

Breathing life into study designs: creating an interactive module for first year nursing students

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Abstract

The teaching of Evidence-based Practice has become increasingly common in tertiary nursing curricula. However, there is often limited focus on study designs and how they can be used to inform clinical practice. In this case study we report on the development of an interactive module which was embedded into a first-year nursing research unit. Using the interactive learning software, [H5P](#), we adopted a narrative approach using a series of scenarios combined with interactive quizzes. This was with the aim of enhancing students' understanding of study designs and their real-world application within a clinical context.

Introduction

The application of Evidence-based Practice (EBP) is a key element to the delivery of high quality and effective healthcare in a range of clinical settings, including nursing (Lehane et al., 2019; Saunders et al., 2019). In recognition of this, many university courses in medicine and nursing are now incorporating EBP into their curriculum (Gallagher-Ford et al., 2020; Kim et al., 2019; Long et al., 2016). Such interventions have been reported as being effective in enhancing students' competence in EBP (Cardoso et al., 2021; Gallagher-Ford et al., 2020; Mena-Tudela et al., 2018). Despite this, educators have also reported challenges in delivering effectively structured teaching programs, as well as barriers to students utilising and transferring these skills into clinical settings (Rholdon et al., 2021; Sin & Bliquez, 2017; Youssef et al., 2018). These challenges can include poorly developed research skills and resistant attitudes toward EBP often resulting in a lack of engagement with teaching content. (Fiset et al., 2017). Kyriakoulis et al. (2016, p.18) note, "The challenge for nursing academics is to find innovative ways to engage students in a way that facilitates the development of positive attitudes to research so that knowledge utilization and translation are skills all future nurses and health professionals actively use."

We took on this challenge in 2015 when Deakin Library's Health Liaison Librarians team, in collaboration with academics in the School of Nursing, produced a suite of six interactive modules on EBP for a first-year nursing unit (Kelly et al, 2016). The modules were: Introduction to Evidence-based Practice; Resources for Research;

Asking the Clinical Question; Qualitative Research; Quantitative Research; and Turning Research into Practice. Whilst some attention was given to the Hierarchy of Evidence, there was limited focus on the study designs themselves as they were beyond the scope of the project. In 2017, the Health Liaison Librarians team developed a guide on [Study Designs](#) (both qualitative and quantitative). However, in 2019, the Unit Chair of the same first year nursing unit approached the team with a request to create a single interactive module designed to better engage the students around the use of study designs in clinical practice. The Unit Chair noted: *"Research understanding is seen as boring by undergraduate students. Use of evidence-based practice and research understanding is essential in nurses actually using evidence in practice. Nurses should have a basic...understanding of research designs to really understand how research is conducted. This is important if the students are to understand what they are reading and provide context to what it actually means... We would like to be able to refine the information and present it in a way that is engaging and meaningful to students in order to create that in-depth understanding."*

One of the challenges for us as librarians is that we have limited access to students' time and attention. Nursing students don't often see the relevance of skills such as digital literacy to their future career. Thus, their desire to learn such skills may be quite low until they understand the benefit of acquiring the new knowledge and skills we are teaching.

Being mindful of the barriers earlier outlined to effective engagement with the concept of EBP, the module was designed to demonstrate the practical use of understanding the different study designs, by using realistic clinical scenarios where study designs can influence real-world practice with patients. The questions posed to the students throughout the module were designed to challenge them to consider what they thought might help the health worker in that scenario.

We selected four study design examples which could demonstrate the change in the use of research over time. This approach is advocated in Deakin University's evidence-based guidelines for developing online content where a "call to action" or "big question" is recommended as a hook to motivate students to participate actively in their learning (Deakin University). Furthermore, Boud and Prosser (2002) maintain that a high-quality learning activity should:

- Engage the learner
- Acknowledge the learning context
- Challenge the learner
- And involve practice

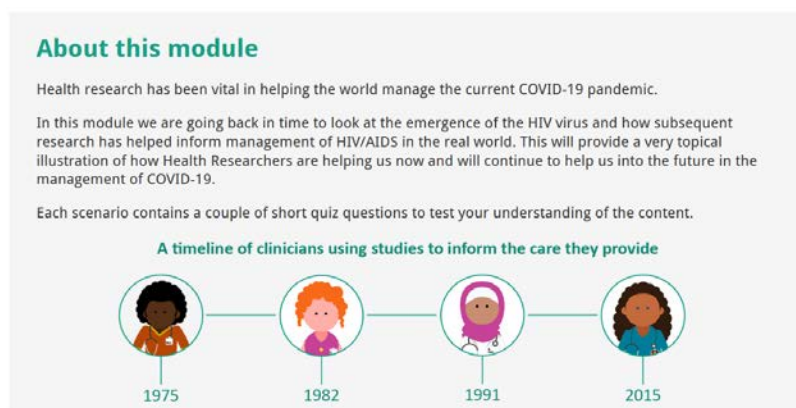


Figure 1. Introduction and timeline of scenarios depicted in the module.

The Module

The Digital Environment

The module was embedded in the unit site on our student learning management system (LMS). It was one of several modules, videos and other types of content the Unit Chair used to teach students about research evidence.

We used H5P as the learning software which is an open-source platform allowing users to create interactive online modules without the need for coding skills. This tool enables educators to create stable, accessible, interactive, and engaging content to improve the learning experience. H5P is compatible with all browsers so no additional plugins or logins are required. It creates a seamless experience for students within their online learning environment. The platform has developed many of its activities to be WCAG 2.1 AA compliant (H5P, 2020), which the library tests independently to ensure accessibility by students using technologies such as JAWS and NVDA.

The course presentation option was selected for the module design. This is a slide show format enabling the creation of a self-contained module which can be embedded into the HTML page of the student LMS in the context of the unit's topic for a particular week. Options for each page of the slide show include images, text, video, quiz questions and other interactive activities. The benefit of using this self-contained module is that it provides an integrated experience on a specific topic without utilising too much space on a web page. Students can view the extent of content from the menu at the bottom of the module which shows the number of pages or sections, indicating activity slides with dots.

The Activities

We designed the module to feature a range of different health professionals so that the content would be relatable and therefore re-usable across the different schools in the Faculty of Health.

The module is built around research development for HIV/AIDS. There are four scenarios set in different years to show development of research over time. Each focuses on a different study design. For instance, the first scenario focusses on a case study design as it relates to the earliest findings of HIV/AIDS before it was identified as an auto-immune disease.

Scenario 1

Nelson, a nurse at the fictional "Everglades Hospital", notes that several patients who are self-identified drug users have been diagnosed with *Pneumocystis Carinii*, a rare type of pneumonia which usually only affects infants. Nelson searches the literature and finds case studies that discuss the same symptoms, except they appear in homosexual patients.



Scenario 1 of 4

It is 1975 and Nelson is a nurse working at Everglades Hospital. In the last few months, several patients, who have self-identified as drug users, have presented at A&E complaining of a severe cough that has persisted for a few months. After assessment the patients are diagnosed with *Pneumocystis Carinii*, a type of pneumonia common in premature and young infants but rarely seen in adults.

Whilst reading up on the condition, Nelson discovers some case studies published in the 1960s that discuss the very same symptoms he has witnessed in his own patients except the patients in the studies are all homosexual.

Nelson realises that in all cases the patients not only have compromised immunity but that they also have in common either homosexuality or drug use. He wonders if this is significant and if there is a possible connection between the disease and the particular patient cohort.

 Read more about what a [case study](#) is.

Tip

Figure 2. Scenario one focusses on Case Studies.



The scenario was designed to help students understand the earliest phases of research and to illustrate the benefits and risks of relying on case studies as the only source of information.

Multiple Choice Questions (MCQs) as a formative learning exercise

Following the principles outlined in Laurillard's 'Concepts and Relations Involved in Learning' (2012, Table 4.1, p.59) we used a multiple-choice quiz as a formative exercise. This provided students with the information in a contextual scenario, tested their understanding of that information, and delivered immediate feedback tailored to their responses. This provided a self-assessment opportunity to support the student's learning of a new topic (Lee et al., 2021; Nicol, 2007). Because of the complexity of study designs, students were permitted to select multiple answers - each one dealt with a different aspect of a study design's weakness or strength in the context of the scenario.

Why are these case studies useful for Nelson? (Select **all** that apply)

- There is now a cure.
- He makes the connection to compromised immune systems
- Patients at risk can be more easily identified and warned to be aware of symptoms and quickly seek medical advice for any symptoms e.g. persistent cough, unexplained fatigue etc.
- He realises this is a bigger health issue than first realised
- He notes that being homosexual doesn't seem to be a requirement for this disease as none of his patients is gay.

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Tip

Figure 3. MCQ activity for Scenario one.

The MCQ prompted students to decide why these case studies were important for Nelson. They were encouraged to select all relevant options that applied to his situation, as there were multiple correct answers that had to be selected in order to earn full points. For example, one of the answers stated that the health issue was larger than first realised, and so patients could now be more easily identified and treated based on early symptoms. Another answer was that this disease may affect two different patient groups - drug users and homosexuals. Both of these options were correct and students got multiple tries to identify the correct answers.

Students were then prompted to think about why the research was written as a case study instead of a clinical trial. Again, they were encouraged to select all relevant answers that applied to the situation, such as that at the emergence of a little understood health issue, the only literature available at the time would be case studies, and that clinical trials investigate treatments, but there were not yet any treatments for the underlying immune deficiency. This pattern was repeated later in the module for case control studies and qualitative literature.

Our 1991 scenario differs slightly in that whilst Dr Zahira was aware there were many treatments available there were no guidelines for recommended treatments. Students had to choose the appropriate study designs that could help inform Zahira's decisions. These included RCTs which test and compare different treatments, and cohort studies, which examine patients' lived experiences with particular treatments as well as documenting any adverse side effects that might affect health outcomes and impact lifestyles.

Feedback to quiz questions was tailored for both correct and incorrect answers allowing for independent learning. Questions had more than one correct answer as a way to communicate the complexity of the research problem. We were careful to word answers consistently, rather than present an obviously wrong answer, as we wanted to encourage students to think more deeply about the study designs and what each one entailed. The answers do not assume prior knowledge of study designs as often embedded in the answer was a description of the study design's purpose. In the Dr. Zahira scenario, the task was to focus on the most appropriate study designs that would help inform treatment. Feedback was provided instantaneously after the submission of each response so students could check their answers in real time. Hattie and Timperley (2007) note: "The most effective forms of feedback provide cues or reinforcement". We thus used clear, positive language to reinforce correct responses, or indicated why an incorrect response was wrong. The main challenge in developing this task was to word the answers and our feedback succinctly enough to fit within the screen as the size, layout, font, and colours in the H5P interface could not be modified.

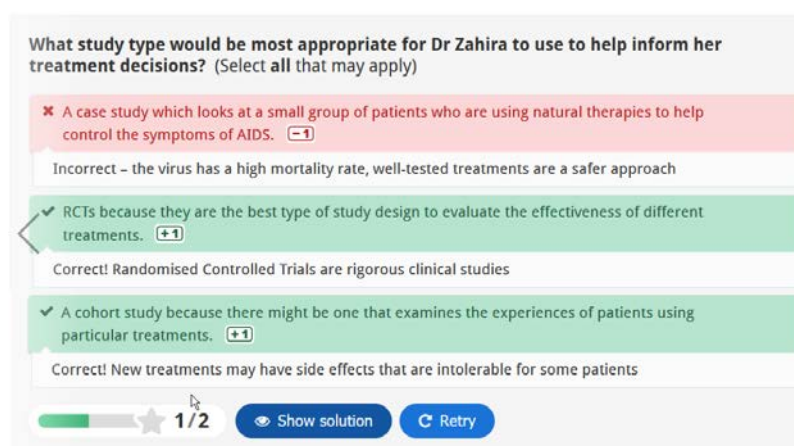


Figure 4. MCQ activity with examples of feedback to student responses.

Limitations

The module was implemented as an optional activity which meant that we would not collect detailed statistics on student engagement or require students to complete the module. This limited our ability to measure the effectiveness of the module given it was one of many in the unit site. However, understanding the application of study designs is only one aspect of the student's learning. The module was designed to introduce and consolidate learning rather than to assess the student's understanding which occurred in the formal assessments for the unit. This was in keeping with the library's role in providing learning support rather than being a part of the academic teaching staff. Marking and assessing student responses would have rendered the project unsustainable on our part.

HP5 did allow us to see how many attempts a student had made and the score they achieved the first and last time they used the module. Of the 967 students in

Trimester 2, 2020, 234 (24%) attempted the module. Over half the students (122) who attempted the module got 70% correct responses (17 questions out of 23). 55 students engaged in the quiz activities more than once, and 32 of those either repeated their high scores or improved their score, demonstrating formative learning as they worked through the module.

In order to improve engagement with the module in future iterations, it might be appropriate for us to review the first few slides of the module with the aim of reducing text and to clarify the purpose and use more engaging visuals. In particular, we think more could be done to reinforce the story of HIV/AIDS research and how it influenced clinical practice and achieved improved health outcomes over a few decades.

Conclusion

Teaching the elements of EBP in an engaging and stimulating way is not without its challenges and presenting a topic as potentially dry as that of study designs is no exception. Interactive and re-usable platforms such as H5P, with the variety of learning, self-assessment and feedback options it provides, gave us an excellent framework with which to define and illustrate the relevance and application of different study designs.

While it was possible for students to research and study the topic beforehand and therefore know the correct answers before undertaking the activity, we assumed little-to-no knowledge of the different study designs. We included information about the examples we discussed within the quiz activities which provided a formative learning experience. Students could answer a question incorrectly but they could easily try again if they were interested in the correct answer, and the reasons behind it. Every interaction was designed to reinforce students' learning through repetition, presenting new challenges with each work-life scenario, and the opportunity to reflect on their answers, and how that would affect practice in the real world. Hopefully the experience was memorable and relevant, so that students would seek out the module for further information (links are provided to more in-depth resources) when completing assessments in the unit.

Whilst we were not able to obtain specific feedback from students who engaged with the module, or collect meaningful data that might demonstrate impact of the module on students' overall academic performance in the unit, the academic staff member told us:

"... the unit overall had much better feedback for learning resources. I definitely think the module was really helpful in seeing the application of the research designs in the context of actual events and over a period of time. It fit in really nicely with some of the other resources about study designs." (Tomlinson, 2020).

We hope this module, along with the others we have developed, goes some way to meeting the challenges in motivating students to engage in learning about EBP as well as in understanding its importance in the delivery of high-quality healthcare in a clinical setting.

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