The significance of metacognitive assessment for university students' learning

Simone E. Volet & Peter D. Renshaw
Murdoch University

An on-going challenge for university educators is to ensure that there is a coherence between course goals and assessment procedures. Often explicitly stated course goals, such as developing critical understanding of theories are not reflected in the assessment procedures, where students are required simply to recall theoretical concepts and factual knowledge. In this paper we report an attempt to match the assessment procedures to the course goals and emphases, and to examine the effect of the assessment procedures on students' own goals, as well as on their cognitive and affective learning outcomes.

The chosen course was an educational psychology unit that emphasised metacognition and self-regulatory theories of learning. The assessment included a case study assignment where students reflected on themselves as learners in the course and examined their goals, study strategies, and anticipated learning outcomes in relation to personal, task-related and institutional constraints. It was expected that this form of assessment would induce students to move towards high level goals of critical understanding and integration of learning theories and formulation of their own theory of learning. It was also expected that this method of assessment, by enabling students to become aware of their own learning, would lead to more satisfying outcomes. Previous research (Lawrence & Volet, in press) has shown that success has a personalised meaning and that some students give more importance to fulfilling self-generated goals than to course goals and requirements.

Goals are viewed as particularly significant in the management of academic study for giving direction to the continuous interplay between the learner and task variables (Zimmerman, 1990; Schunk, 1989) and for providing criteria against which to assess ones own performance (Simons & Vermunt, 1986; McCombs, 1989). In a complex and on-going task such as a course of study, goals can go beyond students' tacit endorsement of course objectives, and express personal intentions that arise from students' perceptions of the situation as a whole (Volet & Lawrence, 1989). While in some instances students' goals are based on misconceptions of what a course requires (Volet & Lawrence, 1988), on other occasions students make deliberate decisions to pursue their own goals even if these clash with course goals (Dodds & Lawrence, 1983; Volet & Lawrence, 1989). Goals are not predetermined but constructed within the context of particular personal, institutional and situational constraints and opportunities, and they can be readjusted dynamically over time. Recent empirical research (Volet & Styles, in submission; Volet & Chalmers, in submission) has revealed that changes in goals are related to changes in students' perceptions of interest, relevance and self-competence. Goals affect students' willingness to invest energy in academic tasks, influence the depth of processing of the content of the materials and mediate the direct effect of entering knowledge.

In this study, goals (whether course goals or students' own goals) were conceptualised as a hierarchy which ranged from acquisition of factual knowledge about learning, to critical understanding of theoretical concepts and construction of a personal theory of learning (Marton & Saljö, 1984; Volet &
Chalmers, in submission). The five goals were, in ascending order: (1) Remember key features of theories of learning; (2) Acquire hints and procedures to make learning easier; (3) Understand what helps and hinders learning; (4) Critically assess theories of learning; and (5) Construct my own theory of learning. Using a pair preference procedure (Andrich, 1989) students' goals were quantified on a unidimensional scale, rather than placed into discrete categories as in previous research (Biggs, 1987; Marton, Hounsell & Entwistle, 1984). The scaling procedure enables fine grained changes in goals to be assessed and relationships of goals to other aspects of study to be measured.

The specific aim of the study was to examine the influence of the teaching and assessment procedures of the course on students' perceptions of the course goals and their personal goals, as well as on their appraisal of cognitive and affective outcomes of the course. In particular, we wanted to examine how students adapted to course emphases over the semester and the effect it had on their goals, course performance, and personal satisfaction.

Method

Subjects. Subjects were 72 students enrolled in an educational psychology course. They were DipEd students or were completing a three year undergraduate programme. The course was designed to provide trainee teachers with basic understanding of major learning theories, in particular metacognition and self-regulatory theories of learning.

Instruments

(a) Personal goals. Data in relation to the 5 goals were collected in the form of pair comparisons: each student had to consider each goal in relation to every other goal, and then indicate which of the two goals was their preferred personal goal for the educational psychology course. With 5 goals the number of pair comparisons was 10. Data were collected in the first and last weeks of the semester.

(b) Perceptions of course goals. The 5 items were the same as for personal goals, but this time students were asked to consider the items as course goals and to indicate which of the two statements represented most closely their perception of what the course emphasised. Information on perceptions of course goals were collected immediately after the data on personal goals on both occasions.

(c) Metacognitive assessment. The major assignment, based on Biggs 3P model (Biggs, 1987b), required students to write a case study of themselves as learners in the course, which would integrate abstract concepts and personal experience. They were told that the aims of the case study were (i) to give them the opportunity to engage in the type of metacognitive and self-regulatory processes presented in the course as necessary for effective management of learning; and (ii) to enable them to develop insight into the application of such approaches for teaching.

Data analysis.

(a) Goals and perceptions. Students' pair preferences among goals on both occasions were analysed using Andrich & Lyne's (1989) PAIRFOLD computer program for analysing unidimensional pairwise unfolding preferences. The program provided a location estimate on a scale for each person's personal goals and perceptions of course goals in Week 1 and Week 12. These estimates were
used as measures of student's personal goals and perceptions of goals on a particular occasion.

(b) Case study assignment. They were marked as part of the normal assessment procedures of the course. The assessors were blind to students' goals as indicated in the questionnaire. Marks were given for evidence that students had reflected on the interactive influence of personal, situational and institutional constraints on their study goals and strategies over the semester. Marks were not deducted if a student reported having adopted low level goals during the course or for resisting endorsing the course objectives. The important factor was that their assignment revealed an awareness of the circumstances that generated and sustained their approach to study whether it was course appropriate or not.

Results and Discussion

Relation of students' goals to their perceptions of course objectives at beginning and end. Students' endorsement of goals was not related to their perceptions of the course objectives either at the beginning or at the end of the course. The low positive correlation coefficients between goals and perceptions on each occasion (Week1, r=.10, and Week12, r=.14), reveal clear discrepancies between students' perceptions of the course emphases and what they personally wanted to get out of the course.

Stability and change in goals and perceptions over time. The low positive correlation coefficients between Week 1 and Week 12 personal goals (r=.19), and Week 1 and Week 12 perceptions of course goals (r=.23) show the instability of goals from the beginning to the end of the semester.

The analyses of changes in goals revealed a significant shift over time towards higher level perceptions of course goals from .224 to .590, t (71) =2.61 p<.01, as shown in Table 1. As a group, students realised across the semester that the course was designed to promote high level thinking about learning theories rather than simple recall of factual information.

Although indicating a similar upward move (.514 to .727), the overall shift for students' personal goals was not statistically significant, due to initial high level goals and to a particularly large standard deviation in Week 12. It can be noted that on both occasions students' personal goals were higher than their perceptions of course goals, which indicates that they were prepared to go beyond what they perceived as the course emphases.

| TABLE 1 |
| Changes in Perceptions of Course Goals and Personal Goals from Week 1 to 12 |

<table>
<thead>
<tr>
<th></th>
<th>Week One</th>
<th></th>
<th>Week Twelve</th>
<th></th>
<th>t-test</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERCEPTIONS</td>
<td>x s.d.</td>
<td>x s.d.</td>
<td>.224</td>
<td>.77</td>
<td>.590</td>
<td>1.10</td>
<td>2.61</td>
</tr>
<tr>
<td>GOALS</td>
<td>.514</td>
<td>.79</td>
<td>.727</td>
<td>1.72</td>
<td>1.02</td>
<td>.70</td>
<td>n.s</td>
</tr>
</tbody>
</table>

Relationship of two distinct patterns of goals to other aspects of study. Using location estimates of goals in Week 1 and Week 12, two groups of students with
distinct high versus low level personal goals were identified and compared. One group (n=11) comprised students with extremely high level goals throughout the whole semester and the other group (n=11) were students with low level goals on both occasions, including some who started with low level goals and ended up with even lower goals. The two groups were compared on their examination results and their case study marks. In addition to these performance measures, students' subjective appraisals of their perceived competence, interest and relevance were compared.

(a) Course results. The examination assessed students' recall of major concepts, understanding of basic theoretical principles and comparison of learning theories. This type of learning involves lower level goals, such as remembering and understanding of learning concepts. It was not expected that students would differ in their examination performance which the results in Table 2 confirmed.

The case study required a kind of reflection consistent with high level goals such as critical assessment and theory building. It was expected, therefore, that students with high level goals would demonstrate greater insight into the interactive factors that affected their learning. However, marks on the case study did not differ for the two groups. This suggests that even students with low level goals demonstrated awareness of the personal, situational, and institutional factors that influenced their learning. It suggests also that they trusted their instructors enough to report personal goals that did not agree with the course emphases, and that the assessors remained unbiased in marking the case study and did not simply assign high marks to students who endorsed course appropriate goals.

(b) Perceptions of course goals. There were no significant group (high vs. low), time (Wk1 vs Wk12), or group x time effects for the perception of course goals. Although the high personal goals group increased their perception of course goals (Wk1 = .292, Wk12 = .840), and were higher at both times than the low personal goals group (Wk = .052, Wk12 = -.032), large variations within groups were found at both times.

TABLE 2
Appraisals of Study & Course Results of Students with Higher vs Lower Level Goals

<table>
<thead>
<tr>
<th></th>
<th>HIGHER-LEVEL GOALS</th>
<th>LOWER-LEVEL GOALS</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraisals of Study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Competence</td>
<td>3.45</td>
<td>2.73</td>
<td>.01</td>
</tr>
<tr>
<td>(b) Success</td>
<td>3.27</td>
<td>2.82</td>
<td>n.s</td>
</tr>
<tr>
<td>(c) Difficulty</td>
<td>3.00</td>
<td>4.09</td>
<td>.05</td>
</tr>
<tr>
<td>(d) Interest in Course</td>
<td>4.27</td>
<td>3.18</td>
<td>.05</td>
</tr>
<tr>
<td>(e) Relevant to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Interest</td>
<td>4.00</td>
<td>3.27</td>
<td>n.s.</td>
</tr>
<tr>
<td>(f) Relevant to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Training</td>
<td>4.18</td>
<td>3.18</td>
<td>.058</td>
</tr>
<tr>
<td>Course Results</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case Study</td>
<td>29.55</td>
<td>28.55</td>
<td>n.s.</td>
</tr>
<tr>
<td>Examination</td>
<td>41.41</td>
<td>39.50</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

900
(c) Appraisals of study. Students with high and low level goals differed in their subjective appraisals of study as revealed in the questionnaire ratings, and in their self-reports about learning in the course as revealed in the examination of the case studies. As shown in Table 2, students with the higher goals perceived themselves to be more competent and found the course less difficult than those with lower level goals. In addition, they found the course more interesting and somewhat more relevant to their teacher training.

These differences are illustrated by contrasting the self-reports of two students with distinct high- versus low-level personal goals for the course. As shown in Figure 1 (attached) a framework was employed that extracted five types of information: (1) students' assessment of their personal learning characteristics, (2) situation-specific constraints and opportunities, (3) general institutional and external influences and (4) personal goals at the beginning and end of the course and (5) reflective comments on their whole experience and their learning outcomes from the course. The main contrast between the students is in their attitude to the reflective case study, and in their final goals. The student with high level goals reported that the reflective case study helped her be more self-directed in her learning and less concerned with the external assessment - she suggested that even a C grade would be acceptable because she had achieved personal satisfaction from her own learning. In contrast, the student with low level goals seemed threatened by the case study since such self-reflection was foreign to her, and her goals declined over the course to the point where she was resigned to achieving a pass.

Conclusion

The study provides further evidence of the importance of goals in directing students' study. Goals were found to be changeable and dynamic over time, and were related to students' appraisals of their competence, and their perception that the course was relevant to their professional and personal interests.

Since the study involves only one group of students who all completed the reflective case study, it is not possible to affirm that the case study had a specific effect on students' goals and appraisals of the course. In a previous study involving economics students (Volet & Chalmers, in submission) goals were found to decline significantly across the semester. The present findings that students' goals remained high throughout the course, and that their perception of the course goals increased significantly, suggests that the assessment procedures, which were designed to achieve such an outcome, were indeed influential. Our initial detailed analyses of the case studies provide further support for the importance of the reflective assessment procedure in sustaining and instigating the pursuit of high level goals for some of the students. On the other hand, the case studies also suggest that some students continued to adopt low level goals, and felt uneasy about the requirement to be self-reflective. More direct coaching of these students may be required in the metacognitive processes of self reflection and self evaluation of study strategies.

References


FIGURE ONE
Comparison of Two Students - One with High-Level Goals and One with Low-Level Goals.

**SELF CHARACTERISTICS**
- Normally adopts an achieving approach and tries to obtain good grades which provides an ego boost.
- Successful previously by rote learning (a language major) but feels that the normal approach will not suit this course. Felt the lack of any psychology would be a problem.

**GENERAL EXTERNAL INFLUENCES**
- Many demands on time including 6 courses per semester, part-time job, busy social life as well as volunteer work.
- Felt compelled to do course - compulsory unit. Had family constraints and financial problems.

**SITUATION SPECIFIC INFLUENCES**
- The case-study assignment was a positive influence in moving from a preoccupation with good grades to a deeper form of learning.
- Found course not relevant and difficult. Found the case-study approach of reflecting on oneself foreign, and tutorials were unhelpful.

**INITIAL GOALS**
- Good grades
  - Good grades and prepared for deeper learning

**FINAL GOALS**
- Good grade plus deep learning. Relate the course content to a meaningful context.
- Good grade but rote learning required.

**FINAL REFLECTIONS**
- Clear distinction made between formal course evaluation and internal evaluation of personal learning. Still be satisfied even if a C grade obtained, since personal goals were achieved.
- Confused and disappointed in the course and resigned to achieving the minimum for a pass. Noted that a similar experience had occurred in a sociology course.