INTRODUCTION

Continuing education (CE) is imperative to the future of professional nursing (1). The use of e-learning for nursing education is spreading; e-learning has been studied extensively for nursing and health professional students in an academic education context, as shown in a review of 22 systematic reviews (SRs) (2,3). No review of SRs has targeted e-learning in a CE context.

Objective

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 in a CE context.

METHODS

Design

• Review of systematic qualitative, quantitative and mixed studies reviews (MSRs).

• The protocol has been published elsewhere (4).

Eligibility criteria

Population

• EFL reaching the professional regulation of work country
• Undergraduate nursing students in an academic context

Intervention

• A learning or use interaction, digital or mobile devices to support learning or CE context
• Any type of interaction with e-learning system

Comparison

• Fear of failure learning, any other e-learning intervention

Outcomes

• Range of possible outcomes based on the Nursing Care Performance Framework (NC Pf) (5) and previous work (6)
• Primary outcomes: Nursing resources (e.g. time management) and services (e.g. collaboration, learning, competencies)
• Secondary outcomes: Relatedness, autonomy, perceived control by public

Studies

• EFL published from January 1, 2006 to January 31, 2017 in peer-reviewed journals

Search strategies

• Developed by the research team and validated by a health information specialist.
• Electronic databases searched (PubMed, CINAHL, Embase and Joanna Briggs Institute) authors contacted, and list of relevant references consulted.

Selection of reviews and data extraction

• Distiller EVID (Evidence Evaluator, Ottawa, Canada) was used as a software to support the entire work
• 5 reviewers (GR, JFG, EN) independently:
• - Searched the titles/abstracts and reviewed full-text papers;
• - Excluded SRs: Characteristics and outcomes of included SRs using the RCRP

Quality assessment

• 2 reviews (GR, JFG, EN) independently appraised SRs quality with AMSTAR 2 (7) and ROBIS (8).

Data synthesis

• Performed through thematic synthesis approach (9) using a data-based convergent design (10)
• Guided with the works of Kirkpatrick (11) and Warren et al. (12)

RESULTS

Search results: PRISMA flow chart

Systematic reviews’ characteristics

Population

• 50 age at different stages of their careers, had different job titles and worked in different settings (e.g. intensive care units, emergency departments, community or rural, mental health, rehabilitation and cancer care organizations).

Intervention: Examples of device

• Computer-related devices, computer-based simulation, virtual environment, online learning, blended learning, distance education, CD-ROM, or email e-learning system

Comparison

• Electronic intervention, Fear of failure, no intervention, blended learning, blended learning, and blended learning

Studies

• (a) EFL published between 2006 and 2016 and (b) used meta-data qualified and qualified) and (c) encompassed the systematic reviews’ quality from ROBIS and AMSTAR 2

Theories

• 6 EFL reported the use of Framework: (a) e-learning, learning, and Kirkpatrick model.

Effects of e-learning according the four-level evaluation model of Kirkpatrick

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<td>1. Satisfaction with using e-learning</td>
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<td>2. Learning</td>
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<td>3. Behavioral outcomes</td>
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<td>4. Results</td>
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Table 1. Results frequency

<table>
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<tr>
<th>Outcomes/Effects (Number of reviews)</th>
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<tr>
<td>Quality of the effects regarding e-learning (Number of reviews)</td>
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<tr>
<td>Negative</td>
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<tr>
<td>1. Satisfaction with using e-learning (X)</td>
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<td>2. Learning (Y)</td>
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<td>3. Behavioral outcomes (W)</td>
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<tr>
<td>4. Results (Z)</td>
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DISCUSSION

Main findings

• The most reported outcomes were learning, followed by satisfaction with using e-learning.
• No outcome reported on behavior (practice), and only one on patients’ outcomes.
• A conservative approach was used to classify the outcomes, especially between learning (level 2) and changes in practice (level 3), due to limited granularity of details reported by SRs’ authors.

Strengths and limitations

• The review of qualitative, quantitative and MSRs is an emerging type of synthesis that allowed us to bring together, summarize and enhance the accessibility of existence (13).
• A comprehensive and systematic process was followed throughout all stages.
• Quality assessment tools (ROBIS, AMSTAR 2) have not been adapted to appraise MSRs.

Suggestions for further advances in the field

• Using other types of knowledge synthesis to explore complementary and broader research questions such as:
• What are the contexts and mechanisms used in e-learning interventions that lead to specific outcomes and for which people does it work in nursing CE? (e.g. a meta-synthesis can be used).
• How do nurses experience e-learning interventions in their work setting? How do they describe its impact on their practice or in their environment? (e.g. a meta-synthesis of qualitative studies).
• Developing new models, adapting or refining existing ones for (e)learning interventions that take into account various types of indicators (e.g. process outcomes, professional practice outcomes, e.g. (5,11)) and that make possible the process through which learning is translated into practice (into behavior).

CONCLUSIONS

Further scientific, methodological, theoretical and practice-based breakthroughs must feed the fast-growing field of e-learning in nursing education.