Implementing a Competency-Based Electronic Portfolio in a Graduate Nursing Program

MAUREEN E. WASSEF, PhD, RN
LYN RIZA, MS
TONY MACIAG, BFA
CHRISTINE WORDEN, BS
ANDREA DELANEY, EdM

Using and implementing information technology in nursing education are no longer viewed as a novel strategy, but a key element in both undergraduate and graduate programs. In a more global sense, institutions of higher education also recognize the need to integrate technology into the teaching and learning process to meet the needs of the changing student population. This increased focus on technology and informatics has led to an emerging trend of highlighting and archiving student accomplishments in a variety of electronic and digitalized collections as opposed to traditional hard copies. These electronic collections can be Web based or independently created on CDs and DVDs. These electronic portfolios (e-portfolios) not only contain various artifacts portraying academic achievements but also allow students to reflect on their content. The purpose of this article was to describe an improvement project implemented in our graduate nursing program to integrate the use of competency-based student e-portfolios within the curriculum.

RATIONALE

The benefits and uses of the e-portfolio initiative were initially endorsed at the beginning of the millennium by the EDUCAUSE Learning Initiative and the American Association for Higher Education and Accreditation. These organizations saw that student e-portfolios could ultimately serve a variety of purposes: developmental, assessment, and showcase. Developmental portfolios demonstrate the progress and development of students over a specific period and serve as a key source of communication between students and faculty. Using this type of student portfolio can promote student engagement and ownership of learning. Electronic portfolios

Use of electronic portfolios (e-portfolios) has been advocated to demonstrate nursing student accomplishments as well as to document program and course outcomes. This use of e-portfolios incorporates information technology, thus aligning the educational process in professional degree programs to 21st-century teaching and learning scholarship. Here we describe a project to explore the feasibility of transitioning from documenting student competencies in hard-copy binders to e-portfolios. To make this transition in an efficient manner in our graduate nursing program, we used the Plan, Do, Study, Act quality-improvement model. An interdisciplinary team of nursing faculty and educational computing consultants developed a professional e-portfolio template and implemented a pilot program for 10 students enrolled in our nurse educator specialty. This program was executed by assessing university resources, evaluating the technological competence of both students and faculty, and through the interdisciplinary team members' commitment to provide ongoing support for the program.

KEY WORDS

Competency • Electronic portfolio • Graduate nursing program • Interdisciplinary collaboration • Nursing education

Author Affiliations: Graduate School of Nursing (Dr Wassef) and Medical School (Ms Riza, Mr Maciag, Ms Worden, and Ms Delaney), University of Massachusetts, Worcester.

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Corresponding author: Maureen E. Wassef, PhD, RN, University of Massachusetts Worcester, 55 Lake Ave N, Worcester, MA 01655 (maureen.wassef@umassmed.edu).

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can also assist students in tracking their own learning progress, deepen their learning experience through collaboration, relate their academic work to local and global communities, and develop reflective practice and a philosophy of lifelong learning. Assessment portfolios demonstrate student competence as defined by program standards. The use of competencies to organize and guide a student’s e-portfolio is widely used in nursing and is well documented. Finally, the use of showe portfolios demonstrates students’ exemplary work and is frequently created at the end of a degree program for potential employers to review. In reality, most e-portfolios are an amalgamation of these three types.

Electronic portfolios can be of value not only to students but also to faculty and the overall curricular process. Using an e-portfolio in a nursing program curriculum, for example, as a teaching/course e-portfolio, can serve a wide range of faculty needs, including assessing, reflecting on, and improving the evaluation process. For example, a course e-portfolio can be used to document student learning and achievement of key objectives. Such a course e-portfolio can be a reflective document that summarizes a course and its impact on student learning. The document can include students’ work to illustrate and examine their understanding and performance and can incorporate faculty reflection on future goals for revising and teaching the course or curriculum. Integration of these course e-portfolios can guide the creation of program e-portfolios. Creating and using program e-portfolios are vital in the accreditation process and can highlight the alignment of learning outcomes on multiple scales.

**IDENTIFYING A NEED FOR CHANGE**

Within our Graduate School of Nursing (GSN), all students were encouraged to develop a portfolio before graduation to demonstrate accomplishment of specialty competencies. Developing this portfolio is a requirement within a few specialty tracks, including the nurse educator role. Historically, in our institution, students in the nurse educator track were required to document key assignments, papers, and presentations that highlight and demonstrate achievement of National League for Nursing (NLN)–based competencies. Our identified problem was that both students and faculty found the traditional paper/binder portfolio to be cumbersome. A literature search was conducted within the educational and healthcare literature in search of best practices for creating student portfolios. Literature within the past 10 years supported the integration and use of student e-portfolios in institutions of higher learning. In addition, both the NLN and the American Association of Colleges of Nursing (AACN) have addressed the need to incorporate informatics’ competencies into nursing curricula.

Of particular interest to our program were the informatics’ competencies identified for students in the AACN Essentials of Master’s Education in Nursing document. The nine essentials addressed in this document delineate the knowledge and skills that all nurses prepared in master’s nursing programs acquire. These essentials guide the preparation of graduates for diverse areas of practice in any healthcare setting. Essential V specifically addresses the issue of informatics and emphasizes the need for the master’s degree–prepared nurse to be competent in the use of information and technology to communicate, manage knowledge, mitigate error, and support decision making. Transitioning our traditional portfolios into an electronic version would increase student exposure and interaction with utilizing innovative technology while introducing them to available software options to organize, file, and showcase professional documents.

We also anticipated that the e-portfolios would provide a repository of essential documentation of student works and outcomes in preparation for upcoming accreditation visits. In particular, standard III within the Commission on Collegiate Nursing Education Standards for Accreditation of Baccalaureate and Graduate Degree Programs highlights the key issue of program quality in regard to curriculum and teaching-learning practices. It is expected that individual student learning outcomes are consistent with the roles for which the program is preparing its graduates. In our program, documentation and evidence of integration of the Essentials of Master’s Education in Nursing would be a great benefit in the overall accreditation process. Based on the results of this literature search and the greater expectation that key nursing organizations place on student proficiency in informatics and technology, we chose to explore the feasibility of designing and implementing a student e-portfolio.

Before embarking on this project, our interdisciplinary team (nursing and educational computing professionals) chose the Plan, Do, Study, Act (PDSA) model to guide our process. The PDSA model (also known as the Deming cycle) is a continuous quality-improvement framework with a logical sequence of four repetitive and interconnected steps (plan, do, study, act) for ongoing improvement and learning. As illustrated in Figure 1, the primary benefit of the PDSA model stems from its inherent circular nature, which allows for continuous improvement over time. As a result, the PDSA model also lends itself to being interactive with the flexibility to allow for evaluation and reevaluation at each step of the process.

To guide us in this process, the PDSA Worksheet developed by the Institute for Healthcare Improvement

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PLANNING AHEAD FOR THE CHANGE

The first step of planning, which was essential to the success of our overall project, was to assess our institutional resources and identify key members of the project team. Since our GSN is affiliated with a major teaching hospital and medical school, we are fortunate to have a comprehensive Information Services (IS) department on site. Thus, we contacted the director of the Educational Computing Division within IS to share our vision and discuss possible options in moving forward.

There were several things we needed to determine before embarking on this change. What software is available to both students and faculty within our institution that could support our vision for an e-portfolio in a cost-effective manner? What technology could transfer to the anticipated enterprise e-portfolio solution? How technologically savvy was our faculty and student population, and would they fully embrace this project? What technological support would be available to partner with the GSN, to plan, initiate, and continually support the process? These questions were based on the underlying principles of technology roadmapping. Technology roadmapping is a form of technology planning that takes into consideration the unique needs and consideration of an institution.15

The emphasis on technology roadmapping is to help identify, select, and develop technology alternatives to a set of needs. In effect, a technology roadmap guides a team to identify alternative technology roads for identified goals or objectives. This takes into account the crucial factors of budgetary, time, and resource constraints. This form of technology planning can provide an institution with greater flexibility and options in regard to both the short- and long-term plans for their technology needs. Our first planning meeting included a GSN faculty member, director of Educational Computing, and several instructional technology and technology training specialists. In this meeting, we initially discussed our shared philosophical approach to this project based on the fundamentals of technology roadmapping. Therefore, we began our discussion with our identified need and proceeded to identify and select technology alternatives to meet our immediate needs. We made several core decisions: we chose the supporting software for e-portfolios, agreed to secure support commitment from the educational computing team, and resolved to assess technological skills of faculty and students. We chose Adobe Acrobat version 9 (Adobe Systems, San Jose, CA) as the supporting software for many reasons. First, this software is user-friendly, has a consistent visual style, and is compatible with other environments (the Learning Management System, enterprise e-portfolio software, and both Mac and PC computers). The software also assists students in creating personalized, media-rich e-portfolios and provides the capability to add personal reflection and comments. Second, this software was available as a free download to all faculty members and for student use in the library computer laboratory. Students also had the option of purchasing this software at a discount for home use. Finished e-portfolios could be viewed by interested individuals, for example, a prospective employer, using only a free download of Adobe Reader.

A critical supporting factor was the commitment to this project was made by the educational computing team in the form of consultation, education, and ongoing support for GSN students and faculty. Finally, based on our assessment of the technological capabilities of the GSN faculty and students, we decided to first implement the project on a small scale with interested faculty and students in the nurse educator track. Thus, the educational computing team began to design an initial e-portfolio template supported by the chosen Adobe software and based on the NLN core competencies for nurse educators. Each e-portfolio would contain a series of electronic folders with various documents that supported the student’s accomplishment of each competency.
DO: EXECUTING THE PLAN AS A PILOT PROGRAM

The educational computing team designed an e-portfolio template, which was first presented as an exemplar with guidelines to faculty in the nurse educator program. This student e-portfolio template consisted of a home page with a university logo, a place for a professional student photograph or other visual image, and pertinent contact information. As mentioned earlier, a series of folders was also included to file the student’s curriculum vitae, documents representing the core competencies, and any other central professional materials unique to the student. At this presentation, additional discussion and brainstorming focused on establishing and refining guidelines that ensured a professional appearance while permitting individual student creativity.

The next step was to conduct a didactic and hands-on educational session to introduce this project to 10 nurse educator students. After the software was installed in the university library’s computer laboratory, a 2-hour educational session was scheduled to accommodate the 10 students’ schedules. This session consisted of an interdisciplinary presentation between IS and nurse educator faculty members to introduce the concept of the e-portfolio, how it would be used and integrated in the program of study, and most important how to design and navigate within the e-portfolio.

The 2-hour educational session was organized around the concepts of collect, select, reflect, and share. Students were given a three-column table identifying the NLN core competencies of academic nurse educators, the required GSN courses that mapped to these competencies, and a blank column for students to identify key assignments denoting accomplishment of the competency. Examples of student-identified documentation are shown in Table 1. Once students had selected some fundamental projects related to a competency, they were encouraged to further discuss each item within the e-portfolio and reflect on how it contributed to their body of knowledge. This hybrid developmental/assessment/showcase portfolio consists of a digital collection of artifacts that represent competency-based academic achievements and reflective experiences. The e-portfolio could contain Microsoft Word documents (Microsoft, Redmond, WA), Web pages, images, audio and video files, and various collaborative features such as faculty- and student-shared document pages.

Two crucial issues that emerged from this educational session were security of student documents and copyright issues within the electronic document. The selected software provides security and privacy options, including password-protected access. Students’ work was copyright protected because it was a personal work of original thought created and fixed in a tangible form perceptible either directly or with the aid of a machine or device.

To further protect their personal documents, students were encouraged to save the documents in their e-portfolios in PDF and to use the copyright notice. The copyright notice is the responsibility of the copyright owner and does not require advance permission from or registration with the US Copyright Office. The recommended copyright notice for documents posted within the e-portfolio contains the following three elements: the symbol © (the letter C in a circle), the year of creation/publication, and the name of the author. Finally, students were provided additional information about the benefits and advantages of copyright registration.

STUDY, EVALUATE, AND RUMINATE

As with any educational session, an essential element was the students’ evaluation and feedback, including suggestions for change. Students were asked the following questions. At the end of the session, were you comfortable beginning your e-portfolio? Are you planning to utilize the computer laboratory in the library to develop your e-portfolio, or do you plan to purchase the software? How can we further support you in this process? What changes would you make to the class in order to facilitate learning?

Overall, the comments indicated a positive, yet cautious attitude about the process. The two areas of concern that emerged included the time commitment to become familiar with the process and then create a professional e-portfolio. Additional feedback focused on the need for ongoing support, an additional hands-on class to help put together the final product, and a recommendation to introduce e-portfolios at the new student orientation.

Of the 10 nurse educator students introduced to the new e-portfolio project, two were planning to graduate within that academic year. Therefore, an additional class was scheduled with IS to help these students create and refine their e-portfolios for the job search process. Both students also chose to purchase the software for personal use on their laptops. In the last few months before graduation, the students worked with nurse educator faculty to select and reflect on key documents and with educational computing members to create a professional finished product. Given the flexible software and portfolio template, each student submitted a very individualized e-portfolio. Of the two students who finished their e-portfolios, one chose a professional, formal picture for her home page and created a folder for several publications and presentations in her specialty of neonatal bereavement. In contrast, the other student chose to illustrate her home page with a more interactive...
depiction of her physical assessment techniques and incorporated her community work in one folder. Both students downloaded their e-portfolios onto CDs and provided a copy to each prospective employer.

### ACT: STANDARDIZE AND EVALUATE THE PROGRAM

All members of the interdisciplinary team (nursing faculty and educational computing consultants) viewed the process of developing the e-portfolio as a positive experience and productive endeavor. This e-portfolio project was presented at the monthly meeting of the university’s innovations in teaching technology group, composed of faculty members of the GSN, school of medicine, school of biomedical sciences, and key IS support staff. This presentation stimulated discussion leading to commonalities among the schools regarding student e-portfolio needs. As a result, the educational computing department scheduled educational opportunities for other faculty to learn more about the software that supported this process.

Within the GSN, the e-portfolio process has been introduced and formally integrated into the nurse educator track, and the DNP and PhD programs. Plans are currently underway to design and implement this project with students in the GSN’s Graduate Entry Pathway and the remaining master’s specialties. For each program, an e-portfolio template has been designed to reflect the program’s core competencies.

<table>
<thead>
<tr>
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<th>Course</th>
<th>Student-Selected Documentation</th>
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<tbody>
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<td>Facilitate learning</td>
<td>N620, N621B, N625B, N622</td>
<td>Lesson plans, including use of diverse strategies such as case studies and role playing</td>
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<tr>
<td>Facilitate learner development and socialization</td>
<td>N621B, N625B</td>
<td>Developed guidelines for patient assignments, lesson plan for preconference and postconference, guidelines for reflective journaling</td>
</tr>
<tr>
<td>Use assessment and evaluation strategies</td>
<td>N623, N625B</td>
<td>Creation of examination template based on NCLEX blueprint, guidelines for clinical anecdotal notes of students</td>
</tr>
<tr>
<td>Participate in curriculum design and evaluate program outcomes</td>
<td>N620, N621B, N625B</td>
<td>Participation as student representative on GSN curriculum committee, creation of curriculum design project</td>
</tr>
<tr>
<td>Function as a change agent and leader</td>
<td>N621B, N624</td>
<td>Performance improvement project on chemotherapy treatment scheduling</td>
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<tr>
<td>Engage in scholarship</td>
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<td>Documentation of formative and summative evaluation in teaching practicum</td>
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<td>N621B, N625B</td>
<td>Publishable leadership paper, service-learning project poster presentation</td>
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*aCore courses/nurse educator specialty.*

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**Table 1**

Mapping Academic Nurse Educator Core Competencies

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of this project and to providing ongoing support for educational and technological assistance.

The primary objective for this part of the implementation process will be to conduct a program evaluation focusing on Kirkpatrick’s first level of “reaction.” This level focuses on the stakeholders’ reactions to satisfaction and perceived usefulness and practicality of the program. Of primary importance to this evaluation program is the inclusion of all key stakeholders including students, faculty, and IS support staff. Through the use of focus groups, themes will be identified to guide the next step of our program.

■ MOVING FORWARD AND LESSONS LEARNED

As with any new project, this one had various “aha” moments and many lessons learned. The success of this project stemmed from several factors: team members’ communication and productivity, early consideration of consumers’ (students and faculty) comfort level and readiness to incorporate this technology within the curriculum, availability of cost-effective software resources within our university, and availability of physical computer laboratory space on campus for educational sessions and with student access for ongoing work on their e-portfolios.

Before embarking on the process, the team needed to address other key issues. First, we identified early on the type of e-portfolio that would be the focus of the project. Second, we had to determine whether the e-portfolio would be a graduation requirement and whether students would receive a grade/credit for its development. Third, we needed to develop a timeline from the initial meeting with IS, to faculty and student orientation, and to final implementation. For this project, the time from our initial meeting with IS to the first student educational session was about 9 months. Four months later, the first student e-portfolios were created before graduation.

In implementing this project, the team faced two obstacles: the initial time investment and changing the mind set of both students and faculty about using new technology. The initial time investment (the 2-hour educational session) was a challenge since this class had to be incorporated into the students’ already busy schedule. Scheduling this class outside the students’ normal class times required giving them sufficient advance notice. In this case, we negotiated ways to give this time back to the students as the semester progressed. Many students and faculty were also very comfortable with their hard-copy binder portfolio and needed a clear rationale to warrant this additional investment of their time. Emphasizing the core competencies of the AACN master’s essentials and other supporting documents was highly effective in supporting this project.

Electronic portofilos provide a unique means to showcase a variety of rich electronic media. These media can take the form not only of Word documents, but also multimedia presentations. Using e-portfolios can benefit not only the students by highlighting their accomplishments, but also faculty seeking promotion/tenure and programs by documenting the curriculum evaluation process. Integrating and implementing the e-portfolio within the nursing education curriculum are essential not only to reinforce student comfort with informatics but also to serve as a vehicle for documenting their core accomplishments within their specialty areas.

Although e-portfolios can meet a variety of educational needs, we chose a hybrid developmental/assessment/showcase student e-portfolio. This type of portfolio met students’ needs and provided the flexibility to highlight individual achievements within their program of study and reflect on their growth as educators. Using an e-portfolio allows students to actively participate in assessing their own learning, tell their own stories, and demonstrate personal connections between course work and experiential learning. Before graduation, the e-portfolio can be of great value as students pursue prospective opportunities (employment or educational); after graduation, the portfolio can be maintained and updated for the purpose of professional career development including promotions, advancement opportunities, or professional credentialing. Finally, the competency-based student e-portfolio offered the additional benefit of mapping curriculum content to core specialty competencies, thus providing key documentation for future nursing school accreditation.

■ REFERENCES


For more than 12 additional continuing education articles related to electronic information in nursing and 23 additional continuing education articles related to education, go to NursingCenter.com/CE.