

Sigma's 29th International Nursing Research Congress

Effects of e-Learning on Nursing Continuing Education Context: Review of Systematic Reviews

Geneviève Rouleau, MSc¹

Marie-Pierre Gagnon, PhD²

José Côté, PhD³

Julie Payne-Gagnon, SN²

Emilie Hudson, BSc³

Julien Bouix-Picasso, MPH⁴

Carl-Ardy Dubois, PhD⁵

(1)Nursing Faculty, Université Laval, Quebec, QC, Canada

(2)Population Health and Optimal Health Practices, CHU de Québec Research Centre, Quebec, QC, Canada

(3)Research Chair in Innovative Nursing Practices, University of Montreal Hospital Research Centre, Montréal, QC, Canada

(4)Laboratoire Educations et Pratiques en Santé EA3412, Université Paris 13, Bobigny cedex (Paris), France

(5)Department of management, evaluation and health policy, Université de Montréal - School of Public Health, Montréal, QC, Canada

Purpose: Continuing education (CE) is an imperative for professional nursing. CE creates opportunities for nurses to acquire knowledge and to introduce and develop competencies (Ross, Barr, & Stevens, 2013) in order to support delivery of safe, evidence-based, high-quality care for patients (American Nurses Credentialing Center's Commission on Accreditation, 2014). Even if e-learning has not proven superior to traditional learning, it represents an alternative way to learn, and has positive impacts on nurses' knowledge, skills and level of satisfaction (Lahti, Hätönen, & Välimäki, 2014). e-learning interventions have been studied extensively for nursing and health professional students in an academic context as shown in a review of 22 systematic reviews (SRs) (De Caro, Marucci, Giordani, & Sansoni, 2014; De Caro, Marucci, Lancia, & Sansoni, 2016). However, we found no review of SRs of e-learning for registered nurses (RNs) in a CE context. The objective of our work is to systematically summarize the best evidence that comes from SRs regarding the effects of e-learning on nursing care. To complement existing nursing knowledge, we believe that it was useful to conduct a review of SRs with an exploratory lens (Caird, Sutcliffe, Kwan, Dickson, & Thomas, 2015). The synthesis it provides is ideal for identifying existing e-learning interventions used by RN in their workplace settings, the possible outcomes of interest, and their effects.

Methods: The protocol of this review of SRs has been published elsewhere (Rouleau et al., 2017). The general methods for Cochrane reviews (Higgins & Green, 2011) and other relevant works (Becker & Oxman, 2011; Lunny, Brennan, McDonald, & McKenzie, 2016; Smith, Devane, Begley, & Clarke, 2011) were used as guidance to conduct and report this review of SRs. The search strategy was developed by the research team and validated by a health information specialist. We searched for relevant publications in PubMed, CINAHL, Embase and Joanna Briggs Institute electronic databases. The eligibility criteria were formulated using the PICOS model (Centre for Reviews and Dissemination, 2009; O'Connor, Green, & Higgins, 2011). Participants: RNs using e-learning. Interventions: e-learning interventions. Comparisons: face-to-face and (non)electronic learning. Outcomes: We used the Nursing Care Performance Framework (NCPF) to organize the outcomes of interest (Dubois, D'Amour, Pomey, Girard, & Brault, 2013). Studies: Systematic quantitative, qualitative and mixed studies reviews (MSRs) published in English, French or Spanish from January 1, 2006 were considered. Three reviewers independently screened the title and abstract first, and then the full texts of potentially relevant papers in order to assess eligibility. Using a predefined form, three reviewers extracted the characteristics and findings from the selected reviews. Two reviewers independently performed critical appraisal with two tools: AMSTAR 2 (Shea et al., 2017) and ROBIS (Whiting et al., 2016). In order to integrate the results from various types of SRs, we performed a qualitative thematic synthesis using a databased convergent synthesis design

(Creswell, 2014; Pluye & Hong, 2014). We qualified quantitative data, meaning that we used a textual and narrative approach to name and qualify the effect.

Results: 12428 titles/abstracts were screened; full-text papers of 183 articles were retrieved and 17 publications met the eligibility criteria. Nine were MSRs and eight were quantitative reviews. RN were at different stages of their career, had different title job and worked in different settings (e.g. intensive care units, emergency, coronary care units, medical-surgical, pediatrics, mental health, palliative care, geriatric hospital). Examples of technologies used for supporting e-learning were: computer-assisted instructions, CD-ROM, videoconference, situated e-learning, virtual journal club, social networking and web-based program computer-assisted instructions. These e-learning interventions were compared to electronic interventions, face-to-face interventions, no intervention or blended learning. Only three reviews of SRs mentioned the use of theoretical approaches (e.g. adult learning theory, Kirkpatrick model) to guide the development and/or the evaluation of e-learning interventions. The most frequently reported outcomes were: learning; nurses' competencies and skills; nurses' satisfaction with using e-learning; and assessment, care planning and evaluation.

Conclusion: The reviewed SRs present heterogeneity in terms of population, interventions, workplace settings and designs. This heterogeneity can complexify the understanding of the components of the e-learning intervention that cause a specific effect; but it can also broaden the overall portrait of the effects of e-learning interventions on a range of indicators underlying nursing care. To the best of our knowledge, this is the first review of systematic reviews that uses the NCPF to draw a broad, multidimensional and systems-based perspective on the dimensions and indicators of nursing care that can be impacted by e-learning interventions.

Title:

Effects of e-Learning on Nursing Continuing Education Context: Review of Systematic Reviews

Keywords:

continuing nursing education, e-learning and review of systematic reviews

References:

American Nurses Credentialing Center's Commission on Accreditation (2014, September). The Importance of Evaluating the Impact of Continuing Nursing Education on Outcomes: Professional Nursing practice and Patient Care. Retrieved December 10, 2017, from <http://www.nursecredentialing.org/Accreditation/ResourcesServices/Evaluating-the-Impact-CNE-Outcomes.pdf>

Becker, L., & Oxman, A. (2011). Chapter 22: Overviews of reviews. Retrieved March 13, 2017, from http://handbook.cochrane.org/chapter_22/22_overviews_of_reviews.htm

Caird, J., Sutcliffe, K., Kwan, I., Dickson, K., & Thomas, J. (2015). Mediating policy-relevant evidence at speed: are systematic reviews of systematic reviews a useful approach? *Evidence & Policy: A Journal of Research, Debate and Practice*, 11(1), 81-97.

Centre for Reviews and Dissemination. (2009). Systematic reviews: CRD's guidance for undertaking reviews in health care. Retrieved May 8, 2017, from <https://www.york.ac.uk/crd/guidance/>

Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches (4th ed)*. Thousand Oaks: SAGE Publications.

De Caro, W., Marucci, A. R., Giordani, M., & Sansoni, J. (2014). [E-learning and university nursing education: an overview of reviews]. *Professioni infermieristiche*, 67(2), 107.

De Caro, W., Marucci, A. R., Lancia, L., & Sansoni, J. (2016). *Case Study 2: E-Learning in Nursing Education in Academic Fields*. In *Umbrella Reviews: Evidence Synthesis with Overviews of Reviews and Meta-Epidemiologic Studies* (Springer International Publishing, pp. 290-303). Switzerland: Biondi-Zoccai. G.

Dubois, C.-A., D'Amour, D., Pomey, M.-P., Girard, F., & Brault, I. (2013). Conceptualizing performance of nursing care as a prerequisite for better measurement: a systematic and interpretive review. *BMC Nursing*, 12, 7.

Higgins, J., & Green, S. (2011). *Cochrane Handbook for Systematic Reviews of Interventions*. Version 5.1.0 [updated March 2011]. Retrieved May 8, 2017, from <http://handbook.cochrane.org>

Lahti, M., Hätönen, H., & Välimäki, M. (2014). Impact of e-learning on nurses' and student nurses' knowledge, skills, and satisfaction: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 51(1), 136-149.

Lunny, C., Brennan, S. E., McDonald, S., & McKenzie, J. E. (2016). Evidence map of studies evaluating methods for conducting, interpreting and reporting overviews of systematic reviews of interventions: rationale and design. *Systematic Reviews*, 5.

O'Connor, D., Green, S., & Higgins, J. P. T. (2011). Chapter 5: Defining the review question and developing criteria for including studies. In J. P. T. Higgins & S. Green (Eds.), *Cochrane Handbook for Systematic Reviews of Interventions* [updated March 2011]. The Cochrane Collaboration. Retrieved May 8, 2017, from http://handbook.cochrane.org/chapter_5/5_defining_the_review_question_and_developing_criteria_for.htm

Pluye, P., & Hong, Q. N. (2014). Combining the Power of Stories and the Power of Numbers: Mixed Methods Research and Mixed Studies Reviews. *Annual review of public health*, 35:29-45

Ross, K., Barr, J., & Stevens, J. (2013). Mandatory continuing professional development requirements: what does this mean for Australian nurses. *BMC Nursing*, 12, 9.

Rouleau, G., Gagnon, M., Côté, J., Payne-Gagnon, J., Hudson, E., Bouix-Picasso, J., & Dubois, C. (2017). Effects of e-learning in a continuing education context on nursing care: a review of systematic qualitative, quantitative and mixed studies reviews (protocol).

Shea, B. J., Reeves, B. C., Wells, G., Thuku, M., Hamel, C., Moran, J., Henry, D. A. (2017). AMSTAR 2: a critical appraisal tool for systematic reviews that include randomised or non-randomised studies of healthcare interventions, or both. *BMJ*, 358, j4008.

Smith, V., Devane, D., Begley, C. M., & Clarke, M. (2011). Methodology in conducting a systematic review of systematic reviews of healthcare interventions. *BMC Medical Research Methodology*, 11, 15.

Whiting, P., Savović, J., Higgins, J. P. T., Caldwell, D. M., Reeves, B. C., Shea, B., ... Churchill, R. (2016). ROBIS: A new tool to assess risk of bias in systematic reviews was developed. *Journal of Clinical Epidemiology*, 69, 225–234.

Abstract Summary:

A review of systematic reviews has been conducted to develop a broad picture of the effects of e-learning in a continuing education context on nursing care. The results will be presented.

Content Outline:

Continuing education (CE) is imperative to the future of professional nursing. The use of e-learning by registered nurses for CE is spreading. A review of systematic reviews (SRs) has been conducted to develop a broad picture of the effects of e-learning in a CE context on nursing care.

Seventeen mixed studies reviews and quantitative SRs published from January 2006 to January 2016 were included. The electronic devices used to support learning were: computer-assisted instructions, CD-ROM, videoconference, situated e-learning, virtual journal club, social networking and web-based program. The most frequently reported outcomes were: learning; nurses competencies and skills; nurses satisfaction of using e-learning; assessment, care planning and evaluation.

The reviewed SRs present heterogeneity in terms of population, interventions, workplace settings and designs. This heterogeneity can complexify the understanding of the components of the e-learning intervention that cause a specific effect; but it can also broaden the overall portrait of the effects of e-learning interventions on a range of indicators underlying nursing care.

First Primary Presenting Author

Primary Presenting Author

Geneviève Rouleau, MSc
Université Laval
Nursing Faculty
PhD candidate
Pavillon Ferdinand-Vandry 1050, avenue de la Médecine - Université Laval
Québec
Canada

Professional Experience: 2015 – present – Chair Coordinator, Research Chair in Innovative Nursing Practices. 2007- 2015 – Research Coordinator, Research Chair in Innovative Nursing Practices. She has participated in the development and evaluation of many “TAVIE” (Treatment Virtual Nurse Assistance and Teaching) Web-based virtual nursing interventions. Until now, Ms Rouleau has been involved in the filming of more than 700 French-speaking videos as virtual nurse, throughout nine “TAVIETM” virtual nursing interventions aimed at supporting people living with chronic conditions to manage their health behaviour. 2013- present -- PhD candidate at Nursing Faculty, Université Laval (Québec, Canada). During the PhD studies, she has conducted a first review of systematic reviews on the effects on information and communication technologies on nursing care. She is conducting a second one exclusively on e-learning interventions in a continuing nursing education context. 2008 – present – Co-author of publications regarding TAVIE intervention.

Author Summary: Ms Rouleau has been working at the Research Chair in Innovative Nursing Practices for 11 years. She personalized the virtual nurse in many Web-based virtual nursing interventions, by filming more than 700 videos. Her expertise in that domain led her to lead a reflection on the relational facet of the VIH-TAVIE intervention. She is now undertaking a PhD in Nursing at Université Laval.

Second Author

Marie-Pierre Gagnon, PhD
CHU de Québec Research Centre
Population Health and Optimal Health Practices
Researcher
Quebec
Canada

Professional Experience: 2012 – present -- Chairholder, Tier 2 Canada Research Chair in Technologies and Practices in Health 2015 – present -- Full Professor, Faculty of Nursing, Université Laval 2006 – present -- Researcher, Population Health and Practice-changing Research Group, CHU de Québec Research Centre 2003- present -- Author or coauthor of more than 145 publications. Many of them focus used different knowledge synthesis approaches.

Author Summary: Dr Gagnon obtained her PhD in Community Health from Université Laval in 2003. Her research program focuses on the use of scientific evidence in the implementation of innovative technologies, particularly Information and Communication Technologies (ICT) in healthcare. She is also interested in by best practices in knowledge translation and application.

Third Author

José Côté, PhD
University of Montreal Hospital Research Centre
Research Chair in Innovative Nursing Practices
Chair Holder
Montréal Quebec
Canada

Professional Experience: 2005 – present -- Chairholder, Research Chair in Innovative Nursing Practices. Dr Côté has invented the TAVIE™ concept and platform. TAVIE is an acronym derived from Traitement Assistance Virtuelle Infirmière et Enseignement (French acronym for Treatment Virtual Nurse Assistance and Teaching), the virtual nurse concept informed by the past ten years of research. TAVIE translates in English as YOURLIFE. 1999 – present -- Professor, Faculty of Nursing, Université Laval 2006 – present – Regular researcher, University of Montreal Hospital Research Centre 2003- present -- Author or coauthor of more than 80 publications. Many of them are related to the use of web-based

interventions to promote healthy behaviour among people living with chronic health conditions.

Author Summary: Dr Côté is ChairHolder of the Research Chair in Innovative Nursing Practices. The core of her research programme is embedded in the development and evaluation of innovative ways on supporting people living with chronic conditions to manage their condition. TAVIE (Treatment Virtual Nurse Assistance and Teaching) encompasses a virtual nurse who guides the learners through the development and consolidation of skills to empower the individual to action.

Fourth Author

Julie Payne-Gagnon, SN
CHU de Québec Research Centre
Population Health and Optimal Health Practices
Research professional
Quebec
Canada

Professional Experience: 2009-2012 - Obtained a Master in Anthropology 2012 - present -- She works as a research professional at the CHU de Québec Research Centre. She is co-author of more than 5 papers targeting systematic reviews or overview of systematic reviews. 2015- present -- She is a third-year nursing student (college).

Author Summary: For the last five years, Ms Payne-Gagnon has been a research professional for the CHU de Québec Research Centre. She works primarily on information and communication technologies adoption and use among healthcare professionals, patients and the public. She is also a third-year nursing student and she has a particular interest in patient education and health prevention.

Fifth Author

Emilie Hudson, BSc
University of Montreal Hospital Research Centre
Research Chair in Innovative Nursing Practices
Research assistant
Montréal Quebec
Canada

Professional Experience: 2016- present –Master of Science Nursing - MSN Field Of Study Health/Health Care Administration/Management 2014-2016 Obtained a bachelor's degree in Nursing Field at McGill University 2012- present – Research assistant, University of Montreal Research Centre (Research Chair in Innovative Nursing Practices) 2015 – present—Research assistant, working on two review of systematic reviews under the supervision of Geneviève Rouleau

Author Summary: Ms Hudson is a registered nurse and obtained her baccalaureate at McGill University in 2016. She has been hired, as a research assistant, to work on two reviews of systematic reviews led by Geneviève Rouleau.

Sixth Author

Julien Bouix-Picasso, MPH
Université Paris 13
Laboratoire Educations et Pratiques en Santé EA3412
Doctoral student
Bobigny cedex (Paris)
France

Professional Experience: 2016 – Doctoral student, International Cotutelles Program, Université de Montréal and Paris 13, French Health Army Service. 2015- Nurse correspondent for Anesthesia, Intensive Care and emergency medicine Chair. French Health Army Service. 2010-2016 -- Nurse Anesthetist, French Health Army Service.

Author Summary: Mr Bouix-Picasso has been a military nurse anesthetist for the last seven years at French Health Army Service (in Paris). He is also a doctoral student, as part of an International Cotutelles Program between University of Montreal and Paris13. He is interested by mobile health as well as knowledge synthesis approaches.

Seventh Author

Carl-Ardy Dubois, PhD
Université de Montréal - School of Public Health
Department of management, evaluation and health policy
Director
Montréal Quebec
Canada

Professional Experience: In 2002, Dr Dubois obtained his PhD in Administration and Management Sciences 2003-2017 – Professor at Nursing Faculty, University of Montreal 2017 – Present –Director, Department of management, evaluation and health policy, School of Public Health, University of Montreal, Montreal, Canada

Author Summary: Dr Dubois has been professor at Nursing Faculty, University of Montreal, for 14 years. He is the leader (first author) of the conceptualization of the Nursing Care Performance Framework. This framework was used as an analytical tool during the realization of the two reviews of systematic reviews led by Geneviève Rouleau.