

The adventures of Trev the tablet: Replacing practical classes and lectures using an online game scenario

Keri Jones and Ian Larson

Department of Pharmaceutics, Faculty of Pharmacy
Monash University

Debbi Weaver

Higher Education Development Unit, Centre for Learning & Teaching Support
Monash University

Suzanne Caliph

Department of Pharmaceutics, faculty of Pharmacy
Monash University

Abstract

Both lectures and a 'wet' practical class using outdated equipment and expensive to run in both materials and staff and student time has been replaced by an integrated online site, incorporating a mixture of text with diagrams, video clips and multiple-choice questions. The online material has been organised into a 'Snakes & Ladders'-type game scenario, where students must successfully complete mini self-assessment activities to progress onto subsequent sections. Movement through the gameboard is via an animated character, 'Trev the tablet' who is also used to explain the concepts and illustrate key points. An action research approach was used during the design and development phase of this module. Three stages of the development, including evaluation, are described.

Keywords

practical class replacement, online games, tablet manufacture, evaluation

Background

Students studying 2nd year Pharmaceutics I in the Bachelor of Pharmacy degree are required to understand the formulation principles and processes involved in the manufacturing of tablets for pharmaceutical use. Previously, students attended four lectures on this topic, and completed three 3-hour practical classes — the first on tablet manufacture, and the second two sessions on quality control (known as tablet-testing). The equipment used in these practical classes are not up to date and too expensive to consider replacing. In addition, only four or five students at a time can undertake the practical class due to limited equipment availability.

This subject has about 200 students in any one year, so each of the practical classes was run four times per week for the whole of semester, taking two staff members for each class. This was only achieved by students working in rotation, meaning that the practical work was rarely aligned with the lectures. The growth of large pharmaceutical companies has meant pharmacists are no longer required to physically prepare medications, so at least the first practical class is no longer relevant. However, it is required that students still have a good understanding of the tablet formulation and-manufacturing processes. The Bachelor of Pharmacy course is delivered on-campus, predominantly face-to-face. However, students have access to an on-campus computer laboratory.

Introduction

By moving the tableting topic of Pharmaceutics I into an online environment, it is hoped that a more integrated approach to this topic can be developed. The inclusion of online text explanations, video clips of the practical processes, and self-assessment activities, should free up both the lecture time slots and the laboratory time of both staff and students. The time previously scheduled for the 'wet' practical class has remained scheduled in the students' timetables as a self-directed learning session in the on-campus computer lab.

An action research approach was taken during the design and development of this online unit (Kember & Kelly, 1993; Phillips, 2002), where development was planned in stages, and each stage was evaluated with students before progressing onto subsequent stages. This paper briefly describes three stages of the redevelopment process.

Development stages

Stage 1: Online videos

The tablet manufacturing practical demonstration was videotaped by a professional film crew and supplied as small video clips (maximum size 17MB, with an average file size of 8.1MB). An online unit (in *WebCT Campus Edition*) was developed, containing pages of content to replace the lecture and practical materials interspersed with the video clips. Simple revision quizzes were prepared and integrated with the content.

When designing the evaluation plan for the implementation of this module, three key evaluation questions were articulated:

- Has the new online tableting component been effective at meeting the learning objectives of this topic? Is it more successful than the previous methods of teaching this topic?
- Given that students are now more responsible for their learning in this topic, are students efficient self-directed learners?
- Have the hoped-for efficiencies in time been achieved for staff and students?

To answer these questions, a range of evaluation methods were used to allow triangulation of results:

- i. A paper based survey to the current cohort of students, asking about their use of the online material as well as their study habits.
- ii. Monitoring of activity in the online unit (to compare with student's perceptions of their use).
- iii. Focus group interviews with past students, to allow comparison with the previous teaching methods.
- iv. Consultations with staff, to investigate time and workload issues.
- v. Comparison of exam performance, to investigate whether learning objectives are adequately met.

Current (2nd year) students completed a paper-based questionnaire after completion of their exam on this topic. 105 responses were received, from an enrolment of 169. Students generally found the online unit easy to navigate and to use the features, although some did report local technical difficulties. Time was scheduled in the students' timetable for completion of this work, and a computer laboratory was available. However, only 23% of students utilised this session. 67% of the students completed at least part of the online module from home, despite prior warning about potential bandwidth issues with video files. Students did express some concern over a lack of instruction about what to do in the online site, including being unsure of the objectives of the module. Most students found the content of the online site useful in preparing for the exam and reported that the content was useful in learning about tableting.

Most students (83%) spent less than four hours working through the online site, and 50% of students felt that the time spent was about right for the amount of work involved. Students enjoyed the flexibility of working from home and at their own pace enabling them to digest, learn and review material, if required. The ability to repeat the revision quizzes and to view automatic feedback was particularly popular. Students thought the content was comprehensive and easy to understand. A typical comment was: "*The unit was easy to do and easy to understand, although a lot was covered. Overall, this was a good way to learn*".

The least-enjoyed aspects included the amount of text to read, and the lack of interaction in the site — several students felt it was too dry and uninteresting. Most students rated the content as easy although a few wanted more directions and support and struggled with the responsibility of self-directed learning.

Monitoring the activity in the online unit confirmed the student's perceptions that the average time spent accessing the material was less than two hours (averaged class data).

Past students who had completed the previous curriculum of lectures and practical classes participated in round-table discussion sessions after a short trial of the new online unit. These students felt that they could navigate the site and use the features without too much difficulty, but that they would benefit from a quick run-through demonstration of the site beforehand. They enjoyed the comprehensive content (noting that it is more detailed than their lecture notes), and felt the use of videos of the tableting equipment meant that everyone could see what was happening (instead of crowding around the equipment in a laboratory situation).

The past students reported that the content was presented in long text-based pages requiring repetitive scrolling, and suggested inclusion of images or diagrams to illustrate points. Inclusion of more references was suggested, as well as provision for a 'printable' version.

This unit replaced four lectures and one of the practical classes. The remaining two practical classes were amalgamated into a single 3-hour session. Removal of the Tablet Manufacture practical session allowed groups of eight (instead of 4–5) students per session for the remaining tableting classes, thus halving the number of iterations required. Overall, large savings in teaching and technical support staff time were achieved (down to 72 staff hours from a total of 288 staff hours in the previous curriculum), and student workload was effectively reduced from 13 hours campus based contact time to 3 hours contact plus 6 hours (on timetable) online.

At the conclusion of semester, students sat a mid-year exam, which included ten multiple-choice questions on the topic of tableting. Students were awarded an average of 76% for all multiple-choice questions (including other topics) and an overall performance on the exam of 66.7%. Performance of students in a previous cohort cannot be easily compared, as substantial changes have been made to the assessment strategies over this period. However, anecdotal evidence from examiners is that students from both cohorts in questions have performed equally well in answering questions on tableting. The results indicate that the current innovation may have had an advantageous effect on student learning; certainly there is no evidence of a deleterious effect.

Overall, the key objectives of the move to online have been met, but student feedback indicated that the online unit was somewhat uninteresting in places and lacked clear objectives. In an attempt to improve the ease of use and to introduce an element of fun into a relatively dry topic, the material was redesigned into a 'Snakes & Ladders' game, where quiz questions were interspersed amongst the text and video clips. Students who successfully answered the questions were able to progress to the next stage, whereas incorrect answers sent students back several screens to review the appropriate material. A new character, 'Trev the tablet', was introduced as the 'token' by which students would progress through the material.

Stage 2: Trev the tablet

Key questions for the Stage 2 evaluation were:

- Is the new games format easy to use? Is it intuitive in the layout, and can students use it without copious directions?
- Can students still access all material?
- Does the new games format improve interest in the online unit? Will it improve student motivation to complete the online activities?

Students overwhelmingly enjoyed the animations and videos, claiming it was easy to understand, and an enjoyable alternative to lectures. Unfortunately, the integration of the questions with the material was not completed in time for the current year's students. Since the game scenario was unfinished, it was decided to constrain the evaluation methods to a survey and class observations, focusing on the usability of the new animations. Eighty-one students from a cohort of 205 completed a paper-based questionnaire.

Suggestions for improvement included further integration of the revision questions with the existing material (as originally planned). The only problems experienced were few in number and all technical in nature, generally relating to a lack of appropriate software on home computers. Students spent a largely varying time in the unit, and there was no correlation between the time spent and whether students considered this was a reasonable amount of time for the material covered. Most students completed all the modules prior to the pre-exam study break, with the remaining students indicating they intended to explore these prior to the exam. A few students are still unclear about the objectives of the online unit, indicating this will need to be made clearer in future.

Stage 3: Games scenario

Changes suggested from previous evaluation phases have now been implemented, and a functional 'Snakes & Ladders' game approach has now been introduced into this online unit. Usability tests will be performed during Semester 2, and the new module will go live to students during 2006. Further evaluation will then be conducted to investigate student use and experiences of the games-type approach.

Discussion

Maintaining student motivation in online learning requires a range of activities, both to cater to different learning styles (for examples, see Felder & Soloman, 1999; Fleming, 1998) but also to add interest to what can often be unexciting and isolating experience (Weaver & Nair, 2005). This paper describes a work in progress using an action research approach to develop a games-type scenario, replacing a 'wet' practical class with integrated videos, text and multiple-choice questions.

Results indicate that the initial objectives associated with replacing the on-campus practical class (that is, time and workload savings for both students and staff) have been met. Early results indicate that the subsequent objective of introducing an element of fun to improve student motivation is also being achieved.

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