TEACHING AN OVER-THE-COUNTER MEDICINES COURSE WITH THE LEARNING ACTIVITY MANAGEMENT SYSTEM (LAMS): STUDENT PERSPECTIVES OF A SUPPLEMENTAL BLENDED LEARNING APPROACH

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Abstract

Background

To optimise patient health care, pharmacists need to use critical thinking skills when applying knowledge to patients. In an over-the-counter medicines course, second year pharmacy students indicated that they wanted more practice with problem-based learning cases to apply their knowledge. Blended learning, supplementing face-to-face sessions with online learning tools (online lectures and LAMS modules), was identified as a suitable approach to meet this need.

Objective

To assess student satisfaction with a blended learning approach that utilised online learning tools and make comparisons with conventional teaching methods.

Methods

All 72 students enrolled in this course in semester 1, 2011 at Griffith University were invited to participate in this pilot study. Student perspectives were obtained using a blended learning survey, the course evaluation, and surveys within each LAMS module. The course evaluation asked students for feedback on the course for: engagement, quality satisfaction and effectiveness for learning, and these results were compared with the previous year’s; when conventional teaching methods were used. For the analysis of questions using Likert scales, positive responses were grouped, as were negative responses. Results from 2010 and 2011 were compared using Fisher’s exact test (SPSS v18) with a significance level of p<0.05.

Results

The response rates were: 93% (55/59) for the blended learning survey, 88.9% (64/72) for the course evaluation and between 43%-88% (31-63/72) for the LAMS surveys. In the blended learning survey, 85.2% (46/54) of students agreed that the approach was beneficial to their learning. The face-to-face sessions were the most helpful aspect for 47% (25/53) of students, however, 98.2% (54/55) of students considered the LAMS modules beneficial to learning. Significant differences were identified in course engagement (p=0.038), quality satisfaction (p=0.017) and effectiveness for learning (p<0.001) when course evaluations for 2010 and 2011 were compared, with a greater proportion of positive responses in 2011. Feedback from individual LAMS modules showed that, on average, 92.4% (SD 6.58) of students believed that the module helped them meet the learning objectives.

Conclusion

This study demonstrated that a supplemental blended learning approach can positively influence student engagement and satisfaction, and help students meet learning objectives. Further investigation is needed to determine if this improves student performance in assessments.

Keywords: Learning Activity Management System, LAMS, blended learning, pharmacy, problem based learning.

1 INTRODUCTION

Pharmacists are required to apply their knowledge to a patient to promote quality use of medicines – to ensure that the medicine is safe and appropriate for them. The pharmacy profession therefore needs practitioners who know how to solve problems [1], apply critical thinking skills to improve patient
outcomes and who meet the competency standards of the profession [2]. Pharmacy schools have a duty of care to ensure that their graduates meet the needs of the pharmacy profession.

The School of Pharmacy, Griffith University consists of two articulated degrees – the undergraduate Bachelor of Pharmaceutical Science (BPharmaceutSc) and the postgraduate Master of Pharmacy (MPharm). The aim of these articulated courses is for students to successfully register as a pharmacist. There are four pharmacy practice courses within the BPharmaceutSc which focus on students gaining the knowledge and skills crucial in practice decision making. The first of these courses is 2001PHM Drug Information and Evaluation I. In this course, students are introduced to over-the-counter medicines i.e. medicines which can be purchased in a pharmacy to manage a range of minor ailments, such as a headache. At the end of the course, students are required to have knowledge of a range of over-the-counter medicines and to be able to apply that knowledge to the presenting patient, reflecting the uni-structural (knowledge) and multi-structural (comprehension and application) stages of the SOLO taxonomy [3]. However, most students have found it difficult to use their critical thinking skills in order to apply their knowledge to patient cases.

The course consisted of three one-hour didactic lectures and one two-hour workshop per week, providing limited time for students to apply their knowledge and develop their critical thinking skills. As the workshops involved database searching skills, students were not given any opportunity to apply the lecture theory to real-life patient cases until the end of semester revision week. Student feedback indicated that they wanted more of these case studies, reinforcing the idea that pharmacy students have a preference for application directed learning [4]. The use of problem-based learning (PBL) to present knowledge has been identified as a method to promote active learning [5] and will enable students to see the relevance of theory to professional practice. From a course review in 2010, the use of blended learning was advocated as a pedagogically sound approach within the University to support student learning [6], that could incorporate more PBL activities. Online learning tools (online lectures and LAMS modules) were therefore selected to supplement and support learning [7] and were introduced alongside traditional teaching methods [8] where didactic lectures became face-to-face discussion and PBL sessions.

2 OBJECTIVE

The aims of the pilot study were to assess the students’ perception of learning via a blended learning approach and to compare the new delivery method of the over-the-counter medicines content to conventional methods. Although blended learning is not a new concept in the educational literature, the knowledge on its effectiveness in teaching medications for the management of minor ailments for pharmacy students is limited.

3 METHODS

3.1 Course Development

Students enrolled in Drug Information and Evaluation I in Semester 1, 2011 at Griffith University were advised of the blended-learning approach to teaching the over-the-counter medicines content at the introductory lecture. This included an explanation of the reasons behind the new teaching style for the course and what it involved for the students: online lectures, face-to-face sessions and LAMS online modules. The text included in the sections or subsections must begin one line after the section or subsection title. Do not use hard tabs and limit the use of hard returns to one return at the end of a paragraph. Please, do not number manually the sections and subsections; the template will do it automatically.

3.1.1 Online Lectures

All nine over-the-counter lectures were recorded using Echo 360 Personal Capture®, enabling an audio-visual presentation of the power-point slides. The duration of the online lectures and on-campus lectures were the same; approximately 50 minutes. To allow sufficient time for students to listen to the lecture recordings in preparation for the face-to-face sessions, seven lectures were available at the beginning of semester on Blackboard®; the University’s learning management system. Lecture notes were also uploaded as a study tool for students who were primarily visual learners. As the remaining two lectures were previously interactive and case-based focused, they were delivered didactically and the recordings made available online after class.
3.1.2 Face-to-face Sessions

These seven one-hour sessions involved PBL activity sheets and revision questions directly aligned with selected learning objectives from the online lectures. It was an expectation that students review the online lecture content and objectives prior to attending these sessions, which were designed to give students time to reflect, ask questions and apply their knowledge to patient cases through discussions with their colleagues and the lecturer. For example, following on from a pain management lecture, students' role played a typical counselling scenario where the patient requested an analgesic and the pharmacist had to question them in order to recommend an appropriate treatment plan. Roles were then reversed so that students had the opportunity to act as the pharmacist and the patient for two analgesic case-studies. Students obtained formative feedback from their peers on their questioning and counselling skills and were asked to write their recommendations on the board to facilitate class discussion. Presence at these sessions was not mandatory or assessed, however, the activity sheets were not posted online.

3.1.3 LAMS

The LAMS platform allows teachers to create online lesson plans for students and can include a variety of different learning activities [9, 10]. Five LAMS modules were created by the teaching staff to supplement the face-to-face sessions and to address the remaining online lecture learning objectives that were not covered in class. To facilitate further understanding of the online lecture content, all modules incorporated evidence-based curricular resources and interactive websites, which students could review if, and when, they needed to. This addressed previous student feedback on the high volume of prescribed readings in the course, as these resources were now integrated within the LAMS modules to assist students to answer questions. Topic areas included: pain (Fig.1-3), dermatology, gastro-intestinal conditions and the supply of non-prescription (over-the-counter) medicines. LAMS activities ranged from reflections, to PBL and past exam revision questions, and provided students with automatic formative feedback from both the teacher and other students. This also ensured that students made an authentic attempt to answer the questions as they could see the responses from their colleagues after submitting their answers. It also allowed the teaching team to review all answers and add further comments to blackboard or to contact an individual student who appeared to be off-track.

Fig. 1: Tasks for pain LAMS module
To enable them to become comfortable with navigating through the LAMS modules, students were introduced in a practical on-campus workshop. This enabled students to reflect individually on the activities and allowed the teacher to facilitate class discussion, in order to develop a sense of community of inquiry [11]. The modules were uploaded onto blackboard, giving students the flexibility to complete them at home or on campus, at a time convenient to them, which have been identified as aspects of online modules [12]. Because student learning can be driven by assessments [13], the LAMS modules also contributed to 5% of the final course grade.

### 4 EVALUATION METHODS

All 72 students enrolled in Drug Information and Evaluation I were invited to participate in this pilot study. At the introductory lecture, students were given a letter explaining the study and the three methods of data collection: a blended-learning survey, the University course evaluation and surveys at the end of every LAMS module. Students were advised that there was no course incentive to participate, that they could decline to take part at any point of the study and that the research was approved by the University’s Human Research Ethics Committee.
A blended learning survey was designed by the teaching team and a curriculum consultant from the University’s health group. This was piloted by other pharmacy academics and students enrolled in a 2010 intensive course which utilised the online lectures and LAMS modules. In 2011, this paper-based survey was completed in a compulsory workshop towards the end of semester, enabling maximum participation. Students were asked to respond to a number of questions on the effectiveness and helpfulness of the three aspects of the blended learning approach (online lectures, face-to-face sessions and LAMS modules), using five-point Likert scales. Students could comment on what they found most helpful, why, and any suggestions for improvement. Demographic information was also obtained and responses were anonymous.

Students were offered time in a different workshop to complete the anonymous, online, University administered course evaluation. A variety of questions were asked, including course feedback on: engagement, quality satisfaction and effectiveness for learning, using five or seven-point Likert scales. Students could also comment on what they found particularly good about the course. These results were compared to responses from 2010, when the over-the-counter medicines content was delivered didactically.

Surveys at the end of every LAMS module asked students to identify if the module had helped them to meet the learning objectives. Student responses were de-identified for analysis.

5 DATA ANALYSIS

Frequencies were determined using SPSS v18, in which strongly agree and agree responses were combined and strongly disagree and disagree responses were combined. Fisher’s exact test was used to compare course evaluation responses from 2010 and 2011, with \( p < 0.05 \) considered significant. Comments were also analysed to determine common themes.

6 RESULTS

6.1 Blended Learning Survey

6.1.1 Participant Details

This survey achieved a 93% (55/59) response rate, with 50.9% (28/55) of participants being male with a mean age of 21.51 years. The majority of participants were domestic students (78.2%; 43/55); with English as their first language (61.8%; 34/55).

6.1.2 Blended Learning Approach

The majority of students (85.2%; 46/54) agreed that this approach was beneficial to their learning with not one student indicating that they were unsatisfied with the quality of the teaching of the over-the-counter medicines content. When asked what blended learning approach they found most helpful, 47% (25/53) of students selected the face-to-face lectures, as they could apply knowledge from the online lectures, interact with other students and have the opportunity to ask questions:

“*It did apply the online lecture content to clinical/real life situations*” and;

“*That there was [sic] cases & we had to interact to find the answers. Enhanced the learning process*” and;

“*.... Also gave us another opportunity to revise lecture material*” and;

“*[The] chance to discuss scenario problems with other fellow students.*”

One student comment highlighted that the face-to-face sessions increased their motivation to study as they had to answer scenarios in class. The majority of students indicated that the activities in these sessions helped them to apply their online lecture knowledge (90.7%; 49/54); with 85.2% (46/54) of students agreeing that they were effective in helping them to understand the learning objectives (Table 1). Some students indicated that these classes required a lot of preparation and suggested that a summary should be given prior to any questions or that the online lectures should be shorter than the average duration of 50 minutes. The majority (81.8%; 45/55) of students had listened to these lectures at least once for study purposes, and the online lectures were rated the second most helpful approach (30.2%; 16/53) with comments including:

“*U [You] could slow down (that is pause) the lecture when needed or rewind and listen again*” and;
“All info [information] was given so face 2 [to] face lectures could be used effectively to reinforce knowledge.”

Table 1: Student responses to the blended learning survey

<table>
<thead>
<tr>
<th>Statement</th>
<th>Agree n (%)</th>
<th>Neutral n (%)</th>
<th>Disagree n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The LAMS modules were helpful to me in learning the OTC content.</td>
<td>54 (98.2)</td>
<td>-</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>The (online) lecture content was well organised.</td>
<td>49 (89.1)</td>
<td>5 (9.1)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>The pace of the speaker was effective for learning (online lectures).</td>
<td>46 (83.6)</td>
<td>6 (10.9)</td>
<td>3 (5.5)</td>
</tr>
<tr>
<td>The online lectures delivered an appropriate amount of information.</td>
<td>50 (90.9)</td>
<td>4 (7.3)</td>
<td>1 (1.8)</td>
</tr>
<tr>
<td>The online lectures were effective in preparing me for the face-to-face lectures.</td>
<td>46 (83.7)</td>
<td>7 (12.7)</td>
<td>2 (3.6)</td>
</tr>
<tr>
<td>The activities in the (face-to-face) lectures were effective in helping me to understand the learning objectives.</td>
<td>46 (85.2)</td>
<td>8 (14.8)</td>
<td>-</td>
</tr>
<tr>
<td>The face-to-face lectures engaged me in learning.</td>
<td>44 (81.4)</td>
<td>9 (16.7)</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>The face-to-face lectures helped me to apply my OTC knowledge from the online lectures.</td>
<td>49 (90.7)</td>
<td>5 (9.3)</td>
<td>-</td>
</tr>
<tr>
<td>The reasons for the blended learning approach in this course were made clear to me at the beginning of this course.</td>
<td>44 (81.4)</td>
<td>5 (9.3)</td>
<td>5 (9.3)</td>
</tr>
<tr>
<td>The blended learning approach was beneficial to my learning.</td>
<td>46 (85.1)</td>
<td>7 (13.0)</td>
<td>1 (1.9)</td>
</tr>
<tr>
<td>The course convenor gave me an appropriate level of feedback by using this blended learning approach.</td>
<td>42 (80.8)</td>
<td>10 (19.2)</td>
<td>-</td>
</tr>
<tr>
<td>I am satisfied with the quality of the teaching of the OTC content.</td>
<td>53 (98.1)</td>
<td>1 (1.9)</td>
<td>-</td>
</tr>
</tbody>
</table>

The LAMS modules were rated the least helpful approach compared to the online and face-to-face sessions. Some students did comment that they had difficulty accessing a number of resources as the web links had become unavailable and suggested that the modules could be improved by having additional questions. The majority (98.2%; 54/55) of students agreed that the online sessions helped them learn the content, with some students wanting more modules. In general, the students appreciated being able to test their knowledge and found the feedback useful to their learning:

“There is no time limit: can take your time reading and understanding the information. Good variety of resources to gather information from and then test your understanding through answering questions. Was good to have feedback and view other people’s responses.”

6.2 Course Evaluation

This University administered questionnaire focuses on obtaining feedback from students pertaining to their overall course experience. Students were given time within another compulsory Drug Information and Evaluation I workshop class to complete this online survey, with 88.9% (64/72) of students choosing to do so. Responses to questions regarding course engagement, effectiveness of the course for learning and course quality satisfaction were compared to 2010. This comparison identified a greater proportion of positive responses from students enrolled in the blended learning (2011) course; these students were more engaged (p=0.038), more satisfied with the quality of the course (p=0.017) and found the course more effective for learning (p<0.001) than those undertaking the course in 2010. One of the 2011 students commented that:

“The blended learning approach was very good, made it more interesting and easy to learn. I found that although there was alot [sic] to do outside of the schedule times, it was essential and helpful when it came to lectures [face-to-face sessions]. I like the LAMS modules and how you could reaccess [sic] them to study later on.”
6.3 LAMS Modules

The majority of students (67/72; 93.1%) completed all five LAMS modules during the semester. There was the option to undertake a short evaluation at the completion of every module, accounting for the varied response rates. These evaluations asked students to identify if the module had helped them to meet the intended learning objectives (Table 2), with an average of 92.4% (SD 6.58) of students agreeing that it had.

Table 2: Student responses to the LAMS evaluations

<table>
<thead>
<tr>
<th>Module</th>
<th>Agree n (%)</th>
<th>Neutral n (%)</th>
<th>Disagree n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dermatology Module 1 (n=63):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This module was effective in helping me to learn the treatment advice for tinea pedis and onychomycosis.</td>
<td>59 (93.7)</td>
<td>4 (6.3)</td>
<td>-</td>
</tr>
<tr>
<td>This module was effective in helping me to learn the treatment options for warts in children.</td>
<td>56 (88.9)</td>
<td>7 (11.1)</td>
<td>-</td>
</tr>
<tr>
<td>Following this module I am confident that I will be able to counsel on a range of sun protection measures.</td>
<td>59 (93.7)</td>
<td>4 (6.3)</td>
<td>-</td>
</tr>
<tr>
<td>Dermatology Module 2 (n=63):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Following this module I am confident that I can discuss how to detect head lice.</td>
<td>57 (90.5)</td>
<td>6 (9.5)</td>
<td>-</td>
</tr>
<tr>
<td>This module was effective in helping me to learn the signs and symptoms of a threadworm infection.</td>
<td>56 (88.9)</td>
<td>7 (11.1)</td>
<td>-</td>
</tr>
<tr>
<td>This module enabled me to understand the importance of giving lifestyle advice for haemorrhoids.</td>
<td>57 (90.5)</td>
<td>6 (9.5)</td>
<td>-</td>
</tr>
<tr>
<td>Gastro-intestinal Module (n=31):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This module was effective in helping me to learn the causes and common symptoms of GORD.</td>
<td>31 (100)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Following this module I am able to describe the step down approach for the treatment of GORD.</td>
<td>23 (74.2)</td>
<td>7 (22.6)</td>
<td>1 (3.2)</td>
</tr>
<tr>
<td>Following this module I am confident that I will be able to recommend lifestyle advice for the treatment of GORD.</td>
<td>29 (93.5)</td>
<td>2 (6.5)</td>
<td>-</td>
</tr>
<tr>
<td>This module was effective in helping me to identify the ALARM symptoms for GORD.</td>
<td>31 (100)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pain Module (n=57):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This module was effective in helping me to learn the signs and symptoms of a migraine headache.</td>
<td>52 (91.2)</td>
<td>5 (8.8)</td>
<td>-</td>
</tr>
<tr>
<td>Following this module I am confident that I will be able to counsel a patient on lifestyle strategies for a migraine.</td>
<td>51 (89.5)</td>
<td>6 (10.5)</td>
<td>-</td>
</tr>
<tr>
<td>This module enabled me to understand the counselling advice for glucosamine.</td>
<td>50 (87.7)</td>
<td>7 (12.3)</td>
<td>-</td>
</tr>
<tr>
<td>Non-Prescription Medicines Module (n=60):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>This module was effective in helping me to learn the differences between Aust R and Aust L medicines.</td>
<td>60 (100)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Following this module I understand the importance of using protocols when supplying S2 and S3 medicines.</td>
<td>58 (96.7)</td>
<td>2 (3.3)</td>
<td>-</td>
</tr>
<tr>
<td>Following this module I understand the importance of a patient’s privacy.</td>
<td>60 (100)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
7 DISCUSSION

The primary objective for all over-the-counter medicines lectures in the Drug Information and Evaluation I course is for BPhearmaceutSc students to be able to apply good practice guidelines [14] when giving advice and supplying medicines to patients. Students are required to have knowledge of a range of over-the-counter medicines used to treat minor ailments (e.g. coughs and colds) and to be able to apply that knowledge to the presenting patient. Critical thinking skills also need to be developed so that students can start to justify why they would recommend a certain product over another for a particular patient. It was proposed that a blended learning approach to teaching this content would assist students to meet these professional requirements, by providing more problem-based cases and further opportunities for class discussion. This study aimed to investigate the student's perceptions of this blended approach compared to conventional methods of teaching the over-the-counter medicines content. Blended learning has been shown to satisfy a broader range of learning styles [13] and this study found that students appreciated the range of learning tools offered (online lectures, LAMS modules and face-to-face sessions). Although the face-to-face sessions scored the highest response rate in terms of the most helpful approach, the online lectures and LAMS modules did assist other students. The results of this study highlight that online learning tools can be successfully embedded within the curriculum [8] and that students found this blended learning approach more effective than conventional methods for learning. Initiating blended learning strategies within a course takes more time initially [15], however the positive responses to all aspects of the blended learning approach indicate that it was well worthwhile in terms of student and teacher satisfaction.

The high attendance rates at the face-to-face sessions, even though the lectures were recorded online, emphasises that students do value personal contact [13, 16, 17], with student comments highlighting that they liked discussing cases with their colleagues and the opportunity to ask the teaching team questions. Other studies have also suggested that students value teacher input as part of the learning process [18]. Upon discussion with academic colleagues teaching other content in the course, lecture attendance dropped for those lectures that did not have a blended learning component in its delivery. This indicates that the use of online learning is not a sole cause of falling lecture attendance [7], and that the students perceived a value in attending the face-to-face sessions [19], particularly when they were not compulsory and when they were expected to prepare for these sessions. Some students commented that they felt more motivated to learn in these sessions, suggesting that an engaging learning environment was created – particularly for those kinaesthetic learners as they could apply their knowledge to ‘real-life’ problem-based cases. As this is the first pharmacy practice course for these students and the majority of them do not work in a community pharmacy, relating the theory to actual practice provides context, relevance and a sense of purpose in relation to their future profession [20].

Online lectures have been identified as valuable in facilitating learning [7]. Student feedback indicated that they wanted more opportunity to apply their knowledge and as online lectures do not assist students to develop creative thinking skills, face-to-face sessions were not replaced but supplemented with online lectures. Students liked the opportunity to go back and listen to information when needed and many students used the online lectures for study purposes. These advantages of online lectures are commonly documented in the blended learning literature [7, 15].

The majority of students completed all five LAMS modules, even though they were not compulsory assessment tasks and had a low assessment value of 1% each. This suggests that the students perceived a benefit other than the course marks in completing these additional tasks in their own time, with comments from both the blended learning survey and course evaluation indicating that they were worthwhile learning activities. Although all web-resources were current and accessible at the beginning of semester, those students who attempted the LAMS modules late in the semester may have had trouble accessing certain URL links. In the future, LAMS modules will be uploaded individually and after their corresponding face-to-face session has taken place to ensure that there are limited problems with accessing web-site URL’s due to subsequent updates.

7.1.1 Strengths and Limitations of study

This study represented the perceptions of a small number of pharmacy students and did not evaluate the impact of blended learning on assessment performance. Although satisfaction measures do not measure learning, the overwhelmingly positive response from three different evaluations indicates that blended learning can be implemented successfully into a pharmacy course teaching minor ailments.
8 CONCLUSION

Second year pharmacy students enrolled in an over-the-counter medicines course responded positively to the use of a blended learning approach that incorporated online learning tools with face-to-face discussions. This pilot study suggests that further evaluation is needed to determine if this leads to actual improvements in assessment performance. In the mean time, this supplemental blended learning approach can increase student satisfaction and engagement, and assist students to see the relevance of theory to professional practice. It allows students the opportunity to develop their critical thinking skills, which will facilitate their transition to competent pharmacists.

ACKNOWLEDGEMENTS

The authors would like to thank the second year pharmacy students at Griffith University who participated in this research.

REFERENCES


