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Operationalizing the TANIC and NICA-L3/L4 Tools to Improve Informatics Competencies

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Abstract: Two tools were developed for nurses to self-assess different levels of informatics competencies. The TANIC is used for all nurses to self-assess; the NICA – L3/L4 is a tool for the informatics nurse specialist (INS) to self-assess skill levels. There are 167 informatics items in the TANIC and 178 advanced informatics items in the NICA – L3/L4. These tools were piloted; the results presented here. Based on the evaluation, the tools have been integrated into informatics courses at the BSN and MSN programs at Chamberlain College of Nursing, and presented in two AACN webinars and other national conferences. Numerous requests have been honored to provide the tools for other schools of nursing to use in their courses, including DNP programs. Other requests include those from CNIOs and managers to include in their job descriptions for informatics nurses.

Keywords. Informatics, competencies, TANIC, TIGER, NICA-L3/L4, self-assessment

1. Introduction and History

Informatics competencies are critical in the technology-rich healthcare delivery system. Nurse educators and leaders experienced in informatics need to be prepared to consistently mentor nurses to use health-information technology (HIT) in ways that foster continual growth in nursing informatics competencies. One problem in reaching this goal is a lack of methods for determining nurses' informatics competencies.

Researchers from Chamberlain College of Nursing (Chamberlain) developed reliable, valid instruments for nurses to self-assess nursing informatics (NI) competencies at the basic and advanced levels. The first competency levels were established by Staggers et al. [1]. Hunter, McGonigle, and Hebda then developed TIGER-based Assessment of Nursing Informatics Competencies (TANIC), a measure of basic informatics competencies [2].

The basic competencies include Level 1, beginning nurse and Level 2, the experienced nurse. McGonigle, Hunter, Hebda, and Hill developed Nursing Informatics

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Competency Assessment (NICA) L3/L4, a measure of advanced informatics competencies, which includes Level 3, informatics specialist and Level 4, the informatics innovator [3].This presentation addresses the implementation of TANIC and NICA L3/L4 self-assessment tools.

The ANA defined Nursing informatics (NI) as the specialty that "integrates nursing science with information and analytical sciences to identify, define, manage, and communicate data, information, knowledge, and wisdom in nursing practice"[4]. Some partial examples of competencies/skills are:

- *Entry level core competencies*: basic computer literacy.
- *Experienced skills*: proficiency in the area of nursing and IT needed to support the area of practice, knowledge of methodologies for evidence based practice (EBP).
- *Informatics Nurse Specialist (INS*): understand and apply information management computer technology which requires high level management/leadership, research, education and clinical practice in new advances.
- *Informatics Innovator:* Support research efforts through use of specific types of software; analyze impact of information management, monitor effectiveness of NI practice; define and develop new computer competencies.

Evaluation of informatics competencies is a priority needed for patient safety. The Institute of Medicine (IOM) report stated, "…nursing practice in each setting where it is rendered will have a significant digital dimension around a core EHR" [5]. This same report noted other areas where NI competencies are important including effective workforce planning and policy making [5]. The World Health Organization (WHO) has a number of informatics initiatives to help meet the mandate including collaborating centers and eHealth Technical Advisory Group formed in 2013 to support WHO's work [6]. The move to support eHealth represents another reason why nurses need to have informatics competencies assessed. The TANIC and NICA L3/L4 tools are one method to evaluate competencies and skill levels in NI.

2. Methods

Tools were developed and a definition of informatics competencies was adopted as, "NI competency is adequate knowledge, skills, and ability to perform specific informatics tasks". The competencies identified by the TIGER Initiative were the base for TANIC [7]. The TANIC instrument has three subsets: basic computer skills, information literacy, and clinical information management. For NICA L3/L4, four competencies from the work of Staggers, Gassert, and Curran were used [1].

2.1 Tool Development

For each tool, the competencies were re-worded as behavioral items. Content validity index (CVI) was established based on responses from the expert-panel review; items had four possible responses: Expert, proficient, comfortable, and beginner/not applicable (NA).

The TANIC pilot study had 184 respondents. In their self-assessments, respondents chose classification of expert for most of the competencies. The NICA L3/L4 pilot study consisted of 178 items and 88 participants. Only 10.7% felt proficient

in using pattern-recognition technologies for analysis. The informatics-knowledge section had 56 items with 12.6% proficient in integrating nursing taxonomies. In the informatics-skills section, there were 109 items, 2.9% felt expert differentiating between machine and high-level programming languages.

3. Results

Results from applying the TANIC and NICA L3/L4 indicated a need to enhance NI education at all competency levels. As the healthcare system continues to rely on electronic means of gathering, storing, and retrieving/ transforming data to information that supports decision making, self-assessment of competencies is a key approach to benchmarking informatics skills that require further development.

3.1 Need for NI education

An intentional integration of NI education is needed throughout healthcare, beginning with pre-licensure educational preparation. Nurse educators must revise curricula, enhancing the content to prepare beginning nurses with necessary NI competencies. Knowledge acquired in class should be applied in simulation laboratories, clinical settings, and individual assessments [8, 9, 10, 11]. Nursing leaders must support evolution of the NI competencies at all levels within their organizations. One way to accomplish this has been through individual self-assessment and targeted educational for individuals and groups.

4. Discussion

In order to operationalize NI into the curricula and clinical practice, nurse educators, both nationally and internationally, must revise their curricula enhancing the NI content to prepare nurses with the necessary NI competencies. Knowledge acquired in class should be applied in simulation laboratories, clinical settings, and individual assessments, as well as management of electronic medical records (EHRs) [8, 9, 10, 11].

4.1 Operationalizing the TANIC and NICA-L3/L4

Chamberlain – NI Research Team (NIRT) has published multiple articles and presented at national and international conferences related to informatics skills competencies. Assessment and identification of current skill levels then training toward higher levels of competency will help enable organizations increase employee's knowledge and utilization of evidence-based practice. According to Hart, it would also allow for diversification across multiple settings [12]. To date, job specific competency tools have not yet been developed. For this reason, training and self- assessment is extremely important. Based on the work of Staggers, et al., the TANIC assessment tool was developed and used today to identify basic level competencies. In 2014, Hill, McGonigle, Hunter, Sipes, and Hebda developed a higher level assessment tool that is now incorporated into competency self-assessment [9]. Sipes, et al. discuss the process

of how partnering with national organizations to develop specific competencies will be essential in the future, as was done with a collaborative project with Chamberlain and the Association of perioperative Nurses (AORN) [13].

The ANA *Nursing Informatics: Scope and Standards of Practice,* deals with professional practice evaluation. Further, the informatics nurse engages in self-evaluation, obtains informal feedback, participates in systematic peer review, achieves goals, and provides rationale for practice beliefs, decisions, and actions as part of the process and reviews/ revises applicability to tool competencies practice [4].

The Chamberlain NIRT have operationalization competency self-assessment tools over the past two years in order to determine what basic computer skills exist, evaluated against suggested criteria from a variety of national groups such as ANA and Technology Informatics Guiding Education Reform (TIGER) [1, 8]. Then developed curricula at both the bachelor's and master's levels to meet the needs and address gaps.

Students at Chamberlain complete the self-assessment in the undergraduate courses, again after completing courses at the graduate level. Skills are self-assessment on one of four levels discussed above by using the TANIC. The same process is used for the advanced level - NICA L3/L4. Personal observations of self-assessment, many times, finds that when tools are employed in the classroom for the first time, students typically self-assess their skill levels higher before completing a series of informatics courses, than just before graduation.

In addition, Chamberlain NIRT has presented/disseminated new knowledge and information in a number of venues, including other schools and provided the tools for others to use such as job descriptions and evaluations by leadership and at the Doctorate of Nursing Practice (DNP) level to evaluate students and faculty. Other areas where tools have been presented are at the national informatics organizations, American Nursing Informatics Association (ANIA), ANCC webinars, educational summits with hospital partners and students conducting research in graduate courses and at international conferences.

Many questions arise regarding skills needed to identify and develop skills required industry-wide, critical to the success of technology-rich healthcare systems today. But is also raises questions regarding global indications. What are the indications today for national and international standardized, educational practices? What are the educational differences when it comes to informatics skills? How are EHRs implemented and used in other countries? If they are implemented what are the skill needs?

Obstacles to operationalizing skills assessment include, lack of a clear understanding of nursing informatics, potentially outdated competencies, and/or competencies that do not include unit specific competencies. Additionally, there is a lack of study of informatics competencies across organizations. While two competency tools, the TANIC and the L3/L4 NICA have been developed, they are currently being incorporated into assessments for nursing informaticists. Additional issues that remain need to be focused on the job specific competency assessment and length of tool.

With regard to tool use, it is interesting to note that when the TANIC and NICA L3/L4 tools were employed in the classroom for the first time, students typically self-assessed their skill levels much higher than after completing a series of informatics courses. This is consistent with Elder and Koehn's findings that performed competency levels were lower than self-reported levels among baccalaureate nursing students [12].

5. Recommendations for future

Recommendations for the future include revising the self-assessment tool to decrease the length of the tool to improve completion of the tool. Revisiting the initial competencies is imperative to identify if revisions are needed based on the new science. With this investigation, researchers and nurse informaticists can meet the recommendation by ANA for Standard 9 of the scope and standards: *The informatics nurse systematically enhances the quality and effectiveness of nursing and nursing informatics process*. Another important reason to update the tools periodically is due to new and innovative research that is developed. Standard 13 of the ANA scope and standards of practice for nursing informatics relates to research; therefore, it is important that more research be completed and implemented into practice to advance the NI profession [4]

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