Portfolio Evaluation for Professional Competence: Credentialing in Genetics for Nurses

SARAH SHEETS COOK, MED, RNC,* RON KASE, MBA, BSN, RN,†
LINDSAY MIDDELTON, BSN, RN, CGC,‡ AND RITA BLACK MONSEN, DSN, MPH, RN§

The use of professional portfolios, comprised of a wide variety of materials and evidence to profile the scope and depth of a clinician's practice competence, is gaining popularity. The usual methods of showing professional competence via paper and pencil/computerized testing, oral presentations, or performance observations provide a picture of competence at a given point in time based on didactic content recall. Portfolios present an opportunity for presentation of a larger number of competency evaluation points. Although examinations can be validated with psychometrics, providing accuracy and reliability of evaluation of portfolios is a more complicated matter. This article discusses the experiences of the Credentialing Committee of the International Society of Nurses in Genetics as they created and validated the evaluation of professional portfolios to provide a quality credential for nurses in genetics. (Index words: Credentialing; Nursing; Professional portfolios; Genetics; competencies) ***J Prof Nurs 19:85-90, 2003.***

IDENTIFYING COMPETENCE IN the health professions and particularly in nursing is traditionally accomplished through paper and pencil testing, oral examinations, and observation of performance. Each of these methods has positive and negative aspects. Paper and pencil (or computerized) testing can reasonably and effectively measure level of competence at a given point in time in an efficient manner, assuming that the testing instrument is valid and reliable. Oral examination is useful when people experienced and accomplished in a particular role discuss cases with an applicant/candidate, who has the verbal opportunity to present competence more cogently and diversely. But this method is time consuming, and results depend on the experienced clinician's ability to define clearly competencies being measured and the responses that indicate the competency. Observation of performance allows a rater to see an applicant in action, not an artificial test situation. It is also time consuming and requires not only a checklist of competencies and behaviors to be observed, but also the additional time of a skilled and unbiased observer. In both oral examination and performance observation, interrater reliability is difficult to achieve. Portfolio evaluation for professional competence combines the positive aspects of the earlier-mentioned methods with fewer of the drawbacks.

In the current health care environment of desire for error-free, evidence-based, and cost effective care (Institute of Medicine, 2000, 2001), the credentialing (validation of quality professional performance) of health care professionals for practice is even more important. Credentialing or certification (terms used synonymously in this article), in addition to academic and legal credentials, indicates to peers, consumers/patients, and to third-party payers that the credentialed provider has successfully achieved another standardized level of practice. Thoughtful consideration of the available processes for providing such certification reveals a confusing and complex morass of issues. A professional license to practice is seen as ensuring competence and/or quality. In nursing, the National Council Licensure Examination for Registered Nurses (NCLEX-RN) provides the route to the legal mandate for practice, but it is based on a minimum, basic, safe level of practice, not necessarily on a quality-producing level of competence. Although the NCLEX-RN has been developed to test levels and types of nursing knowledge in the candidate in a timely and efficient and valid and reliable manner, it still only measures competence at that point in time when the examination is completed. Additional certification for practice

*The Dorothy M. Rogers Professor of Clinical Nursing, Columbia University School of Nursing, New York, NY.
†Westat Research, Rockville, MD.
‡National Institutes of Health-Urology Oncology, Bethesda, MD.
§Educational Consultant, Hot Springs, AR.
Address correspondence and reprint requests to Professor Sarah Sheets Cook: Columbia University School of Nursing, 630 West 168th Street, Box 6, New York, NY 10032.

8755-7223/03/1902-0001$30.00/0
doi:10.1053/jpnu.2003.15

competence in nursing is provided by professional certification examinations, overseen by a consortium of professional nursing and specialty organizations (e.g., the American Nurses Credentialing Commission, National Certification Corporation, National Certification Board of Pediatric Nurse Practitioners and Associates, American College of Nurse Midwives, Council on Certification of Nurse Anesthetists, and so forth). Such certification is achieved through presentation of educational and experience evidence as well as successfully completing a standard paper-pencil/computerized examination. Initial certification is conferred for a given number of years, after which recertification, either by re-examination or other alternatives, is required. Although paper and pencil/computerized examinations have comprehensive psychometrics to validate their effectiveness, education and experience credentials are defined more loosely. Their evaluation is predicated on whether or not they meet the defined requirement—not necessarily whether or not they are of a defined quality.

The Professional Portfolio

This article considers one of the other alternatives and proposes that the evaluation of a professional portfolio can be an effective, accurate, and efficient method to measure professional ability against a defined list of competencies. Such a process might be used for recertification or even for initial certification. Much has been written about the establishment of professional portfolios for nurses, but there is little about the process of their evaluation (Meister, Health, Andrews, & Tingen, 2002; Rae & Cook, 2000; Rawson & Jones, 2001; Wenzel, Briggs, & Puryear, 1998). In 1998, the International Society of Nurses in Genetics (ISONG) began an exploration of the portfolio evaluation process as a means of providing a professional credential for nurses in genetics because there was no other certification process available.

As the genetic/genomic revolution has exploded, the necessity of public access to competent, knowledgeable, and compassionate sources of information about genetic issues, including testing and subsequent implications and treatment as well as ethical and legal issues, has become paramount. Traditionally, medical geneticists and genetic counselors have provided this type of information for interested people/patients. The problem is that the number of qualified persons is currently a combined national total of only about 5,000 (National Society of Genetic Counselors, 2002, www.nsgc.org/nr_factsheet.asp; American Board of Medical Genetics, 2002, www.abmg.org/genetics/abmg/stats-allyears.htm). Although both disciplines continue to educate and certify new members, there is still a huge national gap in available, competent resources. There are some 2.5 million practicing registered nurses in the United States who could form an additional resource for genetic information. Because the information about genetically determined disease, its diagnosis, and treatment is so complex and easily misunderstood, individuals who provide this information need to be extremely knowledgeable and sensitive about all the involved issues. The need for a valid credential for nurses to ensure public and payers of quality is essential.

In 1998, working in conjunction with the American Nurses Credentialing Commission, the credentialing subsidiary of the American Nurses Association, ISONG genetic nurse experts developed and published a statement of scope of practice and standards for the genetic nurse, both at the basic and advanced practice level (ISONG, 1998). This statement of scope and standards was focused specifically on nursing competence in assessing and evaluating genetic health needs, determining an evidence-based program of intervention based on multiple variables, and evaluating and refining that intervention with resulting outcomes feedback. The scope and standards statement is extensive and detailed, but it can be and was used to develop a credentialing tool for genetic nurses. Because the document is so detailed, it does not lend itself to credentialing purposes without some translational work to define what evidence would be necessary to show the competencies defined in the scope and standards. This work was accomplished by a small working ad hoc committee of the larger ISONG Credentialing Committee.

The scope and standards document defines six standards of care: assessment, diagnosis, outcome identification, planning, implementation (which has nine substandards) and evaluation. There are eight standards of professional performance: quality of care, performance appraisal/self evaluation, education, collegiality, ethics, collaboration, resource use, and research. Each standard and substandard has suggested measurement criteria. It would be logical to use all the standards and their measurement criteria as a general tool to evaluate competence, however, this would create a document and a process too cumbersome to be useful and efficient. Further, even though the measurement criteria are well defined, observable behaviors or actions indicative of achievement of any given criterion are not defined in the original document.

To create a user friendly tool accurately reflective of the scope and standards document and its measurement criteria, a subset of nurse experts from the ISONG Credentialing Committee translated the standards and measurement criteria into observable components of the standard and indicators/behaviors indicative of satisfactory accomplishment of the standard. For example, the first standard of care—assessment—is stated as "The client and the family affected by or at risk for a genetic condition are assessed by the genetics nurse to identify risk factors and intervention, information, service and referral needs" (ISONG, 1998, p. 9). The major components of the standard are two-fold: collection of comprehensive client information and interpretation of comprehensive client information. There are 17 indicators of satisfactory accomplishment, ranging from collection of biophysical status via examination or laboratory data to recognition of health beliefs and practices to documentation of information in a standard format. This translational refinement process was accomplished for all seven standards of care (see Table 1 for example of translational process for standard 1).

The standards of care are to be evaluated from required materials presented by each candidate desiring credentialing. Materials required include four case study analyses (written in a prescribed format) and a clinical log of a minimum of 50 cases reflecting the candidate's practice within 5 years of credential application date. Copies of summary letters and/or educational materials prepared by the applicant for clients served also are requested. The standards for professional performance are rated from other portfolio components. Applications are required to submit a curriculum vitae, letters of verification of quality of care provision from the candidate's immediate clinical supervisor and from peers, professional performance appraisals, proof of registered nurse license and any other professional certifications (especially in genetics), and official copies of educational transcripts and verification of continuing education activities in genetics (at least 50 contact hours in the past 5 years). Copies of research proposal abstracts and verification of publications, as well as any teaching materials developed by the applicant for educational or marketing programs, can be submitted. The specific documentation requested was determined by the expert panel of nurses in the ad hoc development committee, with input from the ISONG Credentialing Committee and other expert nurse resources.

The collection of such a large amount of data to substantiate the candidate's competency might seem counterproductive, but it is the feeling of the ad hoc development group that this diverse collection and variety of professional materials provides the most illustrative big picture of clinical competence. This would provide both a quantitative and a qualitative measure of evolving professional ability, which is postulated to be useful for recertifications as well as initial certification.

Portfolio Evaluation

Once the data are collected and submitted, the challenge is to find a comprehensive, accurate, but efficient way to evaluate them. The ad hoc development committee created a one-page evaluation sheet that incorporated all the performance indicators for both genetic care and professional practice (Table 2). Each portfolio rater considers all the documentation provided by a candidate and rates each of the sections listed on the evaluation sheet. An arbitrary convenience range of 4 to 10 on a 10-point scale is used for rating each component. It is assumed that any candidate who would rate below a 4 would not merit credentialing. The minimal expected or acceptable level of performance on each indicator is 7 or 8. A rating of 4, 5, or 6 indicates "needs improvement" and 9 or 10 indicates "exceeds expectations."

Once all categories are rated, the numbers are entered into an artificial intelligence/neural net computer program, and a "met expectations" or "did not meet expectations" score is generated. That is, a final score is generated in which above 7 is considered passing/met expectations. This method of scoring accommodates interrater variations and allows for valid differences of professional opinion. Reliable evaluation of a professional portfolio must involve judgments of experts that are bound to vary at some point in the process. The neural net accommodates these judgment differences with an accuracy and validity of 97 percent.

The question might be raised as to why the neural net program is used instead of a straight arithmetic average. Neural networks (Hanson & Marshall, 2001) are designed to mimic human brain processes, which are multidimensional, complex, and chaotic (meaning not linear). A specific neural network program derived from the ISONG competency parameters allows the aggregate scores of portfolio raters to be considered in toto to accommodate each expert rater's critical judgments but also to be weighted according to both a predetermined and also an evolving set of parameters, much the way one might change an opinion based on

TABLE 1. Translation of Standards to Competencies to Usable Assessment Tool: An Example

Step 1: Original standard

Standard I: Assessment: Client and family affected by or at risk for genetic condition are assessed by genetics nurse to identify risk factors and intervention, information, service, and referral needs

Measurement criterion 1: Assessment begins with data collection through interviews, observation, physical assessment, and formalized instruments

Measurement criterion 2: Data collected may include, but are not limited to, the following: biophysical status for which dysmorphology examination and/or genetic laboratory testing may be used in addition to routine physical and laboratory testing; client expectations; coping and adaptation patterns; cultural, community, and family support systems; economic, environmental, and policy factors affecting client's health; family history in pedigree format; family integrity, structure, and level of functioning; growth and development status; health beliefs and practices; medical histories; prenatal, perinatal, and neonatal histories; psychologic status; spirituality; values and beliefs

Measurement criterion 3: Data collection identifies the following: educational needs; factors placing client and/or family at increased risk for genetic conditions or birth defects; short- and long-term goals as well as follow-up in needs; individual and family strengths; need for referral to other specialities, areas, or support groups; nursing care needs; risk factors associated with genetic conditions or birth defects; support systems

Measurement criterion 4: Data are collected with consideration of client confidentiality from multiple sources, which may include, but are not limited to, client, family, other health care providers, past and current medical records, community sources, and social networks

Measurement criterion 5: Assessment process and data analysis include discussion with client and/or family about mutual health-related goals, roles, and responsibilities

Measurement criterion 6: Ethical dimensions of practice such as confidentiality, informed consent, truth telling, disclosure, privacy, and nondiscrimination are integrated into data collection and documentation process

Step 2: First translation

Standard I: Assessment: Client and family affected by or at risk for genetic condition are assessed by genetics nurse to identify risk factors and intervention, information, service, and referral needs

Component of standard	Performance indicators
I-1 Collects comprehensive client information	Biophysical status using dysmorphology examination, genetic results, and routine laboratory tests
	Coping and adaptation patterns
	Cultural, community, and family support systems
I-2 Interprets comprehensive client information	Economic, environmental, and health policy factors affecting health status
	History in standard pedigree format for at least three generations
	Medical history, inclusive but not limited to, prenatal, perinatal, and neonatal histories as appropriate
	Family integrity, structure, level of functioning
	Growth and development status
	Health beliefs and practices
	Psychologic, spiritual, values, and beliefs status
	Individual and family strengths
	Risk factors associated with genetic condition(s) or birth defect(s)
	Include health-related goals, roles and responsibilities in discussion
	Discuss data assessment and analysis with client and family
	Identify client expectations and needs
	Consider ethical, legal, and social issues
	Documents information in standard format

Step 3: Final translation

Standard I: Assessment: Client and family affected by or at risk for genetic condition are assessed by genetics nurse to identify risk factors and interventions, information, service, and referral needs

Score:

I-1 Collect comprehensive client information

Score:

I-2 Interpret comprehensive client information

new evidence or another point of view. Neural networks are data-driven support systems, as opposed to model-driven decision supports. Model-driven systems are designed to reproduce a specific expert opinion and do not accommodate new knowledge without significant reconfiguration, and outputs are preprogrammed. Data-driven systems, however, are fluid, autodidactic (do accommodate new inputs without maintenance), learn from data entered, recognize patterns, and act to enhance the performance of human experts.

In the case of the ISONG neural net program, the more portfolio scoring data entered from more scorers, the more accurate the final evaluation becomes because the autodidactic function of the program creates an increasingly complex web of information from which to draw conclusions. In the ISONG neural net program, four categories of input are considered, and within each

TABLE 2. Portfolio Scoring Guide for Genlin Software Score Assignments

Evaluation Areas Based Upon Isong S&S and Neural Net Scoring Section Weights	Score (must be between 4 and 10; 7 is neutral)
Standard I: Evaluation	
Section 1: Assessment: Client and family affected by or at risk for genetic condition are assessed by genetics nurse to identify risk factors and interventions, information, service and referral needs	
1. Collect comprehensive client information	
2. Interpret comprehensive client information	
Section 2: Diagnosis: Genetics nurse determines diagnoses by analyzing assessment data consistent with nurse's education and state nurse practice act	
1. Derives diagnoses based on assessment data	
Section 3: Outcome Identification: Identifies expected outcomes individualized to client.	
1. Derives measurable outcome from diagnoses	
2. Outcomes are client sensitive	
Section 4: Planning: Genetics nurse develops care plan with client, whenever possible, prescribing nursing interventions to attain expected outcomes	
1. Develops comprehensive intervention plan tailored to client's genetic condition and health care need	
Section 5: Implementation: Genetics nurse implements interventions identified in care plan	
1. Implements plan	
2. Identifies genetic risk factors among client, family, community	
3. Provides client-centered health teaching	
4. Coordinates health-related services for continuity of care from agencies	
5. Promotes genetic health for client, family, community	
6. Makes provision for genetic therapeutic modalities	
7. Uses therapeutic communication skills to assist client	
8. Collaborates with other health professionals to facilitate client care	
9. Provides consultation that facilitates management for persons or groups	
Standard II: Formal and informal education	
1. Transcripts	
2. CEUs	
3. Genetic certifications	
Standard III: Teaching/Educational Efforts	
Standard IV: Research	
Standard V: Other Achievements	
1. Special recognition	
2. Evidence (reprints, publications)	

category components are weighted according to the number of inputs in each. The program values these inputs depending on how they are arrayed in the category. Such a process ensures that all candidates, current and future, are rated against the same standard neural net, regardless of raters. In the final reports generated by the program, aggregate scores of all the raters are displayed, including indications of any outliers (either higher or lower than the neural net average) as well as absolute final score, which considers all of the data.

Portfolio scorers are expert volunteers from ISONG and are committed to a 3-year term of scorer service with the Genetic Nurse Credentialing Commission, the credentialing subsidiary of ISONG. Each scorer attends a scoring workshop and receives a detailed scorer's manual (Genetic Nurse Credentialing Commission, 2001), including the translational process for all the standards. After training, a scorer evaluates portfolios the first year in conjunction with an experienced scorer. During the second year scoring is accomplished autonomously, and the third-year scorers train new score team members.

To date, one group of candidates has submitted portfolios that have been evaluated by this process. These candidates are all master's-prepared advance practice nurses. A second group of portfolios has been submitted, including candidates such as the initial ones but with the addition of baccalaureate-prepared clinicians. Their portfolio process was similar to that of the advanced practice master's-prepared clinicians, but a separate neural net program was developed for the baccalaureate candidates. Future work revolves around refining the evaluation process and making its implementation more efficient.

Conclusion

Professional portfolio evaluation through the use of neural network programs is a comprehensive, individualized measure of clinical competence and assures clients/patients and third-party payers of a high level of quality expertise in the holder. This model of professional portfolio evaluation provides a mechanism for

multiple raters to compare candidates with disparate and varied backgrounds against the same set of very specific performance criteria. Any evaluation method of professional performance involves expert judgment at some point in the process—in interpreting test scores or in comparing performance with identified criteria or ranking/judging multiple data sources. Even with carefully defined criteria, the potential for evaluation bias exists. The use of expert judgment combined with a neural net computer program that can accommodate potential rater bias seems the most effective way to assess professional competence.

References

American Board of Medical Genetics. (2002). *Statistics* [On-line]. Available: www.abmg.org/genetics/abmg/stats-allyears.htm. Accessed: September 25, 2002.

Genetic Nurse Credentialing Commission. (2001). *Portfolio evaluation and scoring training manual.* Hot Springs, AR: Genetic Nurse Credentialing Commission.

Hanson, C. W., & Marshall, B. E. (2001). Artificial intelligence applications in the intensive care unit. *Critical Care Medicine, 29,* 427-435.

Institute of Medicine. (2000). *To err is human: Building a safe health system.* Washington, DC: National Academy Press.

Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century.* Washington, DC: National Academy Press.

International Society of Nurses in Genetics, Inc. (1998). *Statement on the scope and standards of genetics clinical nursing practice.* Washington, DC: American Nurses Association.

Meister, L., Health, J., Andrews, J., & Tingen, M. S. (2002). Professional nursing portfolios: A global perspective. *MEDSURG Nursing, 11,* 177-182.

National Society of Genetic Counselors. (2002). *Fact sheet* [On-line]. Available: www.nsgc.org/nr-factsheet.asp. Accessed: September 25, 2002.

Rae, K., & Cook, L. (2000). The portfolio experience: More than just a paper exercise. *Primary Health Care, 10,* 38-41.

Rawson, M., & Jones, S. (2001) How exemplars are assessed: Second in a two part series. *Kai Tiaiki: New Zealand Nursing, 7,* 20.

Wenzel, L. S., Briggs, K. L., & Puryear, B. L. (1998). Portfolio: Authentic assessment in the age of curriculum. *Journal of Nursing Education, 37,* 208-212.