Nurse Educator

Transforming Doctoral Education Through the Clinical Electronic Portfolio

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The DNP is a terminal degree focusing on the preparation of expert clinicians with advanced leadership, evidence-based practice, and systems management skills. An electronic clinical portfolio (e-portfolio) allows students to showcase their individual experiences, provides an objective measure of their achievement, and demonstrates integration of the core doctoral competencies within each specialty. The purpose of this article was to describe the development of an e-portfolio and provide general guidelines for successful implementation and evaluation.

Keywords: *advanced practice nursing education; clinical portfolio; Doctorate of Nursing Practice; electronic portfolio; portfolio*

The DNP is a terminal doctoral degree focusing on preparing expert clinicians with advanced leadership, interprofessional collaboration, evidence-based practice, and systems management skills. DNP programs have the potential to create nursing leaders who will transform healthcare in the 21st century. However, the evolution of DNP programs has created new challenges for nursing educators charged with the task of innovative curriculum development across advanced practice-focused doctoral programs. Challenges include the development of a final scholarly project that demonstrates integration of the core doctoral competencies within each advanced nursing specialty practice, as well as achievement of individual program outcomes. According to the American Association of Colleges of Nursing (AACN), this final project should provide tangible evidence of the student's expertise derived from all educational experiences with a primary focus on the practice immersion experience.[1] The primary focus of the DNP is mastery of an advanced specialty within the nursing profession. Thus, an electronic clinical portfolio (e-portfolio), which incorporates a variety of competency-based artifacts and projects, provides an innovative platform for the development of the terminal DNP project so that students may showcase their individual learning experiences, while providing an objective measure of achievement amenable to evaluation by faculty.

The rationale for the e-portfolio is derived from the fundamental premise that DNP education primarily involves the mastery of an area of advanced nursing practice and therefore should include evidence related to the impact of that practice on individual patient and population outcomes.[1] In addition, there should be a strong focus on the application of evidence-based practice and quality improvement (QI), not necessarily on research and the generation of new knowledge.[2,3] The e-portfolio is an ideal medium for a program to use to demonstrate attainment of the DNP Essentials because it can be designed to represent a compilation of student learning accomplishments across the curriculum, from the classroom, clinical arena, and specific experiences created for completion of the scholarly project.[4] Because DNP graduates will assume roles as leaders, consultants, quality managers, and educators in addition to functioning as expert clinicians, the clinical portfolio provides students with the opportunity to develop activities that are meaningful and allow them to showcase their individual areas of clinical and professional expertise.

Graduate nursing programs are committed to providing the clinical and academic foundation necessary to produce competent, advanced practice nursing professionals by providing opportunities for growth and development in a safe and progressive educational environment. The education provides a context for understanding clinical practice and serves as the foundation on which students can continue to build within their chosen areas of scholarly study or professional development long after successful completion of the program.[4] This includes the integration of both theory and research into practice and the use of a critical evidence-based approach to problem solving in diverse contexts. The DNP program also

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builds on a tradition of innovation and commitment to excellence in education, scholarship, social justice, professional service, and leadership. Students are taught to provide and advocate for optimal healthcare for all members of society. These ideals provided the framework for the development of our program's doctoral outcomes (See Table, Supplemental Digital Content 1, http://links.lww.com/NE/A137) and serve as the foundation on which the requirements of our practice portfolio are based. The purposes of this article are to describe the process of developing an electronic practice portfolio as the final scholarly DNP project and provide general guidelines for successful implementation and evaluation.

Elements of Clinical E-Portfolio

There is little advice in the nursing literature about what the e-portfolio should actually contain. Smolowitz and Honig[5] suggest that a portfolio is a compilation of accomplishments achieved by the student during program-related learning activities and experiences representing tangible evidence of clinical competence. It is important that the contents of the e-portfolio include evidence of attainment of national advanced practice specialty competencies, the DNP Essentials, and individual school's program outcomes. Therefore, during the development of the e-portfolio, all of the individual portfolio elements identified were mapped against school of nursing doctoral program outcomes, the Essentials of Doctorate of Nursing Practice Education, and the standards set forth by the National Organization of Nurse Practitioner Faculty to ensure that the e-portfolio would capture all individual program competencies and outcomes in the final product (Table 1). As such, each individual element was chosen as an exemplar of

a specific program outcome or doctoral Essential within the school's program. Each institution should critically appraise its own curriculum to identify the exemplars that work best within its graduate framework. It is important to note that in programs such as ours in which multiple specialties are offered, specifically the nurse anesthesia track, it was also necessary to evaluate the e-portfolio components as they relate to the standards set forth by the Council on Accreditation of Nurse Anesthesia Educational Programs as some nuances in requirements exist.

Faculty representation from each of the specialty tracks was essential to ensure inclusion of the various advanced practice nursing perspectives. For example, one of the most important outcomes of DNP programs is for students to achieve clinical excellence within a specific area of advanced practice. The achievement of this outcome may be demonstrated through the completion of comprehensive, evidence-based clinical case narratives during the clinical practice experiences. DNP students demonstrate competence in the provision, coordination, and direction of care to healthy patients and those with chronic comorbidities across the life span and environments of care specific to a specialty track. The Clinical Case Narrative follows a comprehensive case study format as developed by Smolowitz et al[6] that demonstrates the DNP student's ability to meet the program outcomes and specialty core competencies.

Students in our DNP program also must demonstrate the ability to translate research into practice through critique of existing evidence, evaluation of outcomes, and implementation of projects that contribute to the development of best practices. In addition, they should be able to evaluate healthcare

Table 1. Attainment of DNP Program Outcomes by Portfolio Requirements

Portfolio Requirement	Program Outcomes Met[a]	Course in Which Portfolio Requirement Is MET
Clinical immersion logs	1-8 (See individual track competencies for contents of clinical logs)	*DNP Immersion*: 1 log per clinical immersion experience; 5 logs for BSN-DNP students; 3 logs for MSN-DNP students
Evidence-based case studies	1-8	*DNP Immersion*: 1 per clinical immersion experience; 5 cases for BSN-DNP students; 3 cases for MSN-DNP students
Curriculum vitae	8	*Advanced Nursing Roles and Reflective Practice* (curriculum vitae is started and updated throughout program)
SWOT analysis	6	*Advanced Nursing Roles & Reflective Practice*
Business plan	5	*Finance and Quality Management*
Evidence-based research proposal	3, 4	*Research Methods for Evidence-Based Practice*
Grant application	3, 4	*Research Translation for Clinical Practice*
IRB proposal	3, 4	*Research Translation for Clinical Practice*
NIH Human Subjects Certification	2, 4	*Epidemiology and Biostatistics*
CDC Epidemiology Certification	2, 4	*Epidemiology and Biostatistics*
Quality improvement report	5, 6	*Finance and Quality Management*
Data-based systems improvement project	2, 5	*Information Technology for Healthcare Improvement*
Interprofessional leadership improvement project	7, 8	*Leadership and Interprofessional Collaboration*
End-of-semester self-assessment reflections	4	1 per semester
Primary authorship on publication-ready manuscript: case study, business plan, integrative literature review, or other course materials/issues of interest	1-8	To be determined with advisor
Regional/national poster presentation	1-8	To be determined with advisor

[a]See Table, Supplemental Digital Content 1, http://links.lww.com/NE/A137, for complete list of program outcomes.
Abbreviations: CDC, Centers for Disease Control; NIH, National Institutes of Health; SWOT, strengths, weaknesses, opportunities, threats.
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system outcomes to achieve QI. DNP students are able to demonstrate accomplishment of these program outcome with several deliverables designed to build on one another over the course of the program. The comprehensive research proposal develops from a clinical problem identified and described in the first role course. Students then complete an institutional review board (IRB) proposal and develop an evidence-based grant proposal to demonstrate their skills for seeking institutional support and/or external funding for projects in a particular clinical area. The QI project involves systematic, data-guided initiatives designed to enhance healthcare delivery in a particular setting. Quality improvement projects may involve the implementation and evaluation of interventions to improve the quality of patient care or the development of practice guidelines in an area of clinical expertise. Students may choose to implement these initiatives as part of the final DNP project. These combined artifacts provide evidence of the DNP student's ability to meet both the evidence-based and QI program outcomes (See Table, Supplemental Digital Content 1, http://links.lww.com/NE/A137).

Finally, use of a reflective practice framework informs clinical judgments, helps resolve ethical dilemmas in healthcare, and allows the students to serve as patient care advocates. One of the key elements of the clinical e-portfolio and an ideal measure of this outcome is the end of the semester reflections that DNP students complete. Reflection is defined as a form of "inner work" that results in the energy for engaging in "outer service." Reflection in-and-on action supports meaning making and purpose management in one's professional life.[7] Throughout the program, students use reflection to tie together various elements of learning and facilitate deeper consideration of themselves and their professional practice. The reflections serve as one of the most important components of the e-portfolio because they provide an opportunity for students to continually reexamine their personal and professional development given new knowledge, skills, and clinical situations.[8]

The Immersion Experience

A key aspect of any DNP program is the application of the DNP Essentials in the clinical arena. According to the AACN, doctoral programs should be designed to incorporate a minimum of 1000 hours of supervised, postbaccalaureate practice in order to achieve specific learning objectives and subsequently assimilate knowledge for advanced practice at a high level of complexity.[1] Our DNP program achieves this essential outcome through the integration of specific "immersion experiences" that complement the advanced practice specialty clinical practicum. This allows students to participate in clinical-based activities specifically targeted at the attainment of DNP Essentials I-VII and that culminate in the development of unique projects, publication-ready manuscripts and terminal project poster presentations that serve as the final e-portfolio requirement. Individual objectives and activities for these immersion experiences are designed by the students, along with their portfolio advisor, to meet their individual goals and are documented in the "DNP Immersion Logs," which are an integral part of the e-portfolio. Not all competencies or outcomes are met within each immersion experience. However, by the end of the program, students address all clinical competencies with appropriate objectives and clinical activities.

Implementing the Electronic Practice Portfolio

While a DNP portfolio is used primarily to demonstrate and showcase the student's competence and expertise in the clinical setting, it can also be used for faculty evaluation of students to ensure they meet the program outcomes and national competencies.[5] A time-saving method for faculty members and the communities of interest within the university to monitor a student's progress in any DNP program is through the use of the e-portfolio. Clinical portfolio advisors, preceptors, and fellow students can be invited to view the student's portfolio, which becomes a living chronicle of the student's development as an advanced practitioner. It is accessible for constant review, analysis, and reflection as students proceed along their doctoral journey.

There are many electronic portfolio systems available for showcasing an individual's work, and more e-portfolio platforms are developing daily. The choice is dependent on the specific needs of the institution and individual programs. It is essential to choose a platform that has demonstrated effectiveness and will be sustainable throughout the student's career. It is also important that the university support the chosen platform with resources to facilitate student learning and adoption. Our electronic portfolios are developed within the course management system used by our university.

To increase faculty and student utilization of the e-portfolio system, the advantages need to be continuously communicated on program entry and throughout the course work. Advantages of the e-portfolio for students include accessibility for the student to manage in any setting; the ability to have all of their clinical narratives, projects, and other artifacts in 1 secure area and the ability to view comments made by faculty mentors on an ongoing basis. The e-portfolio is also available to DNP students after graduation for continual use in professional development. Advantages for faculty members include ease of accessibility to individual student course work and the ability to provide feedback in a timely manner. This is particularly useful if multiple faculty members are working with a DNP student because there is less duplication, better coordination of feedback, and easier comparison of the student's work in a longitudinal manner across settings and throughout the program.

Challenges to implementing an e-portfolio exist and include variability in the learning curve required to use this type of system and the possibility of server malfunction. Ease of learning the system depends on the individual and previous computer skills, which can make the process time consuming for those with less technological experience. To address some of the learning issues with the system, DNP students and the faculty participate in an orientation to the e-portfolio at the start of the program. They also are provided with specific program outcomes and objectives that are the foundation for the development of the DNP portfolio and immersion experiences. Students are familiar with the functionality of the course management system, which eases integration of the e-portfolio into the curriculum. To manage technical issues for students, as well as faculty, the computer and networking department within the university is available to answer questions and troubleshoot concerns.

Faculty and Student Responsibility for the E-Portfolio

Faculty Role as Portfolio Advisors

The role of the clinical portfolio advisor can be seen as a combination of *guide* and *mentor*, someone who provides intensive personal support to the student on their journey. Their relationship becomes the foundation that will "facilitate the challenging process of portfolio development."[9(p120)] The e-portfolio itself captures the essence of the students' transformation, and the process of development demands a considerable investment of both time and energy by the portfolio advisor. The portfolio advisor is responsible for facilitating appropriate sites for students to complete their DNP immersion experiences. This may entail the cultivation of new or newly envisaged relationships with a variety of healthcare professionals and practice settings. Faculty members serving as portfolio advisors have to step out of their primary area of practice and consider innovative mechanisms to provide students with opportunities in fields such as policy or informatics. Faculty can work together to compile lists of current or upcoming opportunities in which students from different specialty areas can participate.

Similar to the dissertation chair for the research doctorate, the portfolio advisor is expected to work closely with the student over an extended period to ensure the student has a consistent experience that maximizes his/her learning outcomes. There is an ongoing collaborative process in which the portfolio advisor assists the student in developing measurable goals and objectives and in refining those goals to better match the individual program outcomes, specialty practice competencies, and DNP Essentials. Furthermore, the portfolio advisor should pay special attention to creating reasonable timelines for students and ensuring their adherence to the agreed-on action plan, lest the students complete all program requirements except for the e-portfolio. Assessing the responsibilities of the portfolio advisor, faculty members quantified their workload and determined that they should receive 1 teaching load credit for working with each DNP student for a maximum of 3 semesters or 3 teaching load credits. At our institution, 1 teaching load credit is equivalent to 45 hours per semester or 3 hours per week.

Student Responsibilities for the E-Portfolio

Students are asked at the beginning of each semester's immersion experience to develop goals for the upcoming immersion in collaboration with their portfolio advisor. The goals need to be clear, relevant, measurable, and consistent with the program outcomes. Students are then required to identify tangible measures that will verify the attainment of each goal. These tangibles are referred to as "practice outcome measures" and can take a variety of forms including certification validating completion of an educational program, slides developed for student presentation, or reflective journal entries completed after an immersion-related activity. Students are responsible for collecting all necessary practice outcome measures and uploading them to the e-portfolio on completion of each immersion experience. The portfolio advisor is then responsible for the review/acceptance of each tangible and for indicating their agreement with the immersion hours listed on that semester's log.

As students begin to plan for the next immersion experience, or for the work they need to do to complete a course assignment for the e-portfolio, they are asked to reflect on their individual strengths and previous clinical experiences and to use that knowledge when considering opportunities that might best provide the expertise they need. For example, a student who has already had significant experience with collecting and analyzing data for research might specifically search for opportunities in the healthcare policy realm. Furthermore, as they progress in the DNP curriculum and refine their future career goals, students are encouraged to engage in networking and to identify potential immersion sites that are a match for their needs.

The e-portfolio presents an opportunity for students to document growth as emerging clinician-scholars. The portfolio documents the full range of skills and competencies developed by DNP students across courses and clinical settings; however, no 2 portfolios are exactly alike. It is the responsibility of each student to take individual course assignments in the direction most meaningful to him/her and add items to the portfolio that best capture his/her individual story of transformation. On completion of the final immersion experience, students submit a final reflection that summarizes in narrative form how they have met each DNP program outcome. The portfolio advisor then reviews this reflection and related material in the e-portfolio and documents whether the student has met the individual outcomes.

Joint Responsibilities for Optimal Outcomes

Using the e-portfolio as the final DNP scholarly project can leave students with the feeling they are on their own in linking the various items required for the portfolio and confused about their relevance to scholarship at the doctoral level. Conversely, faculty can be left feeling overburdened with the tasks of cocreating, reviewing, monitoring, and verifying information contained in the e-portfolio.[10] As is most often the case, the relationship between students and their portfolio advisor is critical for the success of the student. Both student and advisor are responsible for scheduling regular meetings throughout the semester and for completing the tasks each had agreed to at the previous session (eg, students submit completed work and faculty provide substantive feedback, both in a timely manner). In addition, both must contribute to the outcome-driven process for each immersion experience. In reality, students increasingly take charge of planning their immersions, while the portfolio advisor monitors their progress toward the final goal. With a curricular structure to follow, a collegial and respectful relationship in place, and shared commitment to the process of DNP education, both student and faculty can derive benefits from the work involved in creating an e-portfolio. As described by Shirey,[11] the e-portfolio can be a way of preparing the student "to leverage talents and to prepare for quickly pouncing on unexpected opportunities."[11(p241)]

Overall Portfolio Evaluation

The course faculty and portfolio advisor evaluate the e-portfolio materials to determine if students have accomplished their individualized goals and met their specialty

competencies, the DNP Essentials, and overarching DNP program outcomes (Table 1). In addition, the portfolio advisor is responsible for reviewing the publication-ready manuscript and chairing the committee evaluating the oral poster presentation.

Evaluation of Portfolio Requirements

Each portfolio requirement embedded in the academic courses has faculty-developed grading criteria (Table 1). The individual faculty members teaching the courses are responsible for grading the student's work and providing feedback on the assignment so that students can revise their end product prior to uploading their e-portfolio. In some cases, students may choose to implement course projects to meet the requirements of the immersion experience. While only hypothetical projects are required for some of the academic courses to demonstrate knowledge for this course requirement, the concurrent immersion implementation allows the student to effectively demonstrate the application of theory to practice. The evidence-based case studies are graded using the established rubric by either the course faculty or portfolio advisor, depending on where in the curriculum the case study is assigned. All other immersion requirements fall to the portfolio advisor for review including the publication-ready manuscript.

Final Portfolio Evaluation

The publication-ready manuscript/project that demonstrates integration of core doctoral and specialty advanced practice competencies and the program outcomes allows the portfolio advisor the opportunity for final portfolio evaluation and is a major component of the student's e-portfolio. Moreover, the manuscript/project depicts the integration of the immersion experiences and allows students to apply whole or parts of the major course papers/projects from the DNP courses. The publication-ready manuscript/project, or another artifact that is chosen by the student in collaboration with the portfolio advisor, also needs to be presented at a professional venue and to the university as part of the clinical portfolio defense because dissemination of project outcomes is an essential part of doctoral education.[12] The portfolio advisor works with the student to further develop a paper/project that originated within a course or immersion experience and bring it to the level required for a professional presentation and publication. The grading rubric for the publication-ready paper (See Table, Supplemental Digital Content 2, http://links.lww.com/NE/A138) and presentation (See Table, Supplemental Digital Content 3, http://links.lww.com/NE/A139) allows for objective evaluation by the portfolio advisor and terminal project committee.

Evaluation of Electronic Portfolio Methodology

Ongoing feedback from both students and faculty members has been positive regarding the clinical portfolio methodology as evidenced by more comprehensive and interprofessional immersion experiences performed by students; increased networking among faculty, students, and preceptors on a variety of collaborative initiatives; and positive evaluation of the online portal portfolio technology by students and faculty.

Table 2. Guidelines for the Development and Implementation of E-Portfolios

- Determine if the use of an e-portfolio as the terminal scholarly project is consistent with the school's mission and individual DNP program outcomes
- Examine the curriculum to determine the scope of the e-portfolio. Consider both the academic and clinical requirements of the specialties offered
- Examine each didactic course to identify exemplars of DNP competency attainment
- Map e-portfolio elements to the DNP program outcomes and Essentials to ensure all competencies are addressed
- Identify best path for integration of the portfolio into the curriculum to maximize resources and establish continuity
- Choose the appropriate platform for implementation of the e-portfolio, taking into account available resources and ease of use
- Develop guidelines for evaluation of all aspects of the portfolio prior to implementation
- Develop guidelines for student advisement (both for the advisors and students)
- Elicit early feedback from both students and faculty to address concerns and implement necessary changes

Feedback has been used to guide programmatic change and develop general guidelines for portfolio development (Table 2).

Conclusion

An e-portfolio that incorporates a variety of competency-based activities and projects allows students to showcase their individual learning experiences while providing an objective measure of their achievement. This final project should provide tangible evidence of the students' expertise derived from all educational experiences with a primary focus on the practice immersion.[1] Graduates from practice-focused doctorates need to be prepared as advanced nursing practice experts and leaders who have accomplished evidence synthesis and/or practice improvement projects, not research.[2] The e-portfolio meets these mandates and provides a rich tapestry of learning experiences for students and the opportunity for faculty to collaborate with each other and students as partners in achieving practice excellence.

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Interprofessional Education Competencies

Interprofessional Collaborative Practice is founded on the principles that healthcare professionals do not work in silos of practice and that best patient outcomes occur through effective team-based care. Interprofessional Education Competencies (IPEC) involves much more than inviting a speaker from a different discipline to class. While IPEC is here to stay, schools of nursing have perceived barriers to overcome that do not seem to be unique. One example is the freestanding nursing school that offers no other health discipline. This hardship often arises in rural areas where partnership with other schools is often miles outside of their geographic location. For larger health sciences schools, collaborating with other disciplines within the university becomes a scheduling nightmare. Nursing, physical therapy, pharmacy, and medicine are all content laden. Some schools have begun piloting options for evening and weekend classes or creative course coding such as IPEC301 instead of NUR301 for an ethics class. Questions emerge. How is tuition divided since it may be different between disciplines? Does IPEC create a generalist when the goal of each discipline is to be a specialist? Do disciplines really work in teams in the real-world settings? What happens when scope of practice overlaps? Is there a practice gap when graduates begin to practice with others who have not had IPEC? These barriers and opportunities demand creative solutions, some of which can be found in IPEC documents on the American Association of Colleges of Nursing (http://www.aacn.nche.edu/) and National League for Nursing (http://www.nln.org/) Web sites.

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