Changing assessment practices. Planning and evaluating the impact of innovations on students' experiences of assessment

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Introduction

Assessment is frequently the major focus of learning effort for university students. If designed and implemented wisely it can promote effective learning by influencing students' time spent on learning tasks (Gibbs and Simpson 2005), encourage deep approaches to learning (Prosser and Trigwell 1999), quality of engagement and learning outcomes (Biggs 2003).

Many students view assessment tasks as artificial hurdles to be cleared in their race to join their chosen profession. This view leads students to adopt superficial approaches to preparing for assessment and to neglect aspects of their study that they believe will not directly contribute to assessments (Prosser and Trigwell 1999). Unfortunately these poor experiences of assessment are common among science and professional students in traditional curricula (Ramsden 2003). Many professional programs have curricula over-packed with content and training for technical competency that are mandated by professional accreditation bodies. This leaves little room for innovative ways of learning and assessing as staff and students are preoccupied with drilling students to achieve lower order learning outcomes. The net effect is a curriculum of transmission and imitation rather than one of inquiry and problem solving (Brown, Rohlin and Manogue 2003) and consequently graduates are frequently ill prepared with key attributes for coping with the full range of challenges that await them on graduation.

One of the major challenges to assessment practices that have a constructive effect on learning is fragmentation of tasks, usually to the level of topic or teacher (to ensure assessment coverage). Atomistic approaches to assessment are convenient, transparent and common, however they prevent the use of authentic, more challenging tasks designed to test graduate attributes. They can have negative effects on student learning due to unforseen interactions in the timing of unrelated tasks. Avoiding these pressures, which were recently increased by semesterization and rationalization of units of study, requires a good understanding of student learning and a strategic view of the whole curriculum. The challenge here is ownership of the assessment process because setting and marking questions is often seen as a matter for individual academic judgement that receives little scrutiny at Faculty or Departmental level. Unfortunately the most important purpose of assessment which is to support deep and meaningful learning (Ramsden 2003) is often overlooked. Mutch (2002) argues that because assessment strategies are usually developed at the level of practice that it is essential to develop and implement strategies, procedures and practices that span the whole organization. These should include development of high level strategies that set targets for assessment to support learning, local procedures to implement those strategies and reinforcement of good practice at the level of units of study, supported by regular cycles of reflection and evaluation.

In contrast to staff views of assessment, students pay very close attention to the nature of assessment tasks and the learning that they are required to demonstrate. Strategic preparation for assessment tasks is one of the major ways that students learn (Gibbs and Simpson 2005) and therefore it has increasingly come to define the real curriculum, particularly for time-poor students. Therefore it is crucial to design and implement assessment tasks that will have a constructive effect on learning and ensure students achieve the graduate attributes for the course.

The Faculty of Veterinary Science (FVS) became aware of the adverse impact of poor assessment on student learning during implementation of our new curriculum which sought to better develop professional graduate attributes through student centred learning. Assessment was identified as a major obstacle to meaningful, lasting professional learning, particularly in the early years of the course. Faculty strategies to improve assessment combined constructive alignment of the curriculum, implementation of policies for good assessment practice, innovation in assessment methods, development of staff skills in assessment with systematic use of evidence and reflection to drive change in Faculty practices. These initiatives have led to lasting change in staff practices, faculty policies and procedures for managing assessment and produced sustained improvements in students' perceptions of assessment.

A strategic Faculty focus on the central role of assessment in learning

The introduction of a new curriculum with increased student numbers (up from 70 to 135 per year with the addition of local and international fee payers), employment of new staff, a Faculty restructure and strong leadership created opportunities for substantial shifts in teaching and assessment. Veterinary Graduate Attributes were developed in partnership with the profession (Collins and Taylor 2002) and we commenced constructive alignment of the curriculum ensuring every unit had well defined aims and learning outcomes that linked directly to the creation of these attributes. Major aims of the new curriculum were early introduction of clinically relevant material, progressive development of graduate attributes, reduced workload of time and content and increased student experience in professional placements. These changes were achieved through a series of writing groups and workshops of cross disciplinary groups to design learning outcomes, teaching and learning activities, assessment tasks and grading descriptors, led by the FVS Teaching and Learning Committee (TLC).

Students' perceptions of their learning collected in the Course Experience Questionnaire (CEQ) for graduates, the undergraduate Student Course Evaluation Questionnaire (SCEQ) and Unit of Study Evaluations (USE) identified heavy workload and assessment as major areas of student concern (Canfield and Taylor, 2005). A previous action research project found that veterinary students who perceived the workload to be excessive and believed assessment rewarded recall were more likely to adopt surface approaches to learning, with poor quality learning outcomes. This provided evidence that our students responded to their learning context in ways consistent with research from large student cohorts in the higher education literature (Prosser and Trigwell 1999). FVS staff were familiar with traditional forms of assessment, primarily examinations using objective instruments like multiple choice, true/false and short answer questions. These were considered reliable measures, time efficient for staff, fair and easy to defend. The softer aspects of preparation for professional practice were neglected and consequently important graduate attributes were not systematically assessed. Armed with a better understanding of our students' experience we focussed on improving Faculty-wide assessment practices to positively influence students' approaches to learning, to support the new curriculum. Since that time the TLC has monitored the nature, timing, focus and grading of assessment tasks to ensure they promote the acquisition and demonstration of high quality learning outcomes.

Development of Faculty strategies, policies and staff skills in assessment

In order to achieve a shift in teachers' approaches to assessment FVS developed a Blueprint for Assessment Change which ended the dominance of examinations and norm-referencing of results. Ambitious Teaching and Learning Plans were approved by Faculty, aimed at creating a culture change towards student-centred learning and assessment. Staff were trained in assessment theory and practice through two annual teaching development days and six initial workshops on aspects of assessment (with external expertise). These generated valuable discussion of new ideas and supported development of materials and systematic adoption of the FVS principles of good assessment.

Working in teams staff peer reviewed constructive alignment of learning and assessment tasks and developed grade descriptors using the SOLO taxonomy (Biggs 2003). The TLC has continued this program of staff development with workshops, small teaching development grants and a series of reviews of aspects of assessment, e.g. reducing the volume/time for many tasks to ensure compliance with FVS and University policies.

Development and implementation of innovative forms of integrated assessment
An action research project on integrated assessment arose in 2002 from our Faculty's struggle to provide meaningful assessment tasks that would develop a range of graduate attributes throughout the course. The aim was to stimulate students to learn in a deep and lasting way through authentic cross disciplinary problem solving tasks. While these may be in use elsewhere, the ideas arose from a traditional assessment culture that rewarded memorization and recall of facts and tolerated the fragmentation of curriculum into a mass of apparently unrelated components. Staff developed problem solving tasks that spanned topics within and across units of study to promote integration and application. Criteria were developed for the assessments (Table 1) which required integration of material from more than one unit of study, problem solving and application to situations or problems from real life. While authentic assessment is relatively easy to use in the clinical years, it is more difficult to use in junior years where the curriculum is compartmentalised into a series of discipline based basic science units that are taught and assessed independently. Staff changed from the prevailing assessment methods of fact-based examinations, multiple choice and true/false questions to tasks that rewarded integration and application, both in their design and their marking. The tasks used were a mixture of individual and group work, conducted during semester and in the end of semester examinationperiod and they addressed aspects of all graduate attributes (Table 2). They were designed to reward knowledge construction, so students needed to demonstrate their own individual understanding of the subject (Table 1) and to reduce emphasis on recall of fact. Each task was marked with SOLO-based criteria (Biggs 2003), describing what students would need to demonstrate to achieve each grade. Students commented on the value and clarity of these descriptors, and were surprised by the emphasis on demonstration of conceptual change, originality in application, rather than just fact-based answers.

Table 1. Criteria for integrated assessment tasks

- Authentic clinical, production or research context
- Developed specific graduate attributes
- Extended discipline content for participating units
- Application and problem solving with preclinical concepts
- Cross disciplinary integration and grading
- Staff collaboration on design and marking
- Graded using SOLO taxonomy
- Opportunities for creativity and personal understanding
- Timely, constructive feedback on learning
- Included evaluation and reflective cycle

During 2002 students and staff were prepared for the integrated assessment tasks. Each task contributed 10-25% of the mark in two units (Table 2). The tasks were implemented as follows:
- year 1, Semester 1, 3 out of 4 units,
- year 1, Semester 2, 3 out of 4 units,
- year 2, Semester 1, 3 out of 4 units,
- year 2, Semester 2, 2 out of 4 units (plus one unit that included an applied task within the unit).

Those units taught externally to the Faculty (service teaching in basic sciences) were unwilling or unable to participate. Students were prepared for the assessments with examples and advice on how to approach these unfamiliar problems. They were briefed on the expectations for integrated tasks, the distribution of assessment weighting to the participating units and the SOLO taxonomy used for grading. Students were invited to consider the implications of their learning approaches, through a self scored Biggs Study Process questionnaire followed by a class discussion of the implications for learning quality.

As an example in Cell Biology 1B groups of five students prepared and presented a recent research paper on stem cells (published in last two years) in semester 2 of year 1 of their BVSc. The task was designed to develop graduate attributes in research and inquiry as the student groups explained key aspects of their selected paper in 10 minutes and made a convincing argument for the potential applications of the research, along with the ethical dilemmas, to their peers, in an informative and interesting way. Students were prepared for the communication and negotiation required to successfully form and perform in groups through small group activities in Professional Practice 1B, while stem cell biology and applications were discussed in one Cell Biology 1B lecture. Students participated in structured group-forming exercises and had two hours of small group (20 students) preparation time along with online assistance in interpreting their research papers. 10% of their assessment in Professional Practice 1B was based on their level of communication and effective group work, aspects that were peer and staff assessed using negotiated criteria in a SOLO taxonomy. 10% of their assessment in Cell Biology 1B was based on the quality of their analysis and explanation of the research and its broader implications. Students received immediate and written feedback from staff and peers. They completed an evaluation of the task and its impact on their learning and many students commented on their development of generic skills and enjoyment of the group interaction.

Table 2. Integrated assessment tasks developed graduate attributes in the early curriculum

Year, semester	Units of study	Assessment task and topic	Graduate attributes developed	Used in 2005/6*
Year 1 Sem 1	Animal Husbandry 1A and Cell Biology 1A	Essay on obesity in dogs, energy metabolism and the implications for feeding practices	Research and inquiry and scientific writing	Yes
Year 1 Sem 1	Professional Practice 1A and Veterinary Anatomy and Physiology 1A	Clinical data collection and report on relationship between body weight, temperature, respiratory and heart rate, and links to breed, nutrition and age	Scientific inquiry, professional communication and clinical skills	No#
Year 1 Sem 2	Cell Biology 1B and Veterinary Anatomy and Physiology 1B	Critical review of research in endocrinology or genetic disorders in dogs	Critical analysis, information literacy and scientific writing	Yes
Year 1 Sem 2	Cell Biology 1B and Professional Practice 1B	Group presentation of research papers on stem cells or inherited disease, discussion of ethical issues and peer review	Team work, research, communication, ethical behaviour	Yes
Year 2 Sem 1	Animal Digestion and Nutrition and Veterinary Anatomy and Physiology 2A	Combined essay question in examination on problem solving in neural control of salivation, swallowing and vomiting	Problem solving and application of concepts	Yes
Year 2 Sem 1	Veterinary Anatomy and Physiology 2A and Professional Practice 2	Investigation and presentation of authentic problems in neural control and problem solving	Inquiry, communication and problem solving	Yes
Year 2 Sem 2	Veterinary Anatomy and Physiology 2B and Professional Practice 2	Poster presentation working in groups on reproduction research and its applications	Team work, communication, research and inquiry	Yes

*Similar tasks continuing within 1 units of study in 2005/6
#One unit of study has been substantially revised so this task is no longer appropriate

This example and other integrated assessment projects formed part of a wider Faculty wide push to improve and enhance our assessment design, practice, marking, feedback and reflection on practice to better support student centred learning. A major development of this project has been increased use of case-based tasks for learning (often conducted in groups) and assessment which extend these graduate attributes.

Systematic use of evidence and reflection to improve and sustain good practice
The cooperation and reflection of staff implementing integrated tasks generated considerable discussion, interest and some totally new approaches to assessment. It helped to bring the focus of assessment back from emphasis on content, to deep learning and progressive assessment of graduate outcomes. The integrated assessment tasks have been adapted to a wide variety of formats (including exam, project, presentation, clinical investigation and poster). Most tasks are still used (Table 2) but are embedded in one unit (for administrative simplicity as unit cohorts do not fully overlap) and so they continue to draw on staff expertise to reinforce integration.

Students' experiences of assessment were evaluated using an aligned series of closed questionnaires, focus groups and open response items. These included the unit of study evaluation (USE), student course experience questionnaire by year of enrolment (SCEQ) and course experience questionnaire (CEQ). They were mandatory for all units of study and the results were reported and reflected upon in TLC and FVS meetings. Their impact is reported elsewhere (Barrie, Ginns and Prosser 2005).

Integrated assessments had a constructive effect on student learning, rewarded transformation over accumulation of facts, provided effective grading tools that were comparable to other assessments in the same units but required more staff effort to manage well. Many students reported improved perceptions of assessment and adopted active, deep approaches to constructing their own learning for these problem solving tasks in an open response questionnaire. There was concern about changing approaches to learning for assessments as students felt they had been rewarded for memorisation and recall during their prior education. These findings indicated that much broader, curriculum wide change in assessment approach is vital to persuade students to adopt a deep, meaningful orientation to learning, mainly because students' perceptions of learning context can be difficult to modify. Year 2 student, *'The integrated learning approach is one of the best aspects (of the course). Relating what we are learning in the lecture theatre to real life situations and understanding how one subject integrates with the others is really important and makes the degree more interesting'*.

Student interest and approaches to learning
Second year students completed individual open questionnaires on the impact of 4 different integrated assessments on their learning over 2 semesters. 93 % agreed or strongly agreed that integrated tasks promoted learning more effectively than traditional assessments. They commented on the positive effects of specific tasks on their motivation and enjoyment of learning, *'Good as it was clinically relevant and brought together material in a practical way'* and *'Made me think about things in a whole context instead of separately and increased my understanding of many factors'*. There were some difficulties in the novelty of the tasks, which were seen initially to be more daunting, and require more student effort to successfully integrate different topics *'They are more inspiring but also a bit more challenging and intimidating'*.

Table 3. Second year students' preferences for integrated tasks

Assessment task and topic (from Table 2)	Best task*	Reasons for preferences (quotes from open responses)
Combined essay in exam, problem solving in neural control of salivation, swallowing etc.	8%	*"Interesting to understand mechanisms rather than simple detail, makes it more applicable"*
Team investigation and presentation of authentic problems in neural control and peer review	39%	*"Helped to see relevance through application to clinical situations"*
Poster presentation working in groups on reproduction research and its applications	20%	*"Fun and you really have to learn it so you can explain it to the rest of the group"*
Clinical problem solving essay in equine anatomy (located within one unit of study only)	20%	*"There was something definite to find/work out and greater satisfaction on completion"*
All integrated tasks assisted learning	7%	*"Because there was no single source that told you the answer, we needed to find info from many sources and make the relevant connections ourselves from thinking about it"*
No preference indicated	6%	*"A haphazard regime of cramming and rote learning is rendered inferior with these assessments"*

*Students' selection of tasks which best supported learning in year 2

Improved unit and course evaluations of integration, relevance and assessment
Faculty USE, CEQ (data not shown) and SCEQ results for appropriate assessment improved from 2002 outstripping the University trend of improvement, except for workload (Table 4).

Table 4. FVS undergraduate student course experience questionnaire (% agreement)

	1999	2000	2001	2002	2003	2005
Good Teaching Scale	48	44	41	50	55	54§
Clear Goals and Standards	54	48	44	41	50	46§
Appropriate Assessment	33	33	33	41	42	46
Appropriate Workload	14	17	17	13	13	16
Generic Skills	60	62	60	61	66	67§
Learning Community#	-	-	61	61	63	63§
Overall Satisfaction	80	74	79	78	80	85*

Learning Community first recorded in 2001 * Highest and § second highest in University

Conclusions

Integrated assessments formed a small, but successful trial of different forms of assessment undertaken during curriculum renewal which had a positive impact on students in preclinical years of a professional curriculum. Their implementation was supported by a substantial change in Faculty views of the role of assessment in learning. FVS recognized the damaging effects of traditional examinationbased assessments on student learning. The Faculty's TLC systematically worked to reverse these problems, focussing on changing academics' practices through development in assessment theory and practice and on implementing ambitious teaching and learning plans based on our own Assessment Blueprint. Staff received training and peer support in designing constructively aligned assessments and the TLC ensured implementation of policies for good assessment practice. At the same time creativity and innovation in assessment methods were encouraged with small teaching development funding and the TLC commenced systematic use of evidence and reflection to drive change in Faculty assessment methods. These initiatives have led to lasting change in staff practices, faculty policies and procedures for managing assessment and produced sustained improvements in students' perceptions of assessment.

analysed by the Institute for Teaching and Learning. The project was supported by a University of Sydney small teaching improvement grant in 2002. An initial, partial report on this project was presented by Taylor, R, Collier, M and Sheehy, P (2005) *Integrated assessments: Do they improve students' perceptions and approaches to learning in a professional course?* at the 2005 Evaluations and assessment conference, University of Technology, Sydney.

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