Benefits of Intensive Mode Teaching to Improve Student Performance

BENEFITS OF INTENSIVE MODE TEACHING TO IMPROVE STUDENT PERFORMANCE

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Abstract

Background: Intensive or block mode teaching is where course materials are delivered over a shorter period of time compared to standard courses, by means of compressed teaching formats. Cost and time saved with the intensive mode teaching are encouraging more universities to offer this type of learning. However, the high level of student satisfaction is the major factor driving the implementation of this teaching mode within tertiary education institutions. Yet, while student satisfaction is an important indicator of the benefit of this teaching mode, there is a scarcity of information regarding the educational benefit on student performance compared with traditional modes of delivery.

Aims: This study aimed to investigate and compare student overall performance between traditional and intensive mode in an introductory pharmacology course for second year pharmacy students at Griffith University, Gold Coast, Australia.

Methods: The introductory pharmacology course (2018PHM) is offered to second year pharmacy students in either traditional or intensive modes. The traditional mode is delivered in semester one over a period of 13 weeks, using 3 hours of lectures per week. The intensive mode is delivered during the summer semester over a period of 3 weeks, using 13 hours of lectures per week. Both modes are supported by an equivalent number of tutorials, workshops and laboratories. A retrospective qualitative and quantitative study was conducted to compare the educational benefit of both modes on student learning. Student satisfaction was obtained from the student evaluation of course (SEC) reports which detailed their preference and attitude towards the intensive course mode. Student performance was also compared as measured by overall course grade over a period of three years (2010 – 2012). Student demographic variables (age, sex and grade average point or GPA) were examined to determine if the groups were comparable on potential confounding factors. Ethical approval was granted by the Griffith University Human Ethics Committee (PHM/05/10/HREC).

Results: The majority of students from the intensive teaching course indicated positive responses (> 4 on a 5 point likert scale) in the SEC reports. There was no significant difference between the age of students or the number of males and females in both teaching modes during the three years ($p > 0.05$). Students who enrolled in the intensive mode had a significantly lower mean GPA compared to their peers from the traditional course for all three study years (traditional *vs* intensive mean ± SD: 2010 - 5.05 ± 0.85 *vs* 4.05 ± 0.50; 2011 - 4.90 ± 0.93 *vs* 4.17 ± 0.50; 2012 - 4.89 ± 0.98 *vs* 4.25 ± 1.0; $p < 0.05$ for all years). While there were statistically significant differences in students' GPAs, there was no significant difference in overall student performance between traditional *vs* intensive modes (mean ± SD: 2010 - 62.0 ± 12.6 *vs* 55.1 ± 26.6; 2011 – 68.7 ± 13.2 *vs* 71.6 ± 11.3; 2012 – 70.3 ± 13.5 *vs* 71.3 ± 25.9; $p > 0.05$ for all years).

Conclusion: Consistent with previous work, the results of this study confirm that intensive modes of delivery increase student preference towards the course. In addition, this study showed that students undertaking intensive mode classes had a significantly lower GPA than students in the traditional mode but performed as well as students in the traditional mode. This suggests that intensive mode teaching has the potential to improve student performance.

Keywords: Intensive mode teaching, student performance, GPA.

1 INTRODUCTION

Higher education is entering a very exciting but challenging time where traditional methods of teaching may not be enough to attract future students. Most universities aim to embrace these changes and accept that students need and expect a different type of education compared to a decade ago [1]. Traditional day-time teaching practices, in the form of weekly lectures and tutorials, are no longer convenient for every student. They require more flexible modes of delivery which fit with demands at work and at home [2]. Many students cannot fulfil the condition of long physical presence in lectures for geographic, financial or family reasons and consequently forgo the opportunity to study [3]. Furthermore, a higher proportion of students are now mature-age working professionals who are enrolling in additional study part-time only, while attempting to work full-time [2]. Many students also balance study in addition to caring for a family.

In this environment of rapid transformation, it is not surprising that higher education institutions are changing their teaching methods, including new ways of delivering course content. A very practical example of this is the consideration of offering courses in both traditional and 'intensive' modes of teaching [4]. Intensive teaching models, otherwise known as 'accelerated', 'time-shortened', 'block format', 'compressed' courses or 'intensive modes of delivery', have been defined in various ways. ‘Block Teaching’ is where a daily schedule has been organised into large blocks of time (more than sixty minutes) to “allow flexibility for a diversity of instructional activities" [5]. ‘Intensive’ or ‘block-mode’ teaching is where course materials are delivered over a shorter period of time compared to standard courses, by means of compressed teaching formats.

One area in which the intensive teaching approach seems important is pharmacology education, because it entails rich content involving numerous drugs and their mechanisms of action, detailed facts about drug classes and individual compounds, and the therapeutic indications for these drugs [6]. Over the years, the discipline of pharmacology has undergone rapid expansion and advancement. The number of United States Food and Drug Administration-approved drugs has increased exponentially, patients have become more educated and demanding, and our knowledge of the mechanisms underlying many adverse drug events and interactions have evolved [7]. This expansion in our knowledge of the discipline has placed more pressure on pharmacology educators to continuously incorporate new facts and principles and update their curricula [8]. Moreover, students perceive pharmacology as a more “difficult” learning area than other subjects in the undergraduate pharmacy curriculum [9, 10]. Additionally, academic staff typically have less teaching time than previously due to the heavy emphasis on undertaking research at a high level and attracting research funding, in addition to teaching commitments [8]. Consequently, teaching pharmacology curricula to students has been a challenge [11] and up-to-date teaching methods, such as intensive teaching, has been proposed to keep the students engaged with the content.

In short, the cost and time savings obtained with intensive mode teaching methods are encouraging more universities to offer this type of learning. The top five academically ranked universities in Australia (Australian National University, University of Melbourne, University of Sydney, University of Queensland, and University of New South Wales) all offer intensive mode courses in multiple different departments and schools [12]. However, the high level of student satisfaction is the major factor driving the implementation of this teaching mode within tertiary education institutions [4]. Most students prefer block or intensive mode courses when taking on a larger number of courses and when balancing work demands, and students have reported high levels of satisfaction with this mode of teaching [1, 13]. In fact, student preference for intensive mode courses significantly increases with increased level of experience taking intensive mode courses [1]. Yet, while student satisfaction is an important indicator of the benefit of this teaching mode, there is a scarcity of information regarding the educational benefit on student performance compared with traditional modes of delivery, and studies examining the impact on actual student performance are necessary to evaluate the efficacy of these modes compared to traditional modes.

2 AIMS AND OBJECTIVES

This study aimed to:

1. Investigate and compare student overall performance between traditional and intensive teaching modes in an introductory pharmacology course for second year pharmacy students at Griffith University, Gold Coast, Australia over three consecutive academic years (2010 – 2012).

2. Compare student satisfaction and attitude between traditional and intensive teaching modes in pharmacology courses for the same three year period.

3 METHODS

This study was conducted at the School of Pharmacy, Griffith University, Gold Coast campus, Australia. The introductory pharmacology course (2018PHM) is offered to second year pharmacy students in either traditional or intensive modes. The traditional mode is delivered in semester one (March to June) over a period of 13 weeks, using 3 hours of lectures per week. The intensive mode is delivered during the summer semester (November to December) over a period of 3 weeks, using 13 hours of lectures per week. Both modes are supported by an equivalent number of tutorials, workshops and laboratories. A retrospective qualitative and quantitative study was conducted to compare the educational benefit of both modes on student learning over three years period (2010 – 2012). Student satisfaction was obtained from the student evaluation of course (SEC) reports which detailed their preference and attitude towards the intensive course mode with both quantitative questions graded according to a 5-point Likert Scale, as well as qualitative open-ended questions. The quantitative questions asked students whether the course was organised, whether it was engaging, whether the teaching was effective, whether assessment was clear/fair with appropriate feedback, and lastly whether students were satisfied overall. Student performance was also compared as measured by overall course grade (measured quantitatively as a percentage) over a period of three years (2010 – 2012). Course grade was also categorised into grade levels, with ≥85% classified as 'High distinction', ≥75-84% classified as 'Distinction', with ≥65-74% classified as 'Credit', ≥50-64% classified as 'Pass', and <50% classified as a 'Fail'. The distribution of different grade levels was compared between traditional and intensive, and between males and females. Student demographic variables (age, sex and grade average point or GPA) were examined to determine if the groups were comparable on potential confounding factors. Gender was analysed by Pearson's chi-square analysis, while mean and standard deviation of GPA, age, and course performance were compared between traditional and intensive by the use of t-test analysis. All statistical analyses were performed in SPSS version 20 (IBM). Ethical approval was granted by the Griffith University Human Ethics Committee (PHM/05/10/HREC).

4 RESULTS

Overall, students appeared to have high levels of satisfaction with the intensive teaching course, as the majority of students indicated positive responses (> 4 on a 5 point likert scale) in the SEC reports. Overall course satisfaction was between 'agree' and 'strongly agree' (4-5) for both the traditional and intensive course modes; however, the traditional mode was rated, on average, 4.33, while the intensive mode was rated, on average, 4.63. There was no significant difference between the ages of students ($p > 0.05$). The distribution of males and females was approximately 50% in the traditional teaching mode, and while there appeared to be a large difference in the numbers of males and females in intensive mode over the three study years, this was not found to be significantly different ($p > 0.05$), due in part to the small sample size of the intensive mode courses ($n<15$ in all years). Interestingly, students who enrolled in the intensive mode had a significantly lower mean GPA compared to their peers from the traditional course for all three study years (Table 1).

Table 1: Student demographic data and performance in the pharmacology course across three years.

Variable	Traditional Mode n (%)	Intensive Mode n (%)	Statistic, p-value
Gender (2010)			
Female (n = 50)	46 (58)	4 (29)	$\chi^2 = 3.1$, p = 0.07
Male (n = 43)	33 (42)	10 (71)	
GPA (2010)			
(Mean, SD)	5.05 ± 0.58	4.05 ± 0.50	t = 4.7, p = 0.0001
Age (2010)			
(Mean, SD)	21 ± 4.2	21 ± 3.76	t = 0.001, p = 0.9
Gender (2011)			
Female (n = 37)	31 (50)	6 (38)	$\chi^2 = 0.3$, p = 0.51
Male (n = 41)	31 (50)	10 (62)	
GPA (2011)			
(Mean, SD)	4.9 ± 0.93	4.17 ± 0.50	t = 3.1, p = 0.003
Age (2011)			
(Mean, SD)	21 ± 4.84	21 ± 2.83	t = 0.001, p = 0.9
Gender (2012)			
Female (n = 47)	42 (55)	7 (78)	$\chi^2 = 0.8$, p = 0.31
Male (n = 36)	34 (45)	2 (22)	
GPA (2012)			
(Mean, SD)	4.89 ± 0.98	4.25 ± 1.0	t = 2.1, p = 0.05
Age (2012)			
(Mean, SD)	20 ± 3.74	22 ± 5.65	t = 1.5, p = 0.14

This table includes statistical comparisons of demographic data and student performance in the pharmacology course in both traditional and intensive delivery modes. Statistical significant differences were noted when comparing student GPA.

However, while there were statistically significant differences in students' GPAs, there was no significant difference between traditional *vs* intensive modes observed in overall student performance, over any of the study years (Table 2).

Table 2: Student demographic data and performance in the pharmacology course across three years.

Performance (Mean, SD)	Traditional Mode n (%)	Intensive Mode n (%)	Statistic, p-value
Performance (2010)	62.0 ± 12.6	55.1 ± 26.6	t = 1.6, p = 0.1
Performance (2011)	68.7 ± 13.2	71.6 ± 11.3	t = 0.8, p = 0.4
Performance (2012)	70.3 ± 13.5	71.3 ± 25.9	t = 0.9, p = 0.8

This table includes statistical comparisons of student performance in the pharmacology course in both traditional and intensive delivery modes. No statistically significant differences were noted when comparing groups.

When student grade distribution was examined in further detail by categorising performance into grade levels, it was found that the distribution in 2010 was slightly different across the two teaching modes. The majority of students (males and females) from the traditional mode passed the course with a Pass grade. On the other hand, most of the female (75%) and 40% of the males obtained a Credit grade. A higher percentage of students from the intensive course in the year 2011 obtained High distinction and Distinction grades than their peers from the traditional teaching mode; see Table 3.

Table 3: Student grades distribution between male and females in both teaching modes.

Year	Traditional Mode		Intensive Mode	
	Female n (%)	Male n (%)	Female n (%)	Male n (%)
2010 (n =79 vs 17)	46 (58)	33 (42)	4 (29)	10 (71)
High distinction (≥85%)	3 (6)	1 (3)	0	0
Distinction (≥75-84%)	9 (20)	3 (9)	0	1 (10)
Credit (≥65-74%)	11 (24)	5 (15)	3 (75)	4 (40)
Pass (≥50-64%)	19 (41)	21 (64)	1 (25)	5 (50)
Fail (<50%)	4 (9)	3 (9)	0	0
2011 (n = 62 vs 16)	31 (50)	31 (50)	6 (38)	10 (62)
High distinction (≥85%)	1 (3)	3 (9)	1 (17)	1 (10)
Distinction (≥75-84%)	12 (39)	4 (12)	3 (50)	3 (30)
Credit (≥65-74%)	13 (42)	10 (33)	2 (33)	1 (10)
Pass (≥50-64%)	4 (12)	11 (36)	0	4 (40)
Fail (<50%)	1 (3)	3 (9)	0	1 (10)
2012 (n = 77 vs 10)	42 (55)	34 (45)	7 (78)	2 (22)
High distinction (≥85%)	7 (17)	2 (6)	2 (29)	0
Distinction (≥75-84%)	14 (33)	12 (35)	4 (57)	1 (50)
Credit (≥65-74%)	14 (33)	7 (21)	1 (14)	1 (50)
Pass (≥50-64%)	3 (7)	11 (32)	0	0
Fail (<50%)	4 (10)	2 (6)	0	0

This table includes descriptive statistics of student grade distribution (females and males) in the pharmacology course in both traditional and intensive delivery modes.

5 DISCUSSION

Consistent with current literature, the results of this study indicate that intensive modes of delivery increase student satisfaction towards the course [1, 14]. Several studies into student preference in relation to intensive mode teaching have already been conducted, though none to date have additionally examined student performance. Previous findings on student preferences have been relatively consistent, that students may initially perceive intensive modes as being more difficult than traditional modes due to the compressed timelines that the material is presented [4]. However, upon gaining experience with intensive mode courses, students report positive experiences, particularly in the social aspects of learning, higher motivations, and learning confidence [13]. Additionally, students opt to enrol in block or intensive mode courses more commonly when taking on a larger number of courses and when balancing work demands (i.e. due to the practical advantages of a compressed timeframe) in spite of potential anxiety surrounding assessment deadlines [13, 14]. Furthermore, student preference for this mode of teaching has been shown to significantly increase with higher levels of student experience taking intensive mode courses [1]. Thus, consistent with previous findings, this study has also shown that student satisfaction, on average, was higher (4.63 *vs* 4.33) for intensive compared with traditional modes of teaching in the Student Evaluation for Course (SEC) reports analysed. This was noted in all the study years (2010, 2011, 2012) and supports the conclusion that intensive mode courses are well-received by students.

In addition, this study showed that students undertaking intensive mode classes had a significantly lower GPA than students in the traditional mode but performed as well as students in the traditional mode. This was a surprising finding, given that most prior studies examining student preferences for intensive courses found that these courses attracted highly motivated and focused students, with higher GPAs on average [1, 13, 14]. Furthermore, a large 2008 study of 944 students enrolled at an Australian post-graduate Business school with a fifteen year experience in intensive mode teaching found that a significantly larger proportion of students will elect for block or intensive mode teaching if they rate their own abilities more confidently in that topic [1]. Another study in 2010 of 130 students from unspecified courses undertaken in a large public university in the United States found that

students with higher GPAs and who are more motivated may rate intensive courses more highly, which was therefore corrected for in their estimation of student preference for intensive mode teaching [14]. However, we have found a significantly lower GPA across all three study years, which shows that, in our Pharmacology course, intensive mode teaching is not exclusively preferred by high-achieving students. Furthermore, the fact that the intensive mode students have significantly lower GPAs than the traditional-mode students have interesting implications for our analysis of performance.

GPA is linked with student performance, thus it would be expected that students with higher GPAs would perform better on average than students with a lower GPA in the same course [15, 16]. As such, we would have expected that students from the traditional mode teaching should have performed significantly better than students from the intensive mode, given that they had significantly higher GPAs than intensive students in all three study years. However, the observed results showed that students from the intensive course performed at the same levels (not significantly different) to students in the traditional mode in any year, and a non-significant increase in average performance was noted for intensive students in 2011 and 2012, compared to traditional mode students. Despite widespread concerns [1], it would appear that intensive mode teaching does not have detrimental effects on overall student performance and may have the potential to improve performance for students with lower GPAs. However, further studies with larger student populations, possibly including alternative measures of student performance, would be beneficial to confirm the impact of intensive mode teaching on student performance.

REFERENCES

[1] Burton, S. and P.L. Nesbit, *Block or traditional? An analysis of student choice of teaching format.* Journal of Management & Organization, 2008. **14**(1): p. 4-19.

[2] Curtis, D. *Competition policy and the future of higher education institutions in Australia*. in *AARE the assiciation for active educational researchers* 2000.

[3] Barajas, M. and M. Owen, *Implementing Virtual Learning Environments: Looking for Holistic Approach.* Educational Technology and Society, 2000. **3**(3): p. 39-53.

[4] Davies, W.M., *Intensive teaching formats: A review.* Issues in Educational Research, 2006. **16**(1): p. 1-20.

[5] Cawelti, G., *High School Restructuring: A National Study. ERS Report.* 1994.

[6] Michel, M.C., A. Bischoff, and K.H. Jakobs, *Comparison of problem-and lecture-based pharmacology teaching.* Trends in Pharmacological Sciences, 2002. **23**(4): p. 168-170.

[7] Zgheib, N.K., J.A. Simaan, and R. Sabra, *Using Team-based Learning to Teach Clinical Pharmacology in Medical School: Student Satisfaction and Improved Performance.* The Journal of Clinical Pharmacology, 2011. **51**(7): p. 1101-1111.

[8] Hughes, I., *Teaching Pharmacology in 2010 - New Knowledge, New Tools, New Attitudes.* Nihon Yakurigaku Zasshi. Folia Pharmacologica Japonica, 2003. **122**(5): p. 411 - 418.

[9] Wang, J., X. Hu, and J. Xi, *Cooperative learning with role play in Chinese pharmacology education.* Indian Journal of Pharmacology, 2012. **44**(2): p. 253-256.

[10] Badyal, D.K., S. Bala, and P. Kathuria, *Student evaluation of teaching and assessment methods in pharmacology.* Indian Journal of Pharmacology, 2010. **42**(2): p. 87.

[11] Halliday, A.C., et al., *Teaching medical students basic neurotransmitter pharmacology using primary research resources.* Advances in Physiology Education, 2010. **34**(4): p. 205-212.

[12] AEN. *The Australian Education Network University and College Guide (Australian University Rankings)*. 2013 [cited 2013 September]; Available from: http://www.australianuniversities.com.au/rankings/.

[13] Lee, N. and B. Horsfall, *Accelerated Learning: A Study of Faculty and Student Experiences.* Innovative Higher Education, 2010. **35**: p. 191-202.

[14] Kucsera, J.V. and D.M. Zimmaro, *Comparing the Effectivness of Intensive and Traditional Courses.* College Teaching, 2010. **58**(2): p. 62-68.

[15] Willey, T., S. Edwards, and V. Gondhalekar, *Predictors Of Performance In An Online Financial Management Simulation.* Journal of Business Case Studies, 2008. **4**(6): p. 35-42.

[16] Sonnert, G. and M.F. Fox, *Women, Men, and Academic Performance in Science and Engineering: The Gender Difference in Undergraduate Grade Point Averages.* The Journal of Higher Education, 2012. **83**(1): p. 73-101.