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Web-Based Collaboration for Terminology Application: ICNP C-Space

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Abstract. The purpose of this paper is to describe the ongoing evolution of a nursing terminology that involves users in all aspects of the terminology lifecycle. A terminology will not succeed until and unless it benefits users and contributes to improved client outcomes at the point of care. Since the release of ICNP® Version 1 in 2005, users have been necessary partners in research and development, dissemination and education, and, to some extent, in terminology maintenance and operations. ICNP C-Space was launched in 2008 as a platform for collaboration among users and the ICNP team. C-Space applications include, but are not limited to, the ICNP browser, a multi-lingual browser, catalogue development pages, and group discussion pages. Future uses may include work related to ICN research and networks. C-Space adds value to ICNP, ICN, and nursing worldwide by ensuring that terminology users can contribute their expertise to finding workable solutions and developing important products related to ICNP.

Keywords. Healthcare terminology, Terminology life cycle model, ICNP C-Space, Terminology user

1. Introduction

As a healthcare terminology matures, there comes a point when developers have to rely on users for continued improvement of the terminology and evaluation at the point of use. The goal of standardized documentation in interoperable health information systems, resulting in automatically collected reusable data, is gaining advocates worldwide. Reusable data means that data are entered only once, preferably electronically, and then are available for multiple purposes [1], such as management decision-making, patient outcomes research and healthcare policy development. To ensure continued development, maintenance, and application of a healthcare terminology, it is essential to have full and productive engagement between terminology developers and users, including clinicians, vendors, informatics professionals, and terminologists.

The International Council of Nurses (ICN) approved development of the International Classification for Nursing Practice (ICNP®) in 1989 and the alpha and beta versions culminated in the release of ICNP Version 1 in 2005. Prior to 2005, development of the terminology was based on the work of nurse experts who gathered and organized concepts representing the nursing domain in a multi-axial terminology

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that required combinatorial processes to structure primitive concepts into nursing diagnoses, outcomes, and interventions. From 2005 forward, ICNP development used a formalized language methodology to represent concepts and relationships within the nursing domain. Formal definitions for ICNP are represented in web ontology language (OWL). Versions 1.1 and 2 were released in 2007 and 2009, respectively. ICNP is a compositional terminology that represents the nursing domain of healthcare. ICNP Release 2011 includes 3281 concepts, 669 pre-coordinated diagnosis and outcome statements, and 484 pre-coordinated intervention statements.

2. Purpose

As ICNP gained stability in development and maintenance processes, the terminology then needed the creativity and expertise of clinicians and researchers who would implement ICNP in care delivery settings, evaluating its usability and the stored, reusable nursing documentation data. As biennial releases of ICNP continue, its value will only be ensured with productive interaction between the ICNP team and users. The purpose of this paper is to describe a process for the involvement of users in all aspects of the terminology life cycle. Specific objectives of the paper are to (1) describe the evolution of a global nursing terminology from 'paper and pencil' structuring of relevant concepts; (2) describe how goals and methods for involving nurses worldwide in the application, evaluation, and quality improvement of ICNP have been implemented and evaluated; and (3) propose future directions for continued collaboration between users and developers.

2.1. Evolving Development Methods

The alpha, beta 1, and beta 2 versions of ICNP used 16 axes to organize concepts of the nursing domain. To ensure consistency of use, rules for forming nursing diagnoses and outcomes, and nursing interventions (actions) complied with ISO Health Informatics 18104:2003 [2]. With ICNP Version 1 [3], concepts were coded with unique, randomly assigned 8-digit identifier, consistent with ISO Health Informatics 17117:2007 [4]. However, users voiced their comfort with the former codes (eg, 1; 1.1; 1.1.1) because they were able to add local concepts to the terminology in places that seemed logical [5]. Thus the reaction of users to the ICNP terminology concepts being modeled in web ontology language and given unique codes clearly showed the need for continuous user-developer consultation, collaboration and education.

   With the release of ICNP Version 1, the increasing number of concepts and the unique codes made it difficult for nurses to use ICNP efficiently and effectively in care delivery settings. The solution for this difficulty was to create subsets of the terminology, or catalogues, with pre-coordinated nursing diagnoses and outcomes, and pre-coordinated interventions. Catalogues would be clinically relevant; applicable to individuals, groups, or communities; and focused on health conditions (eg, diabetes), client phenomena sensitive to nursing interventions (eg, adherence to treatment), specialties (eg, maternal health), or settings (eg, disasters).

   ICN published guidance for catalogue development [6] and two catalogues [7, 8] with the intent of encouraging users to develop catalogues in collaboration with ICN. While pre-coordinated statements were intended to simplify users' application of the terminology, users had learned to compose nursing diagnosis, outcome and

intervention statements for the electronic record using combinations of 8-digit codes. Now these multi-coded statements were being superseded by single, 8-digit codes for the pre-coordinated statements. This change also requires continued discussions between users and ICN.

2.2. Life Cycle Model

As the ICNP terminology continued to increase in number of primitive and pre-coordinated concepts, all modeled within the OWL development environment, and as the additional requirements of the programme increased in scope and complexity, a model was developed to organize all the aspects of terminology development. A model was seen as a way to guide internal operations, aid in setting priorities for the work of the programme, structure quality improvement processes, and inform users about how they can contribute to the development and application of ICNP. The model has three main constructs: research and development, maintenance and operations, and dissemination and education [9].

In addition to catalogue development, users conduct research projects in their work settings (eg, academic, clinical). Translations are an important aspect of ICNP development. Dissemination and education involves professional presentations, publications, and academic and clinical applications related to users' work with ICNP. The model was validated as fit for purpose as overlays of catalogue development (Figure 1) and quality improvement processes were both found satisfactory [10, 11].
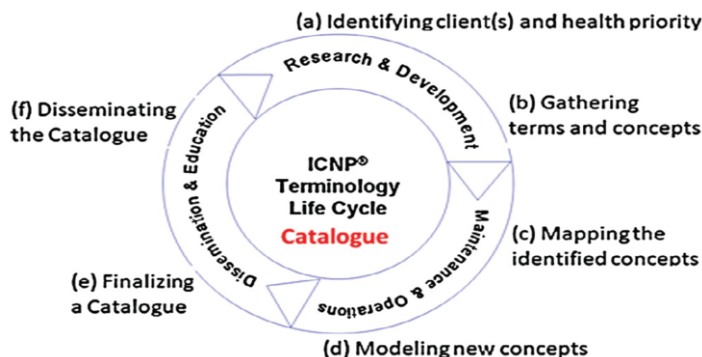

Figure 1. Validating Lifecycle Model with Catalogue Development Process.

3. ICNP C-Space

An important goal for continuing ICNP terminology development was to establish some means by which users and the ICNP team could more inter-actively continue ICNP development and application. A web-based platform was devised and tested for feasibility. Since its inception in 2008, the capabilities of C-Space have continued to advance in support of the terminology.

An ICNP browser was one of the first features of C-Space. Users can download ICNP files from C-Space, using the site as a centralized portal for distribution. The ability of users to access the online browser moved the terminology forward as users asked for various ways of representing the terminology so that it would be as useful,

accessible, and as comprehensible as possible. With each biennial release of ICNP, ICN aims to provide the ICNP representations that users need for clinical applications and continued research. When ICNP is downloaded, users sign agreements that allow ICN to track research, development and translation projects from inception to completion.

In 2011, the browser was made multi-lingual, showing and encouraging worldwide involvement with ICNP. The multi-lingual browser also supports continued translation of the terminology as biennial releases include progressive improvements, mostly in the numbers of pre-coordinated statements for use in the standardized documentation of nursing care delivery.

A catalogue development project on C-Space with collaboration between community nurses in Scotland and the ICNP team resulted in an additional catalogue for users worldwide [12]. The collaboration also tested processes for communication, interaction, content development, and screen designs. This multi-year work resulted in many lessons learned, to include confirmation of the belief that nurses use language in many different ways to mean many different things. Variation of words and meanings is a challenge for the ICNP terminology as it aims to represent the nursing domain worldwide. More catalogue development projects are currently under way on C-Space.

Communication groups are in early stages of development on C-Space. One group has been formed to discuss implementation of ICNP. Members use the asynchronous discussion format to describe their work locally and collaborate internationally to advance ICNP use in care settings. Another group consists of the Directors of the ICN-Accredited Research and Development Centres, who are preparing for the biennial consortium meeting in 2011. Directors are encouraged to collaborate in ICNP development, eg, one Centre's focus on the phenomenon of family care could inform another Centre's focus on disaster nursing.

C-Space usage is described in Table 1.

Table 1. Usage Statistics April 2010 to March 2011.

Unique Visitors	Visits from 129 Countries	Page-views	Registered Users 03/2011	User Groups 03/2011	Down-loads 03/2011
4,791	8,860	111,069	1,520	6	822

4. Future Directions

ICN recognizes the expanding impact of eHealth and the great potential that the use of information and communication technology can have with healthcare assessment, management, documentation, and reporting nationally and internationally. Data about nurses and nursing are rare to non-existent in international reports of healthcare resources and outcomes. ICN further recognizes the potential for nursing communication and documentation that ICNP, as a standardized terminology for representing the work of nursing, can support and propagate, whether the application is used with complex health information systems or mobile technology, such as mobile phones.

C-Space can continue to expand its capabilities to include research using core data sets. ICN core data sets are seen as the research tools for electronic data collection and

analysis in response to focused research questions from any of ICN's programme areas, eg, regulation, socio-economic welfare, and professional practice [13].

Another potential use for C-Space groups would be to support the ICN Telenursing Network as it seeks to interface with nurses and others professionals worldwide. Collaboration between informatics nurses and telehealth nurses could substantially benefit health technology development, application and evaluation, and support standardized documentation of nurse-sensitive client outcomes that would increase nursing knowledge and improve care delivery.

5. Summary

ICNP is increasing in scope of coverage of the nursing domain. Nurses in more regions and countries are implementing clinical applications of ICNP. Among the many challenges for nurses are translation and meeting the technical requirements for clinical applications. C-Space supports a strong network of committed nurses and others who continue to collaborate with ICN to ensure that nurses are able to document their work using ICNP, in a consistent and accurate way to result in reusable data. Then nurses worldwide will be able to describe what nurses do, and what differences nurses make in healthcare outcomes for individuals, families and communities.

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