Robbing Peter to pay Paul? Time management in flexible learning situations

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Abstract: Although subjects permitting flexible learning have been available for many decades, recent advances in information and communications technology have led to an increase in their availability. Most subjects offering flexible learning share two characteristics: there is a clearly stated set of aims and objectives:, and students are given well defined tasks which carry some immediate reward. Thus students can see what they are trying to achieve, and can derive satisfaction, and a contribution towards the final assessment, as they master each step along the way. Evaluation of these initiatives often shows that there is an improvement in student learning.

These subjects may share a third characteristic: students often report spending more time working on subjects with flexible delivery than on conventional subjects. This raises two questions. Does the improvement in student learning for a subject delivered flexibly result primarily from increased time spent on this subject? And is this improvement accompanied by a drop in achievement in the students' other subjects?

The Studio Physics Program developed at the University of Adelaide in 1998 and 1999 reduced the contact time for Physics I students to allow additional time for independent learning. The final examination results for students in the studio program showed neither a significant improvement in physics nor a reduced achievement in other subjects, when compared with the results for students in the conventional physics program. However, many students participating in the studio program reported that their understanding of physics improved as a direct result of the increased time spent studying physics. This raises an additional question: can flexible delivery be extended to more subjects in a way which improves student learning outcomes without making unreasonable demands on students' time?

Introduction

One of the factors affecting the outcome of study is the amount of time devoted to the subject, and we are aware that students make strategic decisions about the best way to spend their time. We would all be familiar with students neglecting work in our subject, especially if it is not immediately assessed, because they have an assignment due in another subject. As students spend increasing time in employment, they are under further pressure to reduce the time spent on their studies. At the same time, there has been an increase in the availability of flexible learning.

A comprehensive evaluation of information technology projects funded by the Committee for University Teaching and Staff Development (CUTSD) in Australian universities was conducted by Alexander and McKenzie (1998). Since most projects involving flexible delivery make use of information technology, these projects are broadly representative of flexible learning programs. Of the 104 projects analysed, 87% listed 'improve the quality of learning' as an intended outcome for students. In comparison, 39% listed 'improve productivity and efficiency of learning/teaching and extend access to learning', and only 3% were concerned specifically with efficiency, in the sense of requiring less time for learning. Thus fewer than half the projects have considered explicitly the time demands being made on students. Through flexible delivery, students have greater choice in the time and place for learning, but they may face increased demand on their time. The Studio Physics project developed at the University of Adelaide in 1998 and 1999 provides a case study of the effects of the time demands placed on students in a flexible delivery program.

The Studio Physics Program

In 1998, the University of Adelaide obtained a CUTSD grant to develop a Studio Course in Physics, based on the program operating at Rensselear Polytechnic Institute in the United States (Wilson 1994). Included in the aims of our program were:

- to increase the time spent by students in independent learning, and reduce the class time; and

- to reduce the emphasis on the lecture, and increase students' use of the textbook.

Students were given a detailed list of objectives for each section of the course, and a set of notes which provided a guide to the text book together with practice problems and questions. Class contact took the form of a studio session in which students worked in groups of six on a range of discussion questions, problems and practical exercises, with staff available to provide assistance. The pilot program operated during second semester for 29 students, while the remaining 60 students continued in a standard lecture/tutorial program. Three lectures and a tutorial per week in the standard program were replaced by a studio session of 2.5 to 3 hours. In addition, both groups attended a 3-hour practical session each week.

For each section of the curriculum, the experience followed a similar pattern. The students:

- listened, towards the end of a studio session, to a mini-lecture which gave a brief introduction to the next section of work;
- developed their understanding of the section independently, by working through the notes and textbook and answering the practice questions; and
- attended the studio session where they discussed their understanding so far, and worked as a group on additional activities.

The outcomes of the program are summarised in the CUTSD Report (Blake 1999).

Most of the students were enrolled in either the BSc degree or a combined BE/BSc degree. To allow the studio format to be implemented with minimum disruption to the students' timetable in their other subjects, the group of students scheduled to attend a specific physics practical session was selected into the studio program. As a result, almost all of the BE/BSc students remaining in the standard program, while the BSc students were fairly evenly divided between the two programs. To improve the comparability of the studio and standard cohorts, only the students enrolled in the BSc degree were included in analysis of the outcomes.

In 1999, all 103 Physics I students experienced the conventional lecture-tutorial format during first semester and the studio format during part of second semester. This larger cohort of students provided an additional opportunity to evaluate a range of characteristics of the program.

Time requirements

Expectations

According to guidelines developed by the Faculty of Sciences at the University of Adelaide, students for whom a full-time load is four subjects should spend a total of 10 or 11 hours per week on each subject. In a subject with three lectures, one tutorial and a 3-hour practical session each week, this leaves three or four hours for independent study. In a subject with fewer contact hours, there is an expectation of more independent study. Of course this is a rough estimate of the expectation for the average student. Students with different levels of preparation and innate ability who spend the same amount of time studying would achieve different outcomes.

Changes in study time

There is limited information about the amount of time students devote to their studies. At the University of Adelaide in 1990 an attempt was made to measure the amount of independent study time spent on physics by First Year students. In an anonymous survey, students were asked to report the time spent outside class on their study of physics during the past week. Reported times ranged from zero to 15 hours, with a mean of 3.5 hours. As part of the evaluation of the studio program in 1998, students in both the standard and studio programs were asked to report on the time spent in independent study of physics. Students in the standard lecture/tutorial program reported times ranging from 0.5 to 2.5 hours, with a mean of 1.5 hours.

These figures indicate a reduction of more than 50% in the time spent in independent study over the 8 year period from 1990 to 1998. During this period, there were minor changes in the physics curriculum, but no change in the format of lectures and tutorials or the nature and relative weighting of assessment components. Therefore the change in reported time devoted to independent study cannot be explained by changes within the Physics I course. It may be related to a change in the way students perceive their university experience, and to the impact of paid employment. Both of these aspects were explored by McInnis and Hartley (2002) in their study, *Managing Study and Work*. They report that between 1994 and 1999,

> there was an increase in the percentage of first year full-time enrolled undergraduate students with some income from paid employment and … an increase in the number of hours they spent in paid work per week. (McInnis and Hartley 2002; p.1)

They also found 40% of students agreeing that their employment has an adverse effect on their studies.

Students in the studio program in 1998 were interviewed as part of the evaluation of the project. They reported independent study times varying from 2 to 9 hours, with a mean of approximately 3.5 hours. Thus on average, the total time spent by these students on physics was close to the expectation of 10 hours per week; taking into consideration the reduced contact time, the average time spent for the studio program was about 1 hour per week more than the average for students in the standard program. The students also submitted a free response questionnaire in which several questions provided an opportunity to comment on the workload. When asked their views of the teaching approach being used, 13 of the 29 students referred to the need to spend more time working independently for this course format than for a conventional format, and five students listed the heavy workload as a concern. In answer to the question ‘Do you think this approach is helping you understand the physics concepts better?’ 23 students agreed, with 8 students attributing the improvement directly to their additional work: ‘I am getting a better understanding of the coursework but this is simply because I am doing more work than I did in the lecture program’ and ‘It makes me feel interested in physics more.’ Apart from their additional effort, students attributed their improved understanding to more opportunity to ask questions (7 students) and additional opportunities to relate the theory to practical examples (5 students).

A student evaluation of teaching was completed by the students who attended the final session of the studio physics segment in 1999. Of the 88 responses, 40 included some comment about the workload or independent study time. Negative comments referring to the heavy workload were made by 21 students. On the other hand, 11 students cited encouragement to work more as one of the best aspects of the program, making comments such as ‘you are required to work consistently rather than cram before exams’. Four students valued the opportunity to work through the material at their own pace, and four students made a direct link between their extra work and their improved understanding: ‘I think I was enticed into doing a lot more work and reading in my own time. I probably learnt more in these weeks of studio physics than I have in the whole of first semester.’

Effect on academic outcomes

When students experience additional demands on their time from one aspect of their lives, they need to make adjustments in other aspects. The report by McInnis and Hartley (2002) has provided some insight into the way students respond to additional demands on their time by exploring the effect of time spent in outside employment on the time students have available for leisure activities, and the time they devote to their studies. 47% of the students in that study agreed that they do not have time for leisure activities, while 36 % disagreed, and 17% were unsure (McInnis and Hartley 2002; p.41). In interviews which explored the effect of work on study time, ‘41% agreed that their paid work gets in the way of their academic study’ (McInnis and Hartley 2002; p.37).

If the students in our studio physics program were spending more time on physics at the expense of their other studies, one outcome could be an improvement in their final result in physics accompanied by an adverse effect on their final result in other subjects. Since the method of selection of students into studio and standard groups was based on their allocation to a particular physics practical group, it was not directly related to their choice of other subjects, or to their aptitude for any particular subject. Thus in this respect, the students in the standard physics program form a control group, and it is appropriate to compare the results in physics and in other subjects for the studio group and standard group of students

The mean results for the 27 BSc students in the studio group and the 35 BSc students in the standard group are presented in Table 1. The mean value for the first semester and final results in physics is very similar, indicating that students in studio and standard groups had similar ability in physics. Given the small numbers of students and the wide variation in their choice of other subjects, the difference in mean values of the final result for all other subjects is not significant. Thus these results do not support the hypothesis that additional time spent on physics was detrimental to the students' results in their other studies. Neither do they support the hypothesis that additional time spent on physics produced a significant improvement in their physics result.

Cohort	Mean first semester result in Physics	Mean final result in Physics	Mean final result in other subjects
Studio (*n*= 27)	52.7	58.7	68.1
Standard (*n*= 35)	54.2	58.4	64.6

Table 1. Relative performance in Physics and other subjects for studio and standard students

There are several possible reasons for this null result, for example:

- the assessment tasks may not make sufficient distinction between understanding and superficial knowledge;
- since increased time spent on physics was reported by some but not all of the studio cohort, any effect may have been too weak to be observed in the mean values; and
- students spending less time during semester may have compensated with additional study before the examination.

The new learning environment did not produce improvements in student learning which could be measured by examination success. However, student responses to the evaluation showed that for some students it provided the incentive and opportunity for improved learning.

The challenge

Prosser (2000) has reminded us that the quality of student learning outcomes is related not so much to the learning environment we provide, but to the way students perceive that environment, and the approach they take to study in response to that perception. The aim in introducing flexible delivery is often to increase the range of ways in which students can interact with the subject, thereby improving their motivation and enhancing their learning. If educators and curriculum developers are successful, we might expect that students will respond to the innovation by spending extra time studying the subject. However, in introducing these changes we should be aware of the possibility of an adverse impact on other aspects of the students' life.

According to McInnes and Hartley (2002), students need to be given clear advice about the effort and commitment required in their course. They should also be given opportunities and encouragement to improve their skills in time management. Faced with a range of tasks, students are more likely to choose those which are clearly defined, and which make an identifiable contribution to the final assessment. However, they will tackle those tasks in a way which is consistent with their own understanding of the requirements, and their own approach to learning in the subject. Our challenge is to design our students' learning experiences so that they encourage students to adopt a deep approach to learning, and contribute towards the development of understanding, without placing unreasonable demands on the students' time.

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