

## Designing open access, educational resources / Développer des ressources éducatives en libre accès

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### Cover Page Footnote

We acknowledge the funding received from eCampusOntario related to the open educational resource that we produced.

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## Introduction

Open educational resources (OER) are learning resources, such as textbooks and digital content, that are freely available and typically accessed online (DeRosa & Robinson, 2017; UNESCO, 2012). The recent burgeoning of OER in North America largely coincided with the emergence of open courses in the early 2000s (Ontario Council of University Libraries, 2017). This movement has meant greater access to materials with open licence in the public domain than ever before (Bissell, 2009; DeRosa & Robinson, 2017; UNESCO, 2012). Alongside this movement is the growing body of OER applicable to postsecondary nursing education, including topics such as vital sign measurement, end-of-life care, anatomy and physiology, psychology, and scholarly writing. In Canada, the expansion of OER has largely been contingent upon funding opportunities, faculty incentives, and political momentum to decrease costs for postsecondary students. The benefits yielded from this shift have typically considered the student user; however there are also meaningful gains for educators when materials, with an open license, can be used in their original format or modified and remixed to suit educators' purposes (DeRosa & Robinson, 2017; UNESCO, 2012; Wiley, 2014). In addition to the numerous advantages for designing customizable OER, it is important to highlight possible incentives for nurse educators who contribute to this growing body of work.

Many educators, including those in the nursing discipline, are still unacquainted with the nature and process of producing high-quality OER that promote excellence in pedagogy. The purpose of this discussion paper is to share our experience in developing an OER e-textbook for students in postsecondary health professions education while highlighting its approachability for educators. This example focuses on vital signs measurement, a familiar concept for nurse educators and a topic ubiquitous in health care. This paper is suited for any educator curious about designing OER with attention to key elements to produce quality educational resources, as well as how the shift to OER promotes quality advancement in nursing education. We begin by setting the stage with the background of our specific project followed by a discussion of the planning phase, the design phase, and other considerations. The e-textbook falls under a Creative Commons licence and can be accessed for free at <https://pressbooks.library.ryerson.ca/vitalsign/>.

## Background

In 2017, members of our team received a \$15,000 eCampusOntario Open Textbook Initiative grant. Our goal was to adapt two existing OER and create our own content to produce an interactive e-textbook on vital sign measurement. We recognized that nursing students are expected to become proficient with an array of clinical techniques, and yet traditional textbooks provide minimal opportunities for practice, demonstration, and interaction with the content, and lack attention to nuances in technique. Our desire to develop a valuable tool also stemmed from the opportunity to augment learning experiences and make learning more accessible with innovative, interactive, and technology-enhanced teaching platforms.

A multimodal learning environment was a necessity, in our opinion, for the kinesthetic learning inherent in a professional practice such as nursing. As such, our team used Pressbooks software as the design platform because it was suitable for multimodal learning (including visual and auditory modalities) and it was available free under our institutional licence. The current limitations of Pressbooks are the inability to glean comprehensive analytics from its use or to receive feedback from/interact with the users. Newer versions of this software are expected to account for these limitations.

The e-textbook we designed provides self-paced and flexible learning opportunities to address the varied learning styles so learners can progress through the resource based on their learning needs. Our approach was underpinned by experiential teaching-learning theory (Kolb, 2015) in which learners are provided with opportunities to practise, reflect, and modify each of the skills. We structured each chapter using the layout of read, observe, practise, and self-test. Thus, learners commence each chapter by reading textual information about the skills and reinforce this information by viewing illustrations, photographic images, and film clips. As a learning strategy, this positions them to accurately practice the skills, as well as to identify errors in their techniques. We integrated testable activities, including answering multiple choice questions, playing matching games, identifying errors in techniques, and calculating correct measurements using audiovisual clips to enhance the learner's capacity to identify mistakes and to develop their self-efficacy in practising the skill. The e-textbook concludes with a chapter devoted to knowledge integration designed for learners to draw upon and synthesize client data to inform diagnostic reasoning and clinical decision making by using case examples.

## **Discussion**

In this section, we discuss our experience in producing an open e-textbook while sharing design tips that may assist nurse educators or those in other disciplines who are considering creating, using, or adapting an OER.

### **Initial Planning Phase**

Our first step in moving forward with the development of an OER was to conduct an environmental scan to identify available resources related to the substantive topic and assess the pros and cons of the existing resources. It was useful to consult with learners about how particular resources could be enhanced and engage them in discussions about the role of a technology-enhanced platform. Similar conversations were sought out with educators who teach comparable content in their classes. For example, members of our team had extensive discussions over the years with nursing students and educators about how the traditional textbook alone does not offer opportunities to engage other senses and make information more accessible for auditory and visual learners. Through consultation, we learned that student users desired the opportunity to observe a skill being demonstrated by an expert. It was important for student users to watch these demonstrations outside the nursing laboratory without restraint on the number of views needed to develop their own competence and confidence. Garnering this input supported our use of Kolb's theory, considering the importance of observing, reflecting, and practising, which was reinforced through the multimodal and technology-enhanced learning environment (e.g., interactive images and videos).

The second step was to explore existing resources in open educational repositories. Several open educational repositories exist globally. Our team began by reviewing resources in the BCcampus OpenEd library supported by the Ministry of Advanced Education in British Columbia and the OpenStax non-profit library based at Rice University in Texas. More recently, eCampusOntario has partnered with BCcampus to launch an open textbook repository for Ontario. Perusing these libraries provides educators with a sense of the current existing resources, the quality of the resources, and the potential content area gaps. Additionally, the outcome of this search may help educators decide on whether to adapt or modify an existing open textbook or create content for a new e-textbook. As part of the Creative Commons licensing, educators can repurpose OER based on their needs. We borrowed and modified

content from two existing OER but still needed to develop considerable content and enhance the delivery modes. The modifications that we made to the OER ultimately produced a high-quality tool that was tailored to the needs of educators and students.

It was important for our team to consider the uptake of the OER for our learner population while also being attentive to wider, global audiences, including learners and educators internationally. We had several discussions about how this OER would fit into our existing nursing curriculum and other health care providers' curriculum while also serving as an attractive resource for professionals eager to renew their vital signs skills. For example, the idea for our project emerged from a year 1 course with high enrolment (500+ students) in a collaborative undergraduate nursing degree program that is taught by a team of 10 educators at three institutional sites. Four of the 10 educators volunteered to collaborate on this project and all 10 educators agreed to implement the newly created OER into the course. Discussing the project early with the course teaching team and gaining buy-in from the outset helped to establish champions for future use of the open textbook.

### **Moving into the Design Phase**

It was vital to consider stakeholder collaboration and identify the key end users of the OER. For our team, we identified the key end users as both students and educators in postsecondary health professions programs (including nursing) as they are most apt to use an OER related to vital signs measurement. Because we had a clear understanding of *who* our end user was, we formed an advisory committee composed of educators and students to provide feedback at various stages of the production process. This step allowed for checks and balances to ensure the production of a high-quality OER and promote good pedagogy. The committee was engaged early in the process and at multiple points so that their input informed content development and the resource's design structure. Students were engaged in active learning and contributed to public knowledge commons, while educators gained opportunities for reflective practice and participation in a connected community. All members of the advisory committee were acknowledged for their contribution in the OER.

The faculty advisory committee included eight educators (many of whom are also currently practising in the health care field) from five different disciplines (nursing, medicine, midwifery, physiotherapy, massage therapy) and five different institutions (both educational and hospital institutions). Before the initial meeting, we provided the faculty advisory committee with an overview of the project and a draft of the layout and content of the e-textbook. At the meeting we shared an overview of the funding, discussed the principles of OER production, and deliberated on rationale for the layout. We solicited general impressions of the e-textbook and queried any unclear information, problematic language, obvious gaps, and necessary additions. Additionally, we shared our ideas concerning the images and film clips that we planned to integrate into the e-textbook as learning resources. Throughout the project timeline, the faculty advisory committee reviewed multiple drafts of the e-textbook.

The student advisory committee included 10 nursing students (from year 2 to 4), who had previously demonstrated proficiency in vital signs skills. The student advisory committee was first consulted early in the project at a group meeting. The meeting commenced by sharing background information about the funding, the principles of OER production, and a brief overview of the e-textbook and the chapter layouts. Then, we engaged in discussions about what skills they struggled with when learning vital sign measurement, what helped them learn, what

needed to be emphasized in the e-textbook, what images could help them understand the concepts, and what demonstrations could be captured in film clips to help them learn. Members of the student advisory committee were also invited to be the actors in the audiovisual components and, as such, provided input into the film scripts. Additionally, they were involved in reviewing multiple drafts of the e-textbook. Their involvement in the production of this OER was particularly important so that the learning resources were student-centred and developed based on their learning needs. The collaborative nature of the development process that incorporated experiences and contributions of student stakeholders reflects the open pedagogy approach yielding multiple benefits for all parties involved (Verkuyl, Lapum, St-Amant, Tan, & Garcia, 2018).

Upon developing an OER, it is important for authorship teams to collaborate with key experts. Early on and throughout the process, we collaborated with our institution's director of e-learning, who also facilitated access to key experts related to library and copyright resources, Pressbooks, instructional design, and audiovisual production. An essential component of creating this OER was collaborating with a copyright librarian to ensure the final product could be accessed and used freely by educators and learners under a Creative Commons licence.

Collaboration with experts in instructional design and accessibility was important to guide decisions in these specialty areas to meet learners' needs from a variety of backgrounds, abilities, and learning styles. Some of the instructional design decisions were related to layout and aesthetics, alignment of content with learners' needs, and learning outcomes, and structuring content based on these outcomes. We also worked with an editor so that the writing of content was clear and suitable to a range of audiences. Throughout the project we strove to create an environment that supported students with learning accommodation to acquire the same information and engage in the same interactions in an equally effective and integrated manner as students without accommodation. Semantic structure and styles were carefully considered, and readability was improved by dividing text into smaller, more manageable sections. For all non-text content we provided text equivalents with clear, concise description that conveys the meaning or purpose of the image. The use of colour to communicate important information was avoided. All text links were structured as descriptive and meaningful hyperlinks. All videos were produced with closed captions and text transcripts. Accessibility of the learning content supported by instructional strategies was considered essential to students' learning experience. This approach reflects universal design for learning, using multiple means to engage and support students, and to create an inclusive resource that values diversity.

### **Other Considerations**

Project leadership is an important element in the process of producing an OER, particularly with large teams and many moving parts. Lack of leadership can lead to team struggles and difficulties meeting deadlines. Our team identified two co-leads. With effective leadership, we were able to collaboratively establish a vision that guided the many team members, establish a schedule, meet the timelines identified, oversee the project, and coordinate the various phases. The transformative leadership style with unwavering inclusion ensured that all team members and advisory committee members felt welcomed to contribute and felt invested in the production of this OER.

Funding implications had to be considered in the design and production of an OER that was influenced by the nature of the e-textbook in terms of its components and design features.

To address varied learning styles, it was important for our team to create a multimedia learning environment using visual images, drawings, and film clips. Thus, we considered costs related to hiring a videographer and a photographer. For the drawings, we were fortunate to draw upon the exceptional talents of the student population. Additionally, we hired the students from the advisory committee to be actors and play the role of patients and health care professionals in the film clips and images. In our experience, this process was cost effective and also proved to be beneficial because the nursing students were already familiar with the content, the language, and the psychomotor skills involved in the audiovisual demonstrations. This approach also garnered buy-in from the students with whom we worked as they became co-producers of the multimedia content, which contributed to a uniquely valuable perspective to learning that would not have been considered by the authorship team alone. This was also a benefit for students as they gained experience in creating educational material, learned about teaching, and contributed to the knowledge base of nursing while engaging in experiential opportunities that added to their own professional development.

Other funding costs to consider included subject matter experts to write the content and learning resource support. In our proposal, grant funds were not sought to cover teaching release time because we viewed the design and creation of the book as an extension of our scholarly and curricular activity as professors; although our time was not specifically calculated, an estimate is about 400 hours over seven months for the four content developers collectively. We did, however, have funds for the e-textbook editor, instructional designer, and copyright librarian. The last expert was important to direct copyright through a Creative Commons attribution. As noted by Bissell (2009), this means that others can “copy, distribute, display, perform, remix your copy-righted work, as long as they give you credit in the way you request” (p. 101). As noted by others (Wang & Wang, 2017), the marketing and promotion channels of OERs are limited. As such, OER authorship teams may need to consider creative ways to disseminate globally. A starting point for us was to engage support from existing networks, key stakeholders, early adopters, and social media platforms. Our team also embedded a link to the resource in their email signature and reached out to their own communities of scholars throughout the country.

The collaborative production of this OER involved an array of experts to facilitate the design and creation of an e-textbook that is of high quality and relevant to students, and that optimizes their learning. As Wiley and Gurrell (2009) indicate, both quality and utility are important to consider while designing an OER. The OER that we produced has already been implemented in our own curriculum across three institutional sites and other postsecondary health professions programs. Because the OER is modifiable, we continue to evaluate its utility and relevance. Through seed funding, we are evaluating the pedagogical and design approach that we employed. Preliminary findings reflect that this OER provided a multimodal experience that promoted engagement, acquisition of knowledge, and knowledge application. The research and student feedback also validated the benefits of using a multimodal learning environment, framed by Kolb’s theory, to facilitate student reflection and learning. Exploration of students’ experiences with this resource and its impact on learning outcomes will inform future pedagogical approaches and add to the body of knowledge concerning students both as consumers and as producers of knowledge. This future research will further establish a body of knowledge that highlights the role and contribution of OER to the quality advancement in nursing education. Like Andrade et al. (2011), our team also recognizes that educators need to consider not only the creation of OER but also how to promote open educational practices in

which these OER are taken up, reused, and adapted into curricula to transform practice and promote innovative pedagogical approaches.

### **Conclusion**

The shift to OER is exciting because both educators and learners can influence the production of knowledge by being actively involved in creating resources. It also reflects a move from pre-set learning materials towards courses that become adaptable elements of teaching strategies and open pedagogical approaches. Nurse educators must overcome seeing OER creation and production as a daunting task or an unfamiliar endeavour. In the spirit of open access, we can instead learn and build upon each other's experience in creating and producing OER that will lead to quality advancement in nursing education.

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