

Intensive Teaching Modes: Benefits, Drawbacks and Directions Forward

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BACKGROUND

Fourth year courses in the Australian School of Petroleum are taught in Intensive formats, with a semester's material presented over a several consecutive days. While intensive courses provide access and opportunity to non-traditional students needing to balance family, work and study (Curtis, 2000), they also offer economic and pragmatic benefits for universities. Specifically: off-shore delivery of 'badged' courses (Clark & Clark, 2000); outside experts to deliver on-campus courses (Burton & Nesbit, 2002); and blocks of 'uninterrupted' research time (Burton & Nesbit, 2002).

For student outcomes, research indicates little detriment (for a review, see, Daniel, 2000). However, results are contaminated by selection bias. Specifically, intensive courses attract older, more motivated and better prepared students (Caskey, 1994; Christy, 1991; and Smith, 1988; all cited in Daniel, 2000). Thus, detrimental effects could be obscured by 'better' students.

PURPOSE

Given increased use of intensive teaching, there is a need to identify any differences between delivery modes, including potential benefits and drawbacks, so as to inform engineering (and more general, university-wide) teaching practices and provide the best opportunities for student learning.

DESIGN/METHOD

Surveys were delivered to 44 current and past Australian School of Petroleum engineering students, who had all undertaken both semesterised and intensive courses, and 21 university staff. These elicited opinions regarding the two delivery methods – including time requirements, required reading, expected grades, learning and fatigue. Data was interpreted in light of analyses of student marks across their degree program to determine whether the methods produced equivalent outcomes.

RESULTS

Results from the student data show concerning trends; specifically they believe that intensive courses require less time to complete, encourage less reading and result in less learning but can earn them higher grades. While analysis of actual marks does not show a significant gain, the fact that staff also believe that students are learning less and that assessments differ between the two delivery formats raises concerns.

CONCLUSIONS

While it may be possible for academics to deliver a course's material over a short period, it seems that students regard intensive courses as a short-cut and do less work than they would in a semesterised course. A secondary concern, arising from student's responses, is fatigue. It is well-known that fatigue undermines learning and performance (see, e.g., Kahol et al, 2008) and the fact that the majority of respondents felt fatigued and unable to concentrate at the end of an intensive course – when the most complex concepts are presented and overall integration is required - bodes ill for retention. While further research is needed, the extension of learning support mechanisms beyond the immediate teaching period seems a viable means of limiting adverse effects of intensive delivery. Given that economic and pragmatic pressures are likely to result in increased use of intensive teaching formats, we need to ensure that their use is not undermining student learning opportunities and outcomes; and understand any limitations so that these can, through appropriate curriculum design, be counteracted.

KEYWORDS

Intensive teaching; semesterised teaching; learning opportunities; quantitative analysis.

Introduction

“Intensive courses” refers to various alternatives to semesterised delivery of courses; wherein material is delivered over a shorter timeframe than a semester. Davies (2006) identifies seven variants that might be referred to as intensive but, herein, ‘Intensive’ is used synonymously with those he identifies as ‘block’ courses – where delivery occurs in long blocks of at least a full day at a time and, often, for multiple full days in a row.

Australian universities are, increasingly, teaching more courses in an Intensive format. Burton and Nesbit (2002) observed that, by 1999, Australian business schools were offering 581 off-shore programs – all in Intensive formats – and that the majority offered these courses within Australia as well. Courses in the Australian School of Petroleum, specifically at fourth year and Masters levels, are commonly taught in Intensive formats where a semester’s worth of material is presented through seminars that run from 9am to 5pm over a short period (generally 5 to 8 consecutive or largely consecutive days).

Whether the drivers behind Intensive delivery are pedagogical rather than economic/pragmatic is, however, arguable (Davies, 2006). While valid cases can be made that Intensive courses provide greater access and opportunity to non-traditional students (i.e., non-school-leavers), who require greater flexibility in order to balance family, work and study (Curtis, 2000), they also offer economic benefits for universities beyond additional enrolments. Specifically, they allow: faculty to fly to off-shore locations to deliver ‘badged’ courses (Clark & Clark, 2000); the university to fly in outside experts to deliver on-campus intensive courses (Burton & Nesbit, 2002); and, finally, staff to free up blocks of ‘uninterrupted’ research time (Burton & Nesbit, 2002).

In terms of student outcomes, the majority of research indicates that grades and short-term retention are as good or better in Intensive courses and as good for long-term retention (for a review of this literature, see, Daniel, 2000). However, these results are contaminated by selection biases, as students who choose Intensive courses often differ markedly from those who choose otherwise equivalent Semesterised courses. Specifically, intensive courses attract older, more motivated and better prepared students (Caskey, 1994; Christy, 1991; and Smith, 1988; all cited in Daniel, 2000); often professionals already employed within the field of study. Thus, any detrimental effects of Intensive formats can be obscured by the fact that they are taken by ‘better’ students who would be expected to achieve higher marks in any case. Work with high school students taught in Intensive formats has shown similarly unconvincing results, with in-school assessments showing improvements but external examinations showing a detriment (Bateson, 1990; Wild, 1998).

There are also questions regarding whether Intensive courses differ from Semesterised courses in terms of *which* students will do well. Anecdotal evidence suggests that non-native English speakers struggle with the Intensive format as it conflicts with their learnt coping mechanisms of repeatedly accessing materials between lectures (C. McCreadie, personal communication, June 28th 2012).

Finally, it is noted that Intensive and Semesterised courses should be equivalent in terms of workload and students’ ability to both learn and obtain grades accurately reflecting their effort and ability. For example, Pierce (2010) points to university guidelines dictating that a 3-point subject (one eighth of a full year’s load) should equate to 150 hours of work by the student including all contact and non-contact time. Whether this equivalency is maintained, however, can be difficult to determine as, generally, there is no equivalent course covering the same material in the alternate format for comparison.

Research Aims

Given the increased use of Intensive teaching formats, there is a need to understand whether and how such courses differ from traditional, Semesterised course, in terms of student

opportunities and outcomes. This study was, therefore, designed to test engineering students' and staffs' *beliefs* about the efficacy of Intensive delivery modes, highlighting potential benefits and drawbacks, with a view to informing engineering (and university-wide) teaching practices so as to provide the best opportunities for student learning.

Additionally, quantitative analyses of patterns of student grades across an engineering program incorporating both Intensive and Semesterised courses were incorporated to complement and compare with these opinion surveys. While focussed on engineering students as matter of convenience, the concerns, results and conclusions apply to the university sector more generally.

Method

An anonymous survey was sent to current and past Australian School of Petroleum (ASP) students (classes of 2008-2012), all of whom had undertaken both Semesterised and Intensive courses as part of their degrees. Of 51 respondents, 44 completed all questions. The survey elicited student opinions regarding a number of questions comparing the two methods – including time requirements, reading requirements, grade expectations, learning expectations and staff and student fatigue.

A complementary survey was designed for delivery to university staff. This asked largely the same set of questions, rewritten in terms of staff preferences and expectations regarding Intensive teaching formats. This was sent to all staff in the ASP and to a selection of staff in other Schools; approximately 50 in total. From these invitations, 21 responses were received – representing four of the University's five Faculties and all levels of academic appointment.

This subjective data was interpreted in light of objective data regarding two cohorts ($N = 35$) of students' actual grades across their entire degree program, using comparisons of Intensive and Semesterised course marks and correlations across years to determine whether the Intensive courses were producing equivalent outcomes to Semesterised courses. This data was collected for students completing their 4-year program in 2010 or 2011. As such, this group overlaps those targeted by the initial student survey but was restricted to only those students not undertaking dual or combined programs.

Results

Student survey

Figure 1 shows the distribution of responses to the first five questions – all of which asked for direct comparisons (on a seven-point scale) between Semesterised and Intensive formats. The first thing to note, however, is that the staff survey (the right-hand column of subplots) has no equivalent to the question regarding student's expectations regarding their grades. Instead, staff were asked whether they believed that assessment methods and standards differed between the two course types. In response to this question, of the 21 staff respondents, 5 indicated they believed there was "no difference", 9 suggested "a little" difference and 7 indicated that course assessments differed "a lot".

Looking at Figure 1, one sees significant similarities between student and staff opinions. In both cases, there is a tendency to prefer one or the other rather than being indifferent between the two, with more individual preferring Intensive courses (10 vs 9 with 2 neutral for staff and 29 vs 15 with 0 neutral for students).

On which course type is better for student learning, the groups differed more. While the students showed a similar division of preferences as on the previous question, staff responses were no longer bimodal. Overall, however, both groups seemed to believe that semesterised courses resulted in better learning (12 vs 5, with 4 neutral for the staff and 23 vs 19 with 2 neutral among students).

Regarding grades, far more students were neutral, believing that their grades would be

equivalent regardless of format. However, of those with a different opinion, more believed that they had received better grades in Intensive courses (19 vs 14 with 11 neutral).

The remaining two questions showed strong effects for both groups, with a clear majority of respondents believing that Semesterised courses encouraged more reading (24 vs 14 with 6 neutral amongst students; and 14 vs 5 with 2 neutral amongst staff) and took more time, overall, to complete or deliver (32 vs 6 with 6 neutral amongst students; and 13 vs 2 with 6 neutral amongst staff).

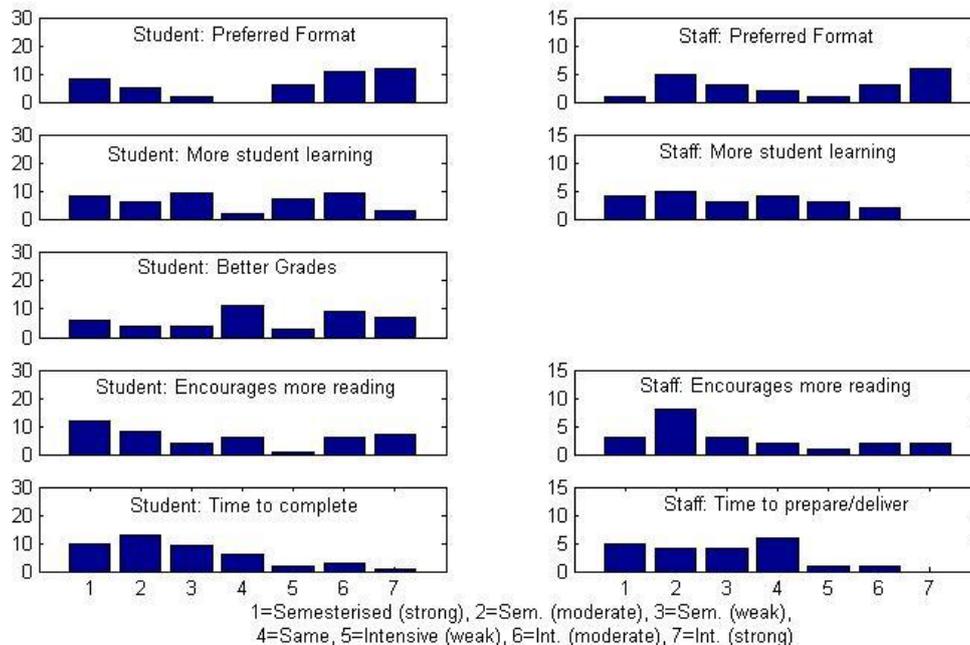


Figure 1. Histograms of participant responses to questions asking for direct comparison between intensive and semesterised courses.

Figure 2 shows the participants' degree of agreement with six statements regarding potential benefits and concerns arising from the teaching formats. Looking at Figure 2, one sees a high degree of agreement between staff and student opinions.

Both groups strongly agree that Intensive courses allow a student to immerse themselves in a single topic for an extended period of time (17 vs 2 with 2 neutral amongst staff; and 35 vs 6 with 3 neutral amongst students) and tend to disagree that Intensive courses allow sufficient time for reflection before continuing on to new topics (12 vs 4 with 5 neutral amongst staff; and 22 vs 11 with 11 neutral amongst students).

Students and staff also agreed that, by the end of an intensive course, students were fatigued and had difficulty concentrating (12 vs 4 with 5 neutral amongst staff; and 31 vs 6 with 7 neutral amongst students) but, perhaps surprisingly, while staff indicated that they felt the same way themselves (11 agree vs 4 disagree with 6 neutral), the students reported no clear effect on the lecturers giving the course (13 agree vs 20 disagree with 11 neutral amongst students).

Finally, students and staff agreed that intensive courses made it easier for them to manage their own time requirements (14 vs 1 with 6 neutral amongst staff; and 33 vs 7 with 4 neutral amongst students) – so long as they did not have intensive and semesterised courses in the same semester (as is the case in the ASP for students progressing at the standard rate), which respondents agreed was likely to cause difficulties (15 vs 1 with 5 neutral amongst staff; and 33 vs 5 with 6 neutral amongst students).

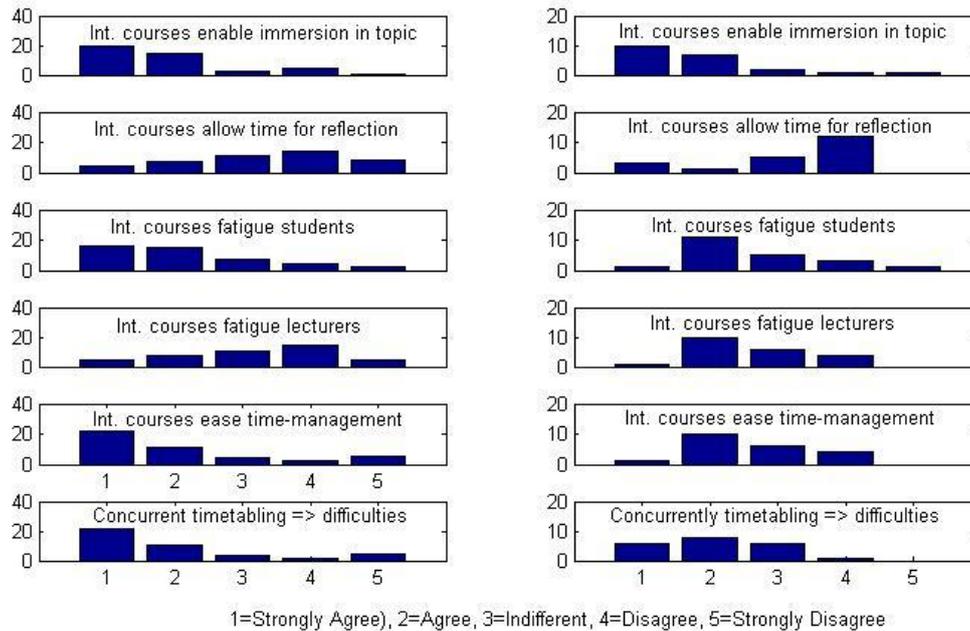


Figure 2. Histograms of participants' degree of agreement with statements regarding teaching formats.

Quantitative analysis of grades

Given the above results, questions can be asked regarding the relationship of students' actual grades and their expectations regarding different teaching formats. The first is whether different methods advantage different students; and the second is whether overall student performance is equivalent in the two forms.

To shed light on these questions, two analyses were undertaken. The first was to correlate students' average grades across the four years of the Petroleum Engineering program. Working on the assumption that the best predictor of a student's grades in a given year is that same student's grades from the previous year, this can determine whether Intensive courses advantage or disadvantage different students to Semesterised because, if this were the case, one would expect a lower correlation between 3rd and 4th year grades, where the change between course types occurs (with 1st through 3rd year ASP courses being Semesterised and 4th year Intensive). Table 1 shows the inter-year grade correlations.

Table 1. Inter-year grade correlations for 35 B.Pet.Eng. students.

	1 st Year	2 nd Year	3 rd Year	4 th Year
1 st Year	1	<.001	<.001	.002
2 nd Year	0.83	1	<.001	<.001
3 rd Year	0.62	0.74	1	<.001
4 th Year	0.49	0.64	0.79	1

Note: the bottom triangle shows the Pearson correlation; the top the significance level.

Looking at Table 1, one sees no evidence of a reshuffling of class rankings between 3rd and 4th year. Instead, there is nearly as strong a correlation between students' 3rd and 4th year results as there is between 1st and 2nd year and stronger than that between 2nd and 3rd year. That is, the best students in 3rd year tend to do best in 4th year despite the format change.

To answer the second question – whether student performance is better or worse in

Intensive courses - is more difficult, as within the ASP intensive courses are all delivered in 4th year whereas earlier courses are semesterised. Thus, differences in marks between years might reflect different markers or standards rather than actual differences in learning. Similarly, marking to a distribution – consciously or not – would hide any differences. With these caveats in mind, paired-sample t-tests were used to compare students' average grades across the different year levels. These results are show in Table 2, below.

Table 2. Summary of paired-sample t-tests comparing student marks across year levels.

Comparison	Mean Difference	t-statistic (df = 34)	p-value (2-tailed)
1 st vs 2 nd	+2.5	2.90	.006
2 nd vs 3 rd	+3.9	4.14	<.001
3 rd vs 4 th	+0.5	0.65	.522

Looking at Table 2, ones sees that, across the program, there is a trend towards grades improving as students progress, with grades at every year level being somewhat better than in previous years; resulting in a total difference of +6.9 between 1st and 4th year marks. This improvement is significant in its own right for the transitions between 1st and 2nd and then 2nd and 3rd years but not for the smaller improvement between 3rd and 4th.

Whether such a trend *should* exist is beyond the scope of this paper but, given its existence, we can ask a different question - specifically, does its existence shed any light on potential differences between Intensive and Semesterised courses? This is hard to answer given the difficulties noted above in comparing grades across year levels but it could, cautiously, be interpreted as suggesting that a general trend of improvement across the degree is being inhibited by the transition from Semesterised to Intensive courses.

Discussion

In general, the results are as one would expect, with a few stand-out take-away points. While opinions are far from united, both staff and students express some preference for intensive courses, believing that these require *less* of their time to deliver or sit, respectively. Students also believe that, despite putting in less time, reading less and even possibly learning less, they will get as good or better grades. Given general agreement by staff that students learn and read less in Intensive courses, this may reflect the staff observation that assessments may differ between the formats. This raises the concerning possibility that students are correct in their assessment of the relationship between effort, learning and grades across the formats. That is, they may achieve as good marks with less work due to easier assessment.

The quantitative analyses, by contrast, are somewhat more reassuring. Specifically, the change between Semesterised and Intensive courses has not produced any observable differences in which students do well, which would have necessitated a discussion of the ethical implications of one format benefitting some students over others. Questions regarding the trend of improvement in marks across the years levels can not be answered definitively here – requiring a more comprehensive approach, looking at marking practices, typical mark trends and distributions in order to establish whether one should expect a significant increase in marks between 3rd and 4th years and, thus, how important our failure to observe such is.

Similarly, while the results herein demonstrate that most academics believe that assessment techniques *do* differ between intensive and semesterised formats, additional work is required to determine *how* assessments currently differ and, further, whether and how they *should* differ in order to accurately measure desired learning outcomes. Ideally, of course, future work would also compare results between specific, clearly equivalent courses offered in the two formats rather than relying on comparisons between different courses taught in different formats as was necessary here – thus avoiding the confounding effects discussed above.

Given just the clear results noted above, however, providing an Intensive rather than Semesterised course to students is not a decision to be taken lightly. Significant research remains to be done: comparing outcomes (both marks and more general 'learning') in better controlled studies and with more sophisticated statistical analyses; looking at any difficulties faced by specific student groups (e.g., non-native English speakers); and determining whether provision of online materials and formative assessments before and after the course produces better outcomes than a 'fire-and-forget' approach.

A secondary concern, arising from responses to the survey, is the question of fatigue. It is well-known from the learning literature that fatigue undermines learning and performance (see, e.g., Kahol et al, 2008) and the fact that the majority of students (and staff) indicated fatigue and an inability to concentrate at the end of an intensive teaching period – when the most complex concepts are presented and overall integration is required - bodes ill for retention. Again, the extension of learning support mechanisms (such as discussion groups and assessed readings) beyond the immediate teaching period seems a viable means of encouraging pre-reading and revision and thus limiting the adverse effects of this.

Given that economic and pragmatic pressures are likely to result in increased use of intensive teaching formats, it is essential to ensure that their use is not undermining student learning opportunities and outcomes. Thus, we need to understand any limitations so that we can, through appropriate curriculum design, counteract them.

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