Developing logic models for a systematic review on e-learning to increase evidence-based health care competencies

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This project is co-funded by the European Union under the Seventh Framework Programme (Grant Agreement No. 306141)
Background

...need to evaluate the effectiveness of EBHC e-learning

What is e-learning?
What is a complex intervention

“A complex intervention combines different components in a whole that is more than the sum of its parts.”

Oakley et al 2006
Characteristics of complexity

Table 1. Examples of complexity described in the health literature

<table>
<thead>
<tr>
<th>Examples of characteristics of complexity</th>
<th>Reference (examples)</th>
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</thead>
<tbody>
<tr>
<td>1. Characteristics of the intervention itself</td>
<td>Various including Campbell et al. [2]</td>
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<td>Emsley et al. [12]</td>
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Petticrew et al 2013
Complexity continuum

E-learning

Simple

Complex
Synthesising research of complex interventions
Logic models

“... a graphic description of a system ... designed to identify important elements and relationships within that system.”

Anderson 2011
Logic models

• Can help overcome some of the difficulties by:
  – Describing components of complex interventions and relationships between them
  – Making underlying theories of change and assumptions about causal pathways explicit
  – Describing interactions between the intervention and the system within which it is implemented
Added value of logic models in systematic review

Scoping the review:
- Refining question
- Lumpening vs. Splitting
- Identifying intervention components

Defining and conducting the review:
- Criteria for including studies
- Search strategy
- Subgroup analysis

Making the review relevant to policy and practice:
- Structuring reporting of results
- Interpreting results based on conceptual framework
Application to Campbell review

Protocol for a Systematic Review: E-learning of Evidence-Based Health Care to Increase EBHC Competencies in Healthcare Professionals

Anke Rohwer, Eva Rehfuess, Taryn Young
Objectives of the review

Primary objective:
• To assess the effectiveness of e-learning of EBHC on increasing EBHC competencies in healthcare professionals.

Secondary objectives:
• To assess the effectiveness of specific dimensions of e-learning in increasing EBHC competencies.
• To assess how educational context influences the effectiveness of EBHC e-learning.
• To assess how implementation approaches influence the effectiveness of EBHC e-learning.
Logic models templates

- INTEGRATE-HTA ([www.integrate-hta.eu](http://www.integrate-hta.eu))
- Developing methods for systematic reviews and HTAs of complex interventions
- System-based logic model
  - describes the system within which the interaction between the participants, the intervention and the context takes place
- Conceptual framework
- Process-orientatated logic model
  - explains the processes and causal pathways that lead from the intervention to its multiple outcomes
  - Analytical framework

*Rohwer and Rehfuess (unpublished)*
System-based logic model template

**Participants:** the targeted population/individuals

**Intervention (and comparison)**

**Intervention theory:** the theory underpinning the intervention, used in a broad way to describe a body of implicit and explicit ideas of how an intervention works. Can also include the aims of the intervention.

**Intervention design:** describes the “what?” of an intervention

**Components:**
- Technology and infrastructure (e.g. new drugs)
- Education (e.g. educational programme on hand-washing)
- Policy and regulations (e.g. residential wood burning regulations)

**Execution:** the “prescription” of the intervention
- Timing (e.g. post-operatively) and duration (e.g. for 6 months)
- Dose (e.g. 2 hours) and intensity (e.g. twice a week)

**Intervention delivery** the “how”, “who” and “where” of the intervention

**Delivery mechanisms:** how the intervention is being delivered e.g. face-to-face education; cellphone messages etc.

**Delivery agent characteristics:** characteristics of the individuals delivering the intervention.

**Setting:** location where intervention is being delivered (e.g. home, hospital, school...). Includes characteristics of the setting.

**Outcomes** (can be further divided into short-, medium-, and long term outcomes)

**Intermediate outcomes**
- Process outcomes: outcomes that refer to the implementation of the intervention e.g. reach, implementation fidelity, barriers to implementation etc.
- Behaviour outcomes: e.g. adherence, compliance, or any other behaviour relating to participants
- Surrogate outcomes: usually direct, measurable, often short-term effects of an intervention (e.g. biomarker levels, knowledge scores, air pollution measurements etc)

**Health outcomes**
- Individual-level health outcomes: e.g. clinical outcomes of individual patients
- Population-level health outcomes: e.g. incidence of a disease

**Non-health outcomes** e.g. costs of an intervention, improved access to healthcare facilities etc.

**Implementation**
- Policy
- Financing
- Organisation and structure

**Context**
- Geographical
- Epidemiological
- Socio-cultural
- Socio-economic
- Ethical
- Legal
- Political
Populating the logic model template

- Literature review
- Experts
- Discussion within team
**Participants**
- Type of healthcare worker (e.g. medical doctor, Nurse, Physiotherapist etc.)
- Level of education (undergraduate, postgraduate, CME)

**Intervention**

*Theory*
- Adult learning theory:
  - Self-motivation
  - Personalised learning
  - Distributed learning

*Intervention design*

Components:
- Course, module, curriculum, workshop on EBHC
- Learning objectives and content of educational activity
  - EBHC enabling competencies (epidemiology, biostatistics, basic searching skills, critical thinking)
  - EBHC key competencies (asking questions, accessing literature, critically appraising literature, applying results, evaluating the process)
- Multifaceted intervention vs. Single intervention

*Execution:*
- Duration (6 weeks, one year etc)
- Intensity (e.g. 2 hours)
- Dose (e.g. twice a week; once a month)
- Timing (within study programme etc.)
- Integrated or stand-alone

*Intervention delivery*

*Dimensions:*
- Pure e-learning vs. Blended learning
- Collaborative (interactive) vs. Individual learning
- Synchronous vs. Asynchronous delivery

*Delivery agent:*
- Facilitators and tutors: Attitude, communication skills, teaching skills, engagement with learners

*Organisation and structure:*
- Institutions offering educational activity (cost, capacity, culture)

**Outcomes**

*Intermediate outcomes*

Process outcomes:
- Barriers to method of teaching EBHC
- Enablers of method of teaching EBHC
- Teacher satisfaction
- Learner satisfaction
- Cost
- Attrition

*Surrogate outcomes*
- EBHC knowledge*
- EBHC skills*
- EBHC attitude*

*Behaviour outcomes*
- EBHC behaviour* (e.g. Question formulation, reading habits etc)
- Evidence-based practice
- Learner adherence

*Non-health outcomes*
- Evidence-based guideline implementation
- Health care delivery (health systems)

*Health outcomes*
- Individual health outcomes
- Population health outcomes

**Educational context**

*Setting*
Location where learning takes place
- Same place vs. distributed
- Home, workplace, university, library, classroom, bedside etc.

*Learner context*
- Background knowledge of EBHC
- Computer literacy
- Learning style
- Motivation

*Institutional context*
- Structure of course within larger curriculum
- Role models

*Socio-economic context*
- Access to internet
- Access to information (databases and electronic journals)
- Affordability
- Availability of electricity
- Availability of personal computers

**Healthcare context**

Socio-cultural
Epidemiological
Legal
Ethical
Political

*Bold outcomes represent primary outcomes, the rest refer to secondary outcomes*
Participants

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Process-orientated logic models

Processes and causal pathways from intervention to outcomes

Intervention components

Direct effects

Intermediate effects

Intermediate effects

Intermediate effects

Outcomes (intermediate, health, non-health)
Our experience with using logic models

• Resources needed
  ➢ Time
• Need to be familiar with content
• Informed (and improved) our protocol
  ➢ Refining our PICO question
  ➢ Search strategy
  ➢ Methods
Next steps

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SURMEPI
Stellenbosch University Rural Medical Education Partnership Initiative