Student assignment workload: students' perceptions compared to lecturers' expectations

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***Abstract**: As part of an undergraduate engineering program review, a study was carried out in a school of engineering to determine if there was alignment between course designers' and students' estimations of time taken to complete assignments. A questionnaire was administered at the time of hand-in of assignments. These assignments were components of several undergraduate engineering degree programs across all undergraduate years. The students' reported estimations of time to complete assignments were compared to the lecturers' allocated time. Results indicated that course designers underestimate the time taken by students to complete assignments. Methodological issues affecting an objective measurement of time are discussed with reference to the results obtained. Recommendations are made for further investigation into this area of student assessment and course design.*

Introduction

According to Gibbs (1992) assessment is the most powerful lever teachers have to influence student learning outcomes. One of the most difficult problems that beset a university lecturer is to design a course of study that includes the conventional lecture format with a time allocation for student reading, study and assessment. Most universities provide their staff with guidelines on the total number of hours per unit of accreditation. The present study was undertaken at the University of New South Wales (UNSW) at the Australian Defence Force Academy (ADFA) in order to determine how well lecturers' estimation of time taken to accomplish an assessment task matched the time estimated by the student.

UNSW has established a College at the Australian Defence Force Academy (ADFA) that offers both undergraduate and post-graduate programs. The Academy is located in Canberra and is unusual in that it is a unit established to provide both military and academic programs simultaneously to midshipmen and officer cadets in the Australian Defence Force (ADF). Most of the undergraduate students are in residence at the Academy. (It should be noted that post-graduate programs, not the subject of this study, are offered to civilian as well as military students.)

The present study was prompted by reviews, both external from Engineers Australia and internal, of the School of Aerospace, Civil and Mechanical Engineering (ACME) (now merged into the School of Engineering and Information, SEIT). One of the issues under scrutiny was whether the number of courses offered per session was too great. With a total of 24 Units of Credit UoC) comprising a standard semester program, many ACME courses were at 3 UoC, so that the number of courses per semester ranged from five to eight. At the same time the School was in the process of revising its programs, one criterion being to standardise courses to 6 UoC. The question of the time taken by students to complete multiple assessments in the more fragmented programs was part of the rationale for this program review. The present study has been carried out using the courses that constituted the

several engineering and technology programs of the former School of ACME. It must be stressed that this paper describes the first stage of what will eventually become a longitudinal study into the question of the time allocated to student assessment once all courses have become 6 UoC.

According to Rowntree (1987), assessment may include a range encompassing essays, reports, oral assessment tasks, reflective writings, exams, tests, architectural drawings and more. An assignment may be included as part of the assessment of the student. In a course, assignments count towards the final aggregate of marks. Students are assessed during the course of their program for a number of reasons. Rowntree (1987) maintains that the purpose of assessment is to provide feedback, grade or rank the student's performance, provide motivation to the student, highlight the student's strengths and weaknesses and provide a measure of student attainment to other institutions.

There have been concerns expressed by both university administrators and students that students are being over-assessed. These concerns have found voice at numerous ACME student-staff liaison meetings. The issue, is of course, not new and the second author can recall as a student some 35 years ago sitting in a liaison committee meeting discussing the same topic. In support of these student concerns, Kember, Jamieson, Pomfret & Wong (1995) report conjecture and evidence to the effect that engineering courses are 'over full' and consequently students experience difficulty in coping with the resultant workload, (p329). One of the main problems in over-assessment is that students are forced to become strategic learners. One strategy is to become a 'surface learner' as defined by Marton & Saljo (1976, cited in Biggs, 1999). These so-called 'surface learners' are in marked contrast to the 'deep learners' who according to Biggs (1999) exhibit a high level of engagement of course material and reflects on the personal significance of what the student is learning. It is often a reason cited by students when caught plagiarising.

Course co-ordinators and lecturers in higher education have traditionally been responsible for designing the courses to ensure that the students meet an expected criteria. Their role is that of subject expert. In planning a course they are required to estimate how much time an 'average' student would be expected to take to complete assignments, prepare for exams or tests, read set texts and do follow-up reading after lectures or tutorials (Armstrong & Conrad, 1995). This time is difficult to estimate as students have different sets of skills emanating from their prior knowledge, experience and background.

Most studies concerned with assessment have been with students' perceptions of workload which does not necessarily equate to an objective measure of number of hours worked. It is difficult to determine an accurate measure of the time spent in assignments as there are many extraneous factors. Vos (1991, cited in Lockwood 1995) found that students adjust the time of different components to fit the time that they were prepared to commit to the course. This notion is supported by Gibbs (1992) who maintains that 'students become more strategic in allocating their allocating their out-of-class time to what counts: to what is assessed', (p. 42).

Lawless (2000) found that time taken on tasks was strongly related to the students' approach to study. He identified two approaches: one where students had the main aim to learn the subject and the other where students' main aim was to pass the assignment and accordingly, the course. The latter condition lends support to the notion that excessive time allocated to assessment may produce a surface learner.

Studies have shown (Chambers 1992, Kember 2004) that a reasonable estimate of the number of hours an undergraduate student spends per week is 40 hours. This includes both contact hours and time spent in private study and assessment. Chambers argues (1992) that based on this objective measure, academics are in a position to make a realistic assessment on the degree of time that can be spent for private study. Predictions could be made for the time for an 'average' student to do preparatory reading for assignments taking into account the relative difficulty and density of the task, range of reading material, time needed for re-reading, making notes and an allowance for thinking time. However in her study, Chambers adopted procedures based mainly on reading texts of varying difficulty that were used to forecast the time predictions for courses primarily in the arts and humanities streams. While Chambers (1992) champions an objective measure of assessment time, she goes on to question whether academics are too removed from the difficulties that students face. She asserts that academics need to make a reasonably accurate estimate on the time needed for 'average'

student to complete the task in the way that is consistent with a deep learning approach; that is, an enquiring and critical stance. However, in engineering courses such as those offered in the School of ACME, assignments include more activity-based tasks such as worked examples, problem solving and exercises. Word counts and estimates of difficulty of reading are not as applicable and estimates of time can be harder to predict.

UNSW uses a Unit of Credit (UoC) system for all of its programs. Each standard full-time year requires a load of 48 UoC (24 UoC per semester). The workload requirement for each UoC is 25 hours. This allocation includes study time, preparation for assignments and exams and face-to-face classes, tutorials and laboratory sessions. The majority of the courses surveyed had a value of 3UoC with an expectation of 75 hours of work over the semester. This should average five to six hours per week per course (3UoC) over the 15 weeks in the semester up to the commencement of exams.

This is useful for the course designer in determining the amount of time that should be devoted to any assessment in order to achieve the course learning objectives. It is the responsibility of the designer to ensure that the time allocations for the assignment tasks are appropriate to the time expectations within the course. If the time is underestimated for a task then students' perception of time taken to complete that task may be high. This may contribute to a student's perception of high workload. A perception of high workload can, in turn, have an effect on the way they approach their studies and therefore their quality of learning (Kember & Leung, 1998; Kember, 2004). Another implication of underestimation of time to complete an assessment is reported by Lockwood, (2005). Lockwood, (2005) maintains that if students take more time to complete the assignment than allocated, the course co-ordinator will judge that the pace of the student is too slow or the demand of the assignment is beyond them.

Method

There have been a number of investigations (Wade 1991, Chambers, 1992, Kember et al., 1995, Lawless, 2000) into the time spent studying in a typical week of an undergraduate student. These have taken the form of questionnaires, interviews and diaries or logs kept over various periods of time. In the present study a simple questionnaire was made a part of the Assessable Work Cover Sheet. In order to submit an assignment in the former School of ACME a student must complete an 'Assessable Work Cover Sheet' with their name, assignment title, subject name, due date and declaration of originality.

Application was made to the ADFA Human Research Ethics Advisory Panel and permission to conduct the study was granted by the committee in August 2008: Reference number A-08-21. The permission approved the incorporation of a student questionnaire into the Assessable Work Cover Sheet. A Participant Information Statement Form was placed at the point where students obtained their Assessable Work Cover Sheet outlining the participant selection, purpose of the study, description of the study and confidentiality and disclosure of information.

After completing the required authorship details on the Assessable Work Cover Sheet the student responded to the question: "How much 'out-of-class' time did you take on this assignment?" This portion of the sheet was detached after the assignments were removed from the assignment submission drawer by administrative staff and before the assignments were handed on to the lecturers. As they were detached they were batched according to the course and nature of assignment – computational or descriptive. By this method student responses were anonymous and confidentiality was ensured

Later, each lecturer was asked to provide an estimate of the time that they had expected the student to complete the assignment. They, of course, were not privy to the student responses.

This procedure was carried out over second semester in 2008 and the participants were full-time, undergraduate students in the former School of ACME.

The types of assessments where students were asked to estimate the out-of-class time included problem sets where work was carried out in tutorial sessions under guidance of tutors then completed outside class time; the completion of a laboratory experiment in tutorial time followed by the completion of the report outside class time before submitting; problem-based team work where

students were required to attempt to solve the problems during private study time prior to working with the team; assignments consisting of mathematical problem solving and essays.

Results

The number of courses contributing to this exercise was 21, spanning all years and all ACME programs. The total number of assignments was 47 and the total number of student responses was 748. A scatter plot comparing student claims with lecturer estimates is given in Figure 1. The x-coordinate position has been nudged with a small random number to aid visibility (otherwise many points would be overlapping). The circles represent mean responses for an assignment and the error bars represent the standard error (unbiased standard deviation estimate). If lecture estimates matched student claims, the points would cluster around the 1:1 line.

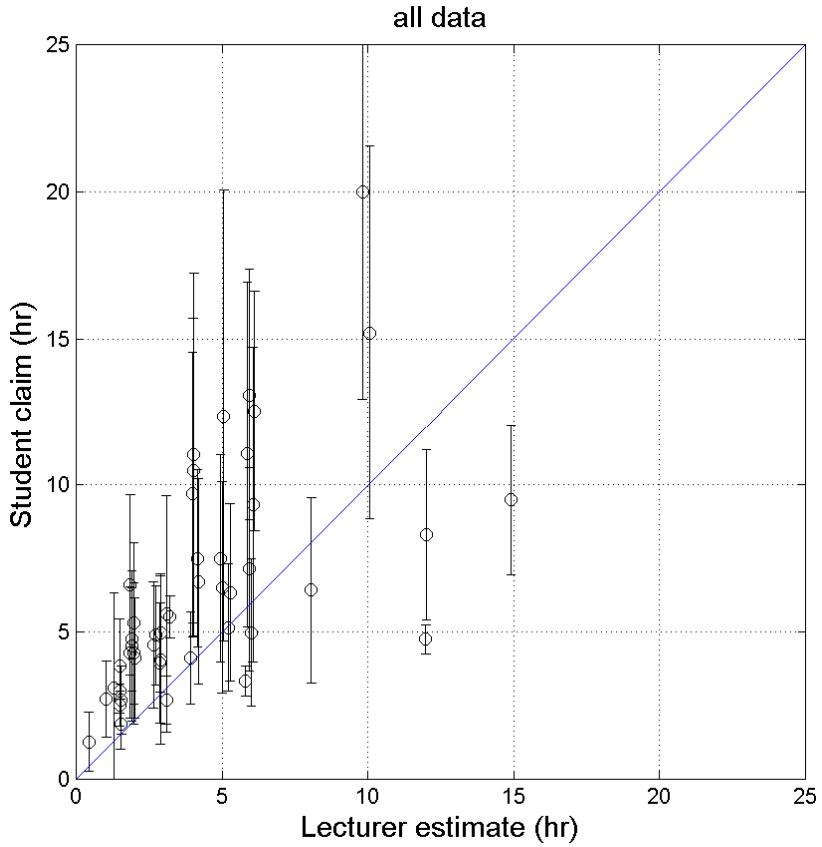

Figure 1: Summary of student responses compared to lecturer estimates.

To further explore the data we have applied two partitions, firstly according to whether the assignment type was computational or descriptive, and secondly in which year of the program the course belongs. For each group of data we have computed the means and standard deviations. The lecturer estimate means were weighted identically to the students' to overcome the problem of class size variation. The results are summarised in Tables 1 and 2.

Table 1: Summary of all responses and partitioned by assignment style

	All data			Computational			Descriptive		
	Mean (hr)	Stdev (hr)	N	Mean (hr)	Stdev (hr)	N	Mean (hr)	Stdev (hr)	N
Lecturer	4.1	2.5		3.9	2.0		7.5	6.5	
Student	6.4	3.3	748	6.5	3.3	716	5.3	3.5	32

Table 2: Summary of responses partitioned by year

	Year 1			Year 2			Year 3			Year 4		
	Mean (hr)	Stdev (hr)	N	Mean (hr)	Stdev (hr)	N	Mean (hr)	Stdev (hr)	N	Mean (hr)	Stdev (hr)	N
Lecturer	2	0*		4.3	2.5		6.2	1.7		2.1	1.6	
Student	4.2	0.3	211	5.6	2.3	320	10.3	3.3	192	4.0	2.4	25

* The first year responses relate to a single subject where the lecture estimated time was a uniform 2 hours.

Discussion

On average lecturers have underestimated the time needed to complete assignments by 35%. The difference in means (all data) of 2.3 hours has 99% confidence intervals of +/- 0.35 hours, so the difference is clearly greater than by chance. This difference appears to be greater for computational exercises than for descriptive assignments and indeed the latter shows a reverse trend with lecturers expecting more effort than the students felt able to give. There is a consistent trend across the years with only Year 2 showing less than the average 35% underestimate of time to complete an item of assessment.

In table 1 it is interesting to note that the time taken by students to complete descriptive assignments is less than the lecturers' expectations. This result is in marked contrast to the greater time taken by students to complete computational assignments as compared to lecturers' expectations. Also, the large difference in the number of computational versus descriptive responses may reflect an emphasis placed on computational work in a School of Engineering. The educational program for engineering students at UNSW@ADFA includes general education courses taken in the School of Humanities and Social Science and Business where there is an expectation that assignments are of a more descriptive nature.

We have not explored the reason for these differences in depth. As previously mentioned the rationale for this study came from an intended change in institutional structure. There are obvious conjectural explanations including lecturers not appreciating or remembering that the students are starting from a low experience level and hence not allowing space for false starts and retracing steps because of uncertainty. Another possible explanation is that students are tackling the assignments underprepared – not having paid enough attention in class or tutorials or failing to revise the topic before tackling the assignment. A more thorough (and possibly more intrusive) study would be needed to answer these questions. These questions will be explored in the next phase of this study when all courses change to the larger module of 6 UoC.

The marked difference in the number of year four questionnaire responses (compared to years one to three) lies in the fact that the majority of students are on a three-year engineering technologist program. Fewer students are enrolled in the four-year professional engineering degree programs. The smaller number of fourth-year responses is shown in table 2. The drop off in the amount of time spent by year four students compared to those in previous years maybe explained by the fact that the fourth year program included a major thesis which was not part of the student survey.

The student may also have taken a different interpretation to the question of how much out-of-class time they took to that expected from the lecturer. An individual may have included the preparation time. This could include time taken to revise the lecture material, reading and rereading material as background, visiting lecturers/tutors for assistance as well as the time taken to complete the assignment itself.

Methodological problems arise when attempting to accurately determine how long students spend working on an assignment. When noting how much time is put into an assignment a student may be influenced by outside factors. In other words a student's perception of the time may be greater or lesser than the actual time taken. Their perception may be altered by their interest in the task or the degree of difficulty in the subject matter. Problems also occur in determining the amount of time

when other factors come into play such as military training commitments; sporting commitments; problems of a personal nature and illness. All or any of these factors may 'interfere' with time allocated to assignment work. Another distortion of time may stem from how much time is actually dedicated to the assignment free from distractions arising from 'multi-tasking'. That is, having background inputs from television, music and incoming emails and the internet, while working at their computer.

Conclusion

The importance of correctly calculating the time required by a student to complete an assessment task cannot be understated. According to Biggs (1999), if students perceive that they are overburdened by assessment, they may become strategic or surface learners. Such learning outcomes are contrary to the graduate attributes of both the University and Engineers Australia.

The outcome of this study may serve to inform future course designers in the School of Engineering and Information Technology when preparing assessments. Further work will be undertaken to more accurately define student assignment workload with regard to lecturers versus student expectations. In particular we aim to repeat the exercise when the new programs consisting of fewer but larger modules are established in order to assess the ramifications of reducing the number of courses per semester.

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