



# eLearning for continuing health professional development

## Background

- Broadly, eLearning refers to “any learning experience supported by information and communication technologies”<sup>1</sup>. eLearning generally aims to be flexible, engaging, learner-focused and interactive, and may involve collaboration and communication<sup>2</sup>. It can be used in fully online courses or as blended learning, involving both face-to-face and eLearning<sup>3</sup>.
- eLearning can enhance instructional materials,<sup>4</sup> provide visual/audio support and facilitate interactivity<sup>5,6</sup>. It can enable learners to participate in authentic problem solving or case scenarios, extend learning by linking to related online resources and interacting with peers and teachers<sup>7</sup>.
- eLearning can enable users to learn material in their own time, at their own pace and in their preferred order, at or near the point of care<sup>7</sup>.
- eLearning is widely used in medical and health professional education<sup>8</sup>. Continuing professional development through eLearning can provide flexibility in the timing and delivery of standardised training, enable access for remote learners and reduce travel time and costs for participants and teachers<sup>7</sup>.

## Review purpose

- To examine models of eLearning that have been developed for health professionals to identify what is known about optimal training approaches for different health professionals in different settings.

## Key findings

- 112 papers met selection criteria, including three systematic reviews.
- Knowledge is easy to change and measure, especially if the baseline is low; knowledge retention is easier with low baseline participants. Baseline data are needed before eLearning resources are developed.
- If procedural or practical skills are required, the program needs to include practice through exercises and testing, not just discussion or interactivity.
- It is hard to effect change in behaviour and practice except in low baseline situations. Attitudes, beliefs and values are difficult to change, but change can be achieved. Matters in the ‘professional’ domain (eg burnout) have been addressed.
- Some interpersonal skills cannot be effectively addressed online without including interpersonal interactions, eg patient-professional communication.
- Regular revision of learning is needed for retention.
- An eLearning resource developed for one group of health professionals may not be relevant for another group.
- Participation and completion can be increased through incentives, ensuring relevance and online mentors. Drop-out rates are often high, especially in long and anonymous programs.
- Participants’ technology and technical skills need to be considered. An online or face-to-face orientation is required for eLearning resources.
- The effectiveness of different eLearning types varies: quizzes with immediate feedback, case-based learning, role play and virtual patients can increase knowledge; interactivity without access to higher cognitive functions may have little effect on learning; and information transfer through PowerPoint, video and text do not result in long-term knowledge retention.
- Participant satisfaction is easy to measure; high satisfaction is associated with online discussions and other features of effective instructional design.

## Summary map of evidence

Learning type	No effect or inconclusive	Small effect	Medium-high effect
Blended learning	Pre/post-test <sup>9</sup>	**CBA <sup>10</sup>	*RCT <sup>11,12</sup> CBA <sup>13-20</sup> Pre/post-test <sup>21-25</sup> Post-test <sup>26</sup>
Case-based learning	Pre/post-test <sup>27,28</sup>	Post-test only <sup>29</sup>	RCT <sup>30-33</sup> CBA <sup>34,35</sup> Pre/post-test <sup>36-41</sup>
Discussions			Qualitative <sup>42</sup> CBA <sup>43</sup>
Interactive eLearning with quizzes	Pre/post-test <sup>44,45</sup> Post-test <sup>46</sup>	Post-test only <sup>47</sup>	RCT <sup>48-51</sup> , CBA <sup>52-63</sup> Pre/post-test <sup>64-72</sup> Post-test <sup>73-75</sup>
Mentor	CBA <sup>76</sup>		RCT <sup>77</sup> Pre/post-test <sup>78</sup>
Modules		CBA <sup>79</sup> Pre/post-test <sup>80</sup>	RCT <sup>81,82</sup> Pre/post-test <sup>83-95</sup> Post-test <sup>90</sup>
Multimedia (and simulation training)			RCT <sup>96</sup>
PowerPoint	Pre/post-test <sup>97,98</sup>	Pre/post-test <sup>99-101</sup>	CBA <sup>102</sup>
Role play			RCT <sup>103</sup> Pre/post-test <sup>104,105</sup> CBA <sup>106</sup>
Screensavers		Pre/post-test <sup>107</sup>	
Spaced education			RCT <sup>108</sup>
Video		CBA <sup>109</sup> Pre/post-test <sup>110,111</sup> Post-test <sup>112</sup>	RCT <sup>113</sup>
Virtual patients	RCT <sup>114</sup>		Pre/post-test <sup>115</sup>
Webinars			CBA <sup>116</sup>

\*Randomised controlled trial designs (RCT) \*\*Controlled before and after studies (CBA)

### Research gaps

- Studies need to describe the instructional design of the eLearning resources and eLearning/blended learning program, rather than only the tests used to determine learning outcomes.
- Papers need to outline how eLearning resources are based on needs assessments and/or evidence related to eLearning in health professional education.
- Research needs to focus on higher order and complex topics, rather than contained and relatively uncomplicated topics (eg handwashing, procedures), and be across – rather than within – institutions.
- Research needs to compare different eLearning interventions to identify which elements are effective for specific health professionals, topics and settings, rather than a comparison of eLearning with no education or with face-to-face teaching.
- More research is needed into the use of role play and virtual patients for developing interpersonal skills, as well as the effectiveness of multimedia, spaced learning, virtual patients and webinars more generally.
- More effort is needed to determine learning outcomes, long-term retention and impact on patients, rather than just satisfaction. Data about satisfaction could be more efficiently elicited through piloting of a program and measurement instruments before eLearning resources are implemented or evaluated.

## Summary of review method

- An electronic search was conducted in PubMed, the largest academic database with published literature from the health disciplines. Because the vast majority of literature on eLearning has been published this century, the search was limited to 2000–2014.
- Guidelines for study inclusion, quality assessment and data extraction outlined in the Cochrane 'Guidelines for Systematic Reviews of Health Promotion and Public Health Interventions' were used<sup>117</sup>. Given the wide range of possible confounding variables in education studies, it is often difficult to isolate the influence of an intervention on learning. For this reason, RCTs are not considered the gold standard in education research. Therefore, to add to the evidence base, study designs eligible for inclusion were RCTs, CBAs and studies with pre-/post-tests and post-tests only.
- 112 papers were assessed as meeting the selection criteria: 109 were grouped according to the type of eLearning used (eg, blended learning, case-based learning, etc.) and three were systematic reviews involving a range of these eLearning types. Data were extracted on authors, year of publication, country of origin, number of participants, health profession, medical topic, health setting, research study design, description of the educational intervention and control, learning outcomes measured, participant evaluation and limitations, as well as implications, which focused on enablers and barriers to eLearning and identification of development time and cost.
- Limitations: A rapid review approach was used to streamline traditional systematic review methods to complete the review in a short timeframe.<sup>118</sup> Although time constraints limit the comprehensiveness of rapid reviews, the results reported here are similar to three related systematic reviews<sup>119-121</sup>.

### The Australian Prevention Partnership Centre

The Prevention Centre is finding out how we can build an effective, efficient and equitable system for the prevention of lifestyle-related chronic disease.



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