Enhancing nursing education and practice through e4nursing: an ontology-based software

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Abstract. This workshop presents the e4nursing software, developed by the Centre for Information Systems Research and Development at Porto Nursing School, Portugal (CIDESI-ESEP) in partnership with VirtualCare. E4nursing integrates a multilingual nursing ontology, with educational software to aid nursing students in care planning and decision-making. This session aims to explore e4nursing's functionalities, its application in nursing education, and its potential to improve nursing practice documentation by facilitating a detailed and integrated care planning process.

Keywords. Nursing education, e4nursing, nursing ontology, care planning

1. Introduction

The CIDESI-ESEP, accredited by the International Council of Nurses developed a multilingual nursing ontology, proposing a structure where a set of concepts within nursing domain and the relationships between them are specified, describing a formal representation of nursing knowledge. The Portuguese Order of Nurses has approved the adoption of the nursing ontology, recommending its integration into the development of electronic health records (EHR) [1].

This ontology includes different items of nursing information that represent the critical elements of the decision-making process - data resulting from the patient assessment, diagnoses, objectives and interventions - organized in domains mainly centered in body and mental processes, selfcare and adaptation processes, targeted to different clients (patient, caregiver, parents and families), mapped with taxonomies such as the International Classification for Nursing Practice (ICNP), Snomed CT, and compliant with ISO standards.

Following this work, the CIDESI-ESEP evolved to the development, in partnership with VirtualCare, of an educational software application for care conception by nursing students - e4nursing - supported in a web environment and incorporating the nursing ontology in its backend, in a "plug and play" setting.

Introduced in 2020, this software is presently employed across 64 curricular teaching units, spanning from the initial phase of pre-graduation courses to the concluding phase of postgraduate courses. Its' utilization extends to more than one thousand students per semester. This educational platform integrates an advanced knowledge structure founded

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on "restriction" or "advising" relationships, and, in conjunction with the ontology structure and content, enhances the completeness and referential integrity of care plan entities, proving to be a valuable resource for designing decision support systems, as exemplified by recent EHR developments in Portugal.

2. Aim

The workshop aims to introduce e4nursing to nursing educators and practitioners, demonstrating its utility in nursing education and practice. It seeks to engage participants in testing the software's functionalities, encouraging feedback to refine and enhance its application.

3. Rationale

The integration of a structured nursing ontology within an educational software environment addresses the critical need for resources that support the complex decision-making processes in nursing. By aligning with international classifications like ICNP and Snomed CT, and compliant with ISO standards, e4nursing ensures a robust framework for nursing students to develop comprehensive care plans, enhancing their analytical and clinical decision-making skills.

4. Outcome

Participants will gain hands-on experience with e4nursing, understanding its role in supporting nursing education and practice. The workshop will foster a collaborative environment for sharing insights and suggestions, contributing to the ongoing development of e4nursing. Expected outcomes include enhanced knowledge of ontology-based decision support in nursing and practical skills in using e4nursing for educational and clinical purposes.

5. Programme

- Introduction to the nursing ontology and its integration into the e-learning solution - e4nursing.
- Live demonstration of the following e4nursing functionalities:
    - Creation of a clinical scenario
    - Definition of domains of attention
    - Assessment and data collection
    - Development of care planning
- Hands-on session for participants to do the proposed tasks in e4nursing:
    - Select one domain of attention in a given clinical scenario
    - Assessment and data collection for the selected domain
    - Develop a care plan for the selected domain
- Gather feedback and suggestions through a short questionnaire

6. Brief CVs of Presenter/Moderator:

Daniel Rodrigues has a background in Nursing and is currently a Masters student in Medical Informatics from the Faculty of Medicine, University of Porto. He has worked for HealthTech companies in the past two years and has helped the development of electronic health records in several clinical settings.

Ernesto J. Morais has a background in Nursing and a Master in Health Management and Economics. He is an associate professor at Porto Nursing School in Portugal, and researcher at the ICN-accredited Centre for Information Systems Research and Development of Portugal. He is also a member of the ICNP Editorial Board and ICN representative at the WHO Family of International Classifications.

Ricardo Cruz-Correia has a background in Computer Science and a PhD in Integration of Hospital Information Systems. He is a researcher in health informatics with about 250 scientific publications. His roles extend to presiding over the Portuguese health informatics association e-MAIS and being the Portuguese representative in the European Federation for Medical Informatics.

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