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Evidence-based learning: Interactive, online EBP modules for first year nursing. A case study.

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Abstract

Deakin University Library designed a series of six modules to provide interactive, online learning for a first year nursing unit, Understanding Research Evidence. The modules were developed in response to the changing learning requirements of students in the digital age. Delivered using Smart Sparrow software, the modules were designed to assist students in the development and consolidation of their understandings of evidence-based practice (EBP).

The development of the modules represents a shift from unilateral communication to interactive content. Previously, online support had largely consisted of static material that was not presented in the context of curriculum. The Library has now developed integrated content that allows for interactivity, but which may also be customised for other purposes or units across all health disciplines.

Feedback and data collected from the modules indicate an encouraging degree of engagement with the content. Data also allows the Library to ensure the continuous improvement of the modules. Library staff have also reported on their improved capacity and confidence in creating learning experiences that integrate core information and digital literacy competencies with students’ curriculum. Staff also report improvements in their ability to use technologies to create online learning objects.

Introduction

The use of digital technologies in the educational environment has been steadily increasing over the last 20 years. The proliferation of new technologies has allowed students to experience new and innovative ways of learning. Historically, online delivery of content tended to promote passive learning and was generally less engaging. However, the development of more sophisticated online learning platforms has enabled the design of learning modules that reflect the principles of more current teaching pedagogies, such as those that promote active learning (1). An adaptive learning system is one such technology that facilitates this type of learning, enabling pathways to be tailored to the unique
needs of learners. The use of technology that promotes interactivity in an online environment this way is being increasingly recognised as integral to improved student learning outcomes (1-5). Studies suggest that the use of an interactive online tool, when integrated into a blended teaching and learning approach, can be very effective in enhancing the development of research skills (2, 3). Much research has been conducted assessing the effectiveness of interactive learning modules on learning outcomes (4, 6-9). While the evidence is not conclusive that self-paced online learning modules are more effective than other modes of delivery, researchers across the board have noted a higher level of student satisfaction for more interactive tutorials, suggesting that students will be more engaged in the learning process if they remain interested (4, 10, 11). Moreover, in 2015 Greer et al. noted that “…carefully crafted online learning objects, which conform to the most recent scholarship of teaching and learning and are responsive to the needs of a specific audience, can be as effective in empowering students to achieve desired learning outcomes as in-classroom instruction” (9).

One area that interactive learning platforms can be particularly effective is in the teaching of evidence-based practice (EBP). Although it has its genesis in medicine, EBP has been increasingly recognised as being pivotal in the provision of high quality healthcare in a range of clinical settings, including nursing (2). In recognition of this, many institutions have integrated the teaching of EBP into their nursing undergraduate courses (12-16).

Deakin University is a world-class provider of undergraduate courses in Nursing and Midwifery, and EBP has been part of the nursing curriculum for a number of years (17). Librarians at Deakin regularly teach components of EBP to students in Medicine, Optometry and Occupational Therapy. In addition, resources have been developed for Nursing in the form of a library resource guide that features a section on EBP within a nursing context. The provision of such support is echoed in many other institutions and hospitals in which librarians play an active role in teaching EBP (15, 18-20).

Case study

Objectives of the project

The Library wanted to create an interactive, online environment to teach EBP to healthcare students, and to tightly integrate it with course curriculum so that application of the knowledge was clearer, and to reduce perceptions of a distinction between course learning and library learning. To achieve these aims, the Library committed to creating a series of learning modules exploring EBP by making use of the adaptive learning features of the Smart Sparrow platform.

These features facilitated learning experiences that were somewhat individualised; based on their actions users follow pathways and receive feedback appropriate to their level of knowledge and understanding. This means a user may not be exposed to certain module elements, depending on their choices, and that experiences will vary across a group according to the needs of the individuals therein. A first year Bachelor of Nursing unit, Understanding Research Evidence, was identified as a target for integration due to its timing within the degree and its curriculum, which aligned strongly with the Library’s role in supporting digital literacy across the University.

Content planning and development

The Library and unit chair agreed on a proposal for a customised suite of integrated online learning modules focused on EBP in nursing, and collaborated to develop learning goals. The unit chair also
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provided details of a clinical scenario that students would follow through the unit. During the initial planning stages, the unit learning objectives and associated curriculum plan were mapped against the elements of EBP, otherwise known as “the five A’s”: ask, access, appraise, apply, audit (21).

A project timeline was created, including deadlines for sharing of drafts. Modules were allocated to project team members to begin the design process. Periodic team meetings were held to share progress and feedback, but otherwise module creation was largely an individual activity. The final stage of the project involved review and sign-off from the unit chair, and integration into the learning management system for release to students.

Module description

The table below describes the six modules. The modules were scenario based and intended to be completed sequentially.

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Evidence-Based Practice</td>
<td>Students establish an understanding of the role of research in EBP, and the elements of EBP.</td>
</tr>
<tr>
<td>2</td>
<td>Resources for Research</td>
<td>Students are tested on their ability to access Library resources, and given information to remedy identified deficiencies.</td>
</tr>
<tr>
<td>3</td>
<td>Asking the Clinical Question</td>
<td>Students develop the ability to ask a specific, answerable question using PICO.</td>
</tr>
<tr>
<td>4</td>
<td>Understanding Research Evidence: Qualitative Research</td>
<td>An in-depth look at the characteristics of qualitative research, and how to access different types of studies. Students apply CASP Qualitative Checklist (22).</td>
</tr>
<tr>
<td>5</td>
<td>Understanding Research Evidence: Quantitative Research</td>
<td>An in-depth look at the characteristics of quantitative research, and how to access different types of studies. Students apply CASP Cohort Study Checklist (22).</td>
</tr>
<tr>
<td>6</td>
<td>Turning Research Into Practice</td>
<td>Students apply research findings to clinical practice and a subsequent evaluative audit.</td>
</tr>
</tbody>
</table>

Challenges

Project challenges could largely be classified under one or more areas: managing requirements, creating content, and establishing technical capacity.

The project team had a tight deadline for project completion, and fitting in module creation around typical duties while attending team meetings and unit chair consultations was challenging. Additionally, initial discussion on project aims and requirements took longer than expected, resulting in changes to module objectives while content was being created.

This content creation process was the most time-intensive stage of the project, as staff aligned unit and module learning objectives, the clinical scenario, and the elements of EBP. Staff then attempted to construct learning modules that presented these in an engaging way that utilised adaptive learning. Moreover, some actions were duplicated across the team which led to inefficiencies.

Finally, rapidly establishing team-wide technical competence with Smart Sparrow was difficult. No team members had previous experience with Smart Sparrow, and its recent introduction at the university meant there was little organisational expertise to rely on. Software unfamiliarity also
impacted module content as further understanding of its capabilities developed, meaning some intended activities were modified as restrictions were encountered and opportunities to exploit features may have been missed as creators were unaware of their existence while designing and drafting.

Benefits of the modules

During project evaluation, the team identified several benefits, including improved collaboration skills, unit integration experience, enhanced discipline-specific knowledge, improved understanding of online learning design, and a sense of successful risk-taking.

Team members were geographically and organisationally diverse, being based at four different campuses and in different sections within the Library, yet all positively assessed project collaboration experiences. The project fostered closer relations and improved skills in collaborative planning, providing feedback, and cross-campus communication.

The opportunity to work closely with academic staff was also seen positively. Communicating closely with academics to create content that fitted teaching intentions was challenging but ultimately rewarding. In the words of one team member: “now that I’ve got some experience, I’m more confident about approaching academics to suggest ideas for collaboration and integration of the Library into their units.”

The module creation process led to enhanced topic understanding among team members and improved teaching skills, as adaptive learning allowed team members to consider a wider range of possibilities for delivering effective learning experiences. Finally, the sense of trying something new and successfully implementing it was invigorating, and helped to position project team members as individuals with particular expertise that is relatively scarce within the University at this point.

Outcomes

The experience produced several outcomes. Foremost is the ability to sustainably deliver high-quality learning experiences to a large number of students, and the possibility of adapting and reusing the content across other units. Feedback and learning analytics data also indicated encouraging levels of student engagement.

These outcomes were underpinned by an improved approach to the delivery of learning experiences, which privileges the development of Digital Literacy as inseparable from an understanding of discipline-specific content. At Deakin, Digital Literacy is considered a graduate learning outcome (GLO). Barrie’s research (23) indicates that a majority of teaching staff consider GLOs to be an add-ons to existing curriculum content, often delivered via external agents. However, digital (or information) literacy experiences are most likely to be effective if they are integrated into existing unit content (24), which the Deakin University Library has a history of success with (25). By constructively aligning the modules with unit learning outcomes and weekly disciplinary content, the likelihood is that Digital Literacy is no longer seen as an optional extra, but as an essential part of becoming an evidence-based practitioner (26).

One of the most significant outcomes was the ability to collect more complex and granular data that provides evidence of engagement with the modules. Previously page views, play counts or average duration of viewing data could be collected. More comprehensive data is available by using Smart Sparrow, including the number of individuals who have attempted or completed modules and whether or not they have done so on multiple occasions. This will allow identification of any correlation...
between overall unit results and engagement with the modules. Data on specific interactions allows identification of areas of difficulty, and ensures that the modules are adequately challenging.

**Usage statistics**

Module usage statistics provide encouraging indications of student engagement and learning, as measured by data collected on the number of students who have attempted or completed individual modules.

A total of 1007 students had been enrolled in the unit at the time of writing, 115 of whom had withdrawn. 812 (81%) of the 1007 formerly or currently enrolled students had attempted one or more of the modules. At least 581 (58%) of these students had completed one or more modules. This is especially encouraging, as the modules were not compulsory.

The table below gives an indication of the number of students who have attempted and completed each module, and the percentage of all students who have ever been enrolled in the unit that this number represents. At the time of writing, there was one month remaining until the end of the Trimester exam period, and students were ‘up to’ Module 5 (Quantitative Research); we therefore anticipate an increase in these numbers in the near future.

<table>
<thead>
<tr>
<th>Module</th>
<th>Number of students who attempted</th>
<th>% of enrolled students who attempted</th>
<th>Number of students who completed</th>
<th>% of enrolled students who completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to Evidence-based Practice</td>
<td>647</td>
<td>64%</td>
<td>457</td>
<td>45%</td>
</tr>
<tr>
<td>2. Resources for Research</td>
<td>656</td>
<td>65%</td>
<td>448</td>
<td>44%</td>
</tr>
<tr>
<td>3. Asking the Clinical Question</td>
<td>403</td>
<td>40%</td>
<td>289</td>
<td>29%</td>
</tr>
<tr>
<td>4. Qualitative Research</td>
<td>419</td>
<td>42%</td>
<td>247</td>
<td>25%</td>
</tr>
<tr>
<td>5. Quantitative Research</td>
<td>215</td>
<td>21%</td>
<td>153</td>
<td>15%</td>
</tr>
<tr>
<td>6. Translating Research into Practice</td>
<td>102</td>
<td>10%</td>
<td>75</td>
<td>7%</td>
</tr>
</tbody>
</table>

**Feedback**

As well as the statistics, encouraging feedback has been received. Teaching staff call the modules “terrific” and said they have noticed “the students really seem to have engaged well with them.” Student’s comments have allowed us to identify some of the factors that have helped to make them engaging. The first of these factors was their ease of use. One student mentioned that they are “good... easy to drive.” Another factor was the usefulness of the modules, which highlights the value of integrating digital literacy into curriculum as part of the disciplinary content. Students have mentioned their intention to use it in preparation for the final exam, others noted that they would use it as part of their study notes. Finally, students highlighted the interactivity of the modules, saying “the interactive module is a good form of study material for learners as the information can be understood more easily than just reading.”

Moreover, feedback is also an essential part of the way decisions will be made for the improvement of the module in the future. While students’ comments have been overwhelmingly positive, some have also indicated areas that require improvement. On the whole, the major theme emerging in terms of what could be improved is that the modules could be more challenging. One student felt that it was “a good base of a general idea” and used it to “warm up,” while another stated that we “should put more complex topics on there.”
Future Plans

The team has been pleasantly surprised by the success of these modules in the very positive comments from students, academic staff, and through the usage statistics. The units have also generated significant interest from across the University.

As the unit nears completion, the team will review final feedback from the teaching team and students, the unit chair’s view on the impact of the modules on student engagement, retention of EBP knowledge, and the impact on both grades and any noticeable change in information behaviours. Areas which could be developed further will be identified for the next iteration of modules, and planning for adaptation of the modules for other courses will begin.

Several team members are also planning further research into the impact of the modules, including garnering student feedback on their experiences of and attitudes towards using the modules, and their reflection on the impact of the modules in their learning of EBP.

Overall, creating the modules has been a very positive experience, albeit one with challenges. The bulk of the workload occurred in the trimester prior to delivery; modules such as these need a substantial amount of planning and lead time. However, the end product is of a high quality, and can be reused in succeeding years. It is also a useful, sustainable way of reaching out to a very large cohort of students and providing a level of personalised support not possible in large presentations, or even via multiple sets of tutorials.

This has been a wonderful opportunity to embed EBP skills early in the curriculum, with a view to developing students’ digital literacy skills required both on placement and in the future as graduate nurses.

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References