Mapping Professional Competencies to Curriculum

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Demonstrating the extent to which curriculum meets competencies

- Problems in mapping trial Canada 2009
  - No solutions identified, rater concordance not measured
- Canada-La Trobe Skills Project 2002-2009
  - This project initial mapping results were unexpected
    - Raters mapped independently
  Proportion of Agreement 44% 85%
  - Achieving rater concordance not straightforward
- Changed focus to develop the mapping process using action research method

Researchers

La Trobe University
Priscilla Robinson, Bronwyn Carter, Lesley Ervin

Public Health Agency of Canada (PHAC) Jennifer Lowe, Elizabeth Wright
Developing the mapping process

Limited health sciences and education literature on the process for mapping competencies to curriculum

- Australian studies
  - template designed for mapping generic skills to B Ed courses Macquarie University AARE Conference 2002
  - mapped generic attributes required of IT course graduates to unit objectives QUT PhD 2004

- CDC funded study planned to map competencies for US epidemiologists to courses ASPH/CDC/CSTE 2008

- Inter rater reliability not measured, mapping processes not reported or not transferable

- This project aimed to map competencies developed in Australia and Canada to online courses while further developing the mapping process, findings published Journal Vocational Education and Training Vol. 65:3 2013
Relationship between competencies and the module

- **Competencies**
  - 30 Canadian
  - 16 Australian

- **Module Objectives**
  - 8 objectives

- **Lesson 1**
  - 5 objectives

- **Lesson 2**
  - 6 Objectives

- **Lesson 3**
  - 4 Objectives

- **Lesson 4**
  - 5 objectives

- **Lesson 5**
  - 5 objectives

- **Course Material**
The Mapping Process

- Decisions: Yes, No, ?Yes, ?No
- Compare
- Default options
- Discuss interpretation
- Revise
- Use the Rationale Document
- Compare and finalise results
- Document issues
Good rater concordance achieved

Proportion of Agreement

Lesson 1 objectives

Lesson 2 - 5 objectives
Mapping is a subjective process

Variables identified as influencing mapping decisions:

1. Interpretation of terms used in the wording of competencies and objectives
   - C3.5 ‘Demonstrate the ability to implement practice guidelines’
   - Similar problem found by PHAC, previous studies in Australia 2002 & Netherlands 2007
   - Refer to PHAC glossary
   - Discussion improved agreement (PHAC)

2. Broad versus literal interpretations of competencies:
   - Rater 1 58%
   - Rater 2 63%

3. Possible vested interests of raters/staff – suggest involve students QUT 2004
Mapping is a subjective process

Variables identified as influencing mapping decisions:

4. Level of proficiency assumed, not assessed
   - 4 point scale –not addressed introductory intermediate advanced - used to assess courses University of Hawaii 1995
   - meet ‘spirit’ of competency (introductory level) used by 2 of 3 raters PHAC
   - Dreyfus theory ‘novice to expert’ recommended for use by public health graduates in self assessment by US Accreditation Council Graduate Medical Education 2008

5. Rater knowledge of course content and familiarity with course, prior teaching and practice experience, one rater had developed curriculum and taught an online module

6. Understanding of the implications of mapping curriculum to competencies and familiarity with the competencies increases while mapping

→ may have contributed later in the project to fewer competencies rated as met

83% Canadian rated as met 15% Australian rated as met – mapped later

7. Structure and phrasing of competencies - rater concordance better for Australian competencies, map to highest relevant element applied only to Australian
Strategies and Tools

‘Rationale for Yes’ Table

- Where there is discrepancy in results, rater who decided Yes completes table
  --> other rater accepts rationale or result defaults to No
- Resolves rater disagreement using a transparent process
- Full consensus was achieved
- Documents evidence for claims that objectives meet particular competencies
- Provides a basis for:
  - review of the particular competencies and objectives
  - Investigation of implications for curriculum mapping
  - further development of the mapping process
Strategies and Tools

Issues Table

- Where a term needs clarification, document in Issues Table
- Records issues for later follow up
- Points for clarification may include meaning of particular terms or phrases in competencies or objectives
Implications for curriculum development

- Interpretation of competencies needs to be sufficiently specific to inform curriculum development
  - 15% (16 of 105) Australian elements and
  - 83% (30 of 36) Canadian competencies considered to be met by the module

- Mapping to the lowest component of competencies is important – to elements rather than Units
  - In 4 of 19 Australian Units and 3 of 7 Canadian Units only some competencies were considered met
  - US study 129 modules found few modules met all specific competencies within the broader competency Unit ASPH 2002

- Cross checking results within and across lessons assists in clarifying implications for curriculum development and aligning course material to competencies
### Australian Elements of Competence met by Lesson 1 objectives

<table>
<thead>
<tr>
<th>Units of Competency (1-19)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lesson 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective 1a</td>
<td>1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7</td>
<td>4.1, 4.2</td>
<td>6.1, 6.2</td>
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<tr>
<td>Objective 1b</td>
<td>1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7</td>
<td>2.1, 2.2</td>
<td>4.1, 4.2</td>
<td>6.1, 6.2</td>
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<tr>
<td>Objective 1c</td>
<td>1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7</td>
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<tr>
<td>Objective 1d</td>
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<td></td>
<td>6.1, 6.2</td>
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<tr>
<td>Objective 1e</td>
<td>1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7</td>
<td></td>
<td></td>
<td>4.1, 4.2</td>
<td>6.1, 6.2</td>
</tr>
</tbody>
</table>
Australian Competencies integrated into learning objectives

On completion of the Outbreak Investigation module participants will have developed competencies in the following Units of Competency:

1. Monitor and evaluate population health data or indicators
and may have developed competencies in the following Units of Competency:
2. Analyse the quality of findings from a surveillance or screening program
3. Plan a disease prevention/ control strategy
4. Formulating and implementing a response to a public health emergency
6. Mapping and analysing the environmental determinants that contribute to disease in a given community or population

........(continued)........
Australian Competencies integrated into learning objectives (continued)

And will be able to:

Understand the goal, objectives and steps of an outbreak investigation;

Be able to create and apply a case definition within the context of an outbreak investigation;

Know the key elements of a standard investigation questionnaire;

Be able to interpret descriptive data in terms of time, place and person characteristics;

Be able to generate verifiable hypotheses on the source, mode of transmission, vehicle or vector of propagation, exposures or risk factors;

Be able to identify appropriate control measures to halt an outbreak;

Know the elements required for documenting an outbreak and how these may be used to prepare concise reports;

Review the essential organizational and operational aspects of an outbreak investigation.

......(continued)........
On completion of Lesson 1 the participants will have developed competencies in:

- Monitoring and evaluating population health data or indicators (1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7)
- Analysing the quality of findings from a surveillance or screening program (2.1, 2.2)
- Formulating and implementing a response to a public health emergency (4.1, 4.2)
- Mapping and analysing the environmental determinants that contribute to disease in a given community or population (6.1, 6.2)

And will be able to:

- Define the following terms: epidemic, outbreak, cluster and pandemic;
- Understand the goal and objectives of an outbreak investigation;
- List the conditions that enable outbreaks to occur;
- List the main reasons for investigating a presumed outbreak;
- List the main steps of an outbreak investigation and

Apply these competencies, knowledge and skills to their place of work.
Recommendations for future mapping

- Further trial strategies and tools:
  - the Question mark and Default system
  - Rationale for Yes
  - Issues Table
  - Map to ‘lowest relevant element’ (for competencies in hierarchy)
  - Consider possible rater bias, use independent raters
- At least 2 raters, ideally 3 raters
- Trial proficiency ratings at least 2 levels
- Cross check results to clarify implications for curriculum development
- Trial suitable data base software
- Revise mapping outcomes for Outbreak Investigation and Management module
Thank you

Curriculum mapping: not as straightforward as it sounds. Journal of Vocational Education & Training, 2013 Vol.65 No. 3 309-318. Lesley Ervin, Bronwyn Carter & Priscilla Robinson

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