the first 1996 oral presentation and the only 1997 presentation. However, there was no significant difference between the second 1996 presentation and the 1997 presentation, which could suggest that certain learning outcomes in a unit may be achievable in less class contact time when instruction in critical thinking is given to students, than in a unit without such instruction.

Finally, results suggested that tutor marking time can be somewhat reduced due to availability of a number of other comparison grades and comments which can help reduce tutor 'agonising' time with, for example, borderline Credit/Distinction grades.

It is possible that the teaching of critical thinking skills may be of use in developing the ability of students to perform assessment tasks based on evaluation and judgement; replication of these results, and further research in other supervisory management applications, would strengthen support for the approach outlined in this study.

Note on Contributor

KAREN MACPHERSON has been a lecturer in supervisory management with the Faculty of Communication at the University of Canberra, Australia, for four years, and a tutor with that Faculty since 1992. She holds a Bachelor of Education from the University of Sydney, and is currently completing her PhD thesis on learning theory and information retrieval. The module described in the current paper was developed pursuant to a University of Canberra teaching grant awarded in 1996 to K. Macpherson and C. Pascoe of the Faculty of Communication. *Correspondence:* Karen Macpherson, Division of Communication & Education, University of Canberra, ACT 2601, Australia. Email: kjm@comserver.canberra.edu.au; Fax: +61 26 201 2649; Tel: +61 26 201 2925.

REFERENCES

- BEYER, B. K. (1987) *Practical Strategies for the Teaching of Thinking* (USA, Allyn and Bacon).
- BOUD, D. J. (1986) Implementing student self-assessment, Sydney. (Higher Education Research & Development Society of Australia).
- BOUD, D. J. (1989) The role of self-assessment in student grading. *Assessment & Evaluation in Higher Education*, **14**(1), pp. 20–30.
- BROWN, S. & KNIGHT, P. (1994) *Assessing Learners in Higher Education* (London, Kogan Page).
- DONALD, J. G. (1992) The development of thinking processes in postsecondary education: application of a working model, *Higher Education*, **24**, pp. 413–430.
- FALCHIKOV, N. (1995) Peer feedback marking: developing peer assessment, *Innovations in Education & Training International*, **32**(2), pp. 175–187.
- FREEMAN, M. (1995) Peer assessment by groups of group work, *Assessment & Evaluation in Higher Education*, **20**(3), pp. 289–299.
- KELMAR, J. H. (1993) Peer assessment in graduate management education. *International Journal of Educational Management*, **7**(2), pp. 4–7.
- KUISMA, R. (1995) Criteria referenced marking of written assignments *Research & Development in Higher Education*, **18**, pp. 452–457.
- MCKENNA, R. J. & WILLIAMS, M. C. (1997) Paradigms and approaches to learning—preparing for the third millennium, *Journal of the Australian and New Zealand Academy of Management*, **3**(1), pp. 30–50.
- OLDFIELD, K. A. & MACALPINE, J. M. K. (1995) Peer and self-assessment at tertiary level—an experiential report, *Assessment & Evaluation in Higher Education*, **20**(1), pp. 125–132.
- SOMERVELL, H. (1993) Issues in assessment, enterprise and higher education: the case for self-, peer and collaborative assessment, *Assessment & Evaluation in Higher Education*, **18**(3), pp. 221–233.
- STEFANI L. (1994) Peer, self a total assessment: relative reliabilities, *Studies in Higher Education*, **19**(1), pp. 69–75.
- WIND, J. (1996) interview by Jensen, M. reported in *Sales & Marketing Management*, **148**(3), pp. 12–15.