IHC Key Concepts

Comparison of the Informed Health Choices Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices: protocol for a mapping review

Oxman AD and Martínez García L.  
Working paper, 29. August 2018

www.informedhealthchoices.org
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critical thinking, argumentation, causal inference, cognitive biases, epistemic cognition, evidence-based practice, evidence informed decision-making, health literacy, logical fallacies, meta-cognition, philosophy of science, problem solving, science education, scientific literacy, scientific reasoning, scientific thinking, frameworks, models, competences, concepts, criteria


October 2018
Plain language summary

The Informed Health Choices (IHC) Key Concepts serve as standards for judgment, or principles for evaluating the trustworthiness of treatment claims, comparisons, and choices. The concepts can help people to:

- Recognise when a **claim** about the effects of treatments has an untrustworthy basis
- Recognise when evidence from **comparisons** of treatments is trustworthy and when it is not
- Make well-informed **choices** about treatments

They serve as a framework for developing learning-resources to help people understand and apply the concepts when claims about the effects of treatments (and other interventions) are made, and when they make health choices.

We present here a plan for reviewing frameworks for critical thinking. The findings of this review will inform further development of the IHC Key Concepts, development of related frameworks, and use of such frameworks.
Abstract

Background
The Informed Health Choices (IHC) Key Concepts serve as standards for judgment, or principles for evaluating the trustworthiness of treatment claims, comparisons, and choices. They serve as a framework for developing learning-resources to help people understand and apply the concepts when claims about the effects of treatments (and other interventions) are made, and when they make health choices.

Objective
The objective of this study is to systematically compare the IHC Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices.

Methods
We will identify relevant frameworks from reviews of frameworks, searches using Google Scholar, citation searches, and contact with key informants. We will include frameworks that are intended to provide a structure for teaching or learning to think critically about the basis for claims, evidence used to support claims, or making informed choices. To be included, there must be a description of the purpose of the framework, a list of the framework’s elements; and definitions of the key terms. The two authors will independently assess frameworks for eligibility and extract data from included frameworks using standardised forms. We will map the relationship of the included frameworks to the IHC Key Concepts, to frameworks for 21st century competences, and national and international curricula.

Discussion
The findings of this review will inform further development of the IHC Key Concepts, development of related frameworks, and the use of such frameworks.
Background

Key Concepts for learning how to think critically about health claims, comparisons, and choices

There are endless claims about treatments in the mass media, advertisements, and everyday personal communication. Some are true, and some are false. Many are unsubstantiated: we do not know whether they are true or false. Unsubstantiated claims about the effects of treatments are often wrong. Consequently, people who believe and act on these claims suffer unnecessarily and waste resources by doing things that do not help and might be harmful, and by not doing things that do help.

In response to these challenges, we developed the Informed Health Choices (IHC) Key Concepts as the first step in the Informed Health Choices project [1-6]. The aim of the project is to help people, particularly primary and secondary school students, assess claims about treatments and make informed health choices [7].

A treatment is any intervention (action) intended to improve health, including preventive, therapeutic and rehabilitative interventions, and public health or health system interventions [8]. Although we have developed and framed the Key Concepts to address treatment claims, people in other fields have also found them relevant; for example, for assessing claims about the effects of educational interventions or environmental measures. Work to adapt these concepts to other fields is ongoing.

The IHC Key Concepts serve as the basis for developing learning resources to help people understand and apply the concepts when claims about the effects of treatments (and other interventions) are made, and when they make health choices [5]. They are also the basis for a database of multiple-choice questions that can be used for assessing people’s ability to apply the IHC Key Concepts [10].

We started to develop this list of concepts in 2013. We published the first version of the list in 2015 with 32 concepts in six groups [1]. We published a revised list with 34 concepts in three groups in October 2016 [3]. The current list has 44 concepts in the same three groups (Figure 1) [6].

The IHC Key Concepts serve as standards for judgment, or principles for evaluating the trustworthiness of treatment claims and comparisons, and making informed choices. The concepts can help people to:

- Recognise when a **claim** about the effects of treatments has an untrustworthy basis
• Recognise when evidence from **comparisons** of treatments is trustworthy and when it is not
• Make well-informed **choices** about treatments

**Figure 1 The IHC Key Concepts (short titles)**

1. Beware of treatment claims like these

   We hear claims about the effects of treatments all the time. Many of these are not trustworthy. When you hear someone use one of these reasons to support a claim about the effects of a treatment, you should beware and ask where the evidence is.

   **1.1 Beware of claims that are too good to be true.**
   a) “100% safe!”
   b) “100% effective!”
   c) “100% certain!”
   g) “Old is better!”
   h) “New is better!”
   i) “More is better!”
   j) “Early is better!”
   k) “Personalised medicine!”

   **1.2 Beware of claims based on faulty logic.**
   a) “Treatment needed!”
   b) “It works like this!”
   c) “Associated with!”
   d) “Real world data!”
   e) “No comparison needed!”
   f) “A study shows!”
   b) “As advertised!”
   c) “Recommended by experts!”
   d) “Peer reviewed!”

2. Check the evidence from treatment comparisons

   A treatment has to be compared to something else to know what would happen without the treatment. For treatment comparisons to be FAIR, the only important difference between comparison groups should be the treatments they receive. Unfair treatment comparisons and unsystematic summaries of treatment comparisons can be misleading. The way that treatment effects are described can also be misleading.

   **2.1 Don’t be misled by unfair comparisons!**
   a) Dissimilar comparison groups
   b) Indirect comparisons
   c) Dissimilar attention and care
   d) Dissimilar expectations or behaviours
   e) Dissimilar assessment of outcomes
   f) Unreliable assessment of outcomes
   g) Lots of people not followed-up
   h) Outcomes counted in the wrong group
   b) Selective reporting
   c) Unfounded assumptions

   **2.2 Don’t be misled by unreliable summaries of treatment comparisons!**
   a) Unsystematic summaries

3. Make well-informed treatment choices

   Deciding what to do requires judgements about the relevance of the evidence, how important the good and bad outcomes are to you, and how sure you can be about the treatment effects.

   **3.1 What is the problem and what are the options?**
   a) What is your health problem and what are your options?
   c) Are the treatments different from those available to you?
   d) Are the circumstances different from yours?

   **3.2 Is the evidence relevant?**
   a) What outcomes matter to you?
   b) Are the people (or animals) very different from you?
   **3.3 Do the advantages outweigh the disadvantages?**
   a) Do the advantages outweigh the disadvantages for you?
   b) How sure are you about the treatment effects?
We developed the IHC Key Concepts by searching the literature and checklists written for the public, journalists, and health professionals, and by considering concepts related to assessing the certainty of evidence about the effects of treatments [1]. We have tried to include all concepts that are important for people to consider when they assess treatment claims and make health choices. At the same time, we have tried to limit the number of concepts by minimising redundancy. We have organised the concepts in a way that makes sense to us and others who have provided feedback. They are not organised based on how complex or difficult they are to understand and apply, or in the order in which they should be learned. That is something we plan to do in the future.

Although we have written the concepts and explanations in plain language, some of them may be unfamiliar and difficult to understand. However, the list is not designed as a teaching tool. It is a framework, or starting point, for teachers, journalists and other intermediaries for identifying and developing resources (such as longer explanations, examples, games and interactive applications) to help people to understand and apply the concepts.

Other frameworks relevant to learning how to think critically about treatment claims, comparisons, and choices

There are many other frameworks that include competences, dispositions, or concepts that are relevant to thinking critically about treatment claims, comparisons, and choices. These include frameworks for argumentation, causal inference, cognitive biases, critical thinking, epistemic cognition, evidence-based practice, evidence-informed decision-making, health literacy, logical fallacies, meta-cognition, philosophy of science, problem solving, science education, scientific literacy, scientific reasoning, and scientific thinking. For each category of frameworks there are disagreements about definitions and what is included. For example, learning to think critically is widely held as an aim of education [10], but there is not agreement on the definition of “critical thinking” and there are several different frameworks (conceptual structures intended to serve as a support or guide) for critical thinking [11-15]. Similarly, there are different definitions and frameworks for scientific reasoning (and scientific literacy and scientific thinking) [16-19], epistemic cognition [20], causal inference [21], problem solving [22], meta-cognition [23], health literacy [24-26], evidence-informed decision making [27,28], and evidence-based practice [29]. There is also overlap across these different categories of frameworks, some of which have been grouped together as frameworks for “productive thinking” [13].

Objective

The objective of this study is to systematically compare the IHC Key Concepts to other frameworks that are relevant to learning how to think critically about treatment claims, comparisons, and choices. We will examine similarities and differences between the IHC Key Concepts and other frameworks - particularly in the context of primary and secondary school education - including:

- The purposes and definitions of key terms
- The elements they include and domains in which those are grouped
- How they have been developed and evaluated
- How they have been used as the basis for curricula, teaching and learning, and assessment tools

Terminology

Definitions of terms that we use in this protocol are shown in Table 1.

<table>
<thead>
<tr>
<th>Table 1 Definitions of terms as used in this protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Choice</strong></td>
</tr>
<tr>
<td><strong>Claim</strong></td>
</tr>
<tr>
<td><strong>Comparison</strong></td>
</tr>
<tr>
<td><strong>Competency</strong></td>
</tr>
<tr>
<td><strong>Concept</strong></td>
</tr>
<tr>
<td><strong>Curriculum</strong></td>
</tr>
<tr>
<td><strong>Disposition</strong></td>
</tr>
<tr>
<td><strong>Domain</strong></td>
</tr>
<tr>
<td><strong>Element</strong></td>
</tr>
<tr>
<td><strong>Fair comparison</strong></td>
</tr>
<tr>
<td><strong>Framework</strong></td>
</tr>
<tr>
<td><strong>Intervention</strong></td>
</tr>
<tr>
<td><strong>Skill</strong></td>
</tr>
<tr>
<td><strong>Thinking critically</strong></td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
</tr>
</tbody>
</table>
Methods

We will conduct a systematic mapping review of frameworks that are relevant to learning to think critically about treatment claims, comparisons, and choices.

Criteria for considering frameworks for inclusion

We will include frameworks that are intended to provide a structure for teaching or learning to think critically about at least one of the following:

- The basis (justification) for claims or arguments about the effects of interventions and the reliability of those justifications
- The extent to which evidence used to support claims about the effects of interventions (comparisons) is fair and reliable
- Choices about what to do in order to achieve a goal

To be included, there must be:

- a description of the purpose of the framework;
- a list of the framework’s elements; and
- definitions of the key terms used to describe the purpose of the framework, its elements and domains (in which elements are grouped, if there are any)

Frameworks that are modifications of another framework will be considered together with the framework that was modified.

Search methods for identification of frameworks

We will begin by considering the 41 frameworks reviewed in Frameworks for Thinking: A Handbook for Teaching and Learning [13] and reviews of frameworks used in health [24-29]. We will search for other relevant frameworks using Google Scholar and the search strategies in Appendix 1. We will supplement these searches by conducting citation searches for key references and contacting key informants for each category of frameworks. We will also search for reviews of frameworks for 21st century competences [e.g. 10] and national curricula [e.g. 30].

Selection of frameworks

The two review authors will independently assess each identified framework for possible inclusion using the selection criteria described above, using an eligibility form (Appendix 2). The two authors will discuss disagreements and reach
a consensus. Frameworks that are considered for inclusion and then excluded will be listed with the reasons for exclusion.

**Data collection and assessment of frameworks**

For each included framework, we will conduct focused searches and compile a list of publications that describe the framework, its development and evaluation, and its use as the basis for curricula, learning resources, and assessment tools.

The two authors will then independently record the following information for each framework, using a data collection form (Appendix 3):

- Its purpose
- Its domains and elements
- Definitions of key terms used to describe its purpose, domains, or elements
- Methods used to develop the framework
- Methods used to evaluate the framework (if any) and findings
- Ways in which the framework has been used as the basis for
  - Curricula
  - Teaching and learning
  - Assessment tools

We will then compare the data that we have collected and discuss any disagreements and reach a consensus.

For each framework for 21st century competences and national curricula included in one of the reviews that we identify, we will independently record learning goals that correspond to the purposes of the included frameworks for learning how to think critically, or the elements and domains in those frameworks.

Based on this information, we will independently assess:

- Strengths and weaknesses of how the framework was developed and evaluated
- Strengths and weaknesses of how the framework has or could be used
- Any other strengths or weaknesses

We will compare our assessments and resolve any disagreements.

**Analysis**

1. We will summarise key characteristics of the included frameworks in tables.
2. We will map the extent to which the purposes of the different frameworks overlap using Venn diagrams, focusing particularly on overlap with the IHC Key Concepts.
3. We will prepare three matrixes with elements as columns and frameworks as rows, including one for concepts, one for competences, and one for dispositions. For concepts, we will focus particularly on overlap with the IHC Key Concepts, and concepts that are relevant to the purpose of the IHC Key Concepts, but not currently included. For competences and dispositions, we will focus particularly on those that are relevant to the purpose of the IHC
Key Concepts. If we identify elements that cannot be categorised as concepts, competences, or dispositions, we will prepare additional matrixes for any relevant categories of elements that we identify.

4. We will map the extent to which the included frameworks are reflected in frameworks for 21st century competences and national curricula, focusing particularly on the IHC Key Concepts.

5. We will reflect on our assessments of the frameworks and identify implications for how we might improve the IHC Key Concepts framework and its usefulness.

The two authors will conduct these analyses independently. We will then compare our analyses, discuss disagreements, and reach a consensus.

Discussion

The findings of this review will inform future improvements of the IHC Key Concepts. In addition, they will inform the development of other frameworks, and the choice and use of frameworks by curriculum developers, teachers, and others.
Declarations

Author contributions
AO prepared the first draft of this protocol and coordinated revisions, which were co-authored by AO and LMG.

Competing interests
AO has helped to coordinate the development of the IHC Key Concepts since 2013 and currently has primary responsibility for further development of that framework. Both AO and LMG are members of the IHC Network.

Funding
The IHC Key Concepts were developed as part of the Informed Health Choices Project, which was funded by the Research Council of Norway (project no: 220603/H10).

Acknowledgments
We would like to thank Astrid Austvoll-Dahlgren, Iain Chalmers, and Joe Chislett for comments on an earlier version of this protocol, and Steve Higgins for advice.
References


Appendix 1 Google Scholar search strategies
Our initial search strategies are summarised in the table below. We have elected initially to use search strategies that are more specific than sensitive, by searching for key terms in the titles of articles only.

### Search log

<table>
<thead>
<tr>
<th>Focus</th>
<th>Date</th>
<th>Search strategy</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argumentation</td>
<td>19/10/18</td>
<td>allintitle: argumentation (framework OR model OR competences OR competencies) (teaching OR teachers OR learning OR students OR school OR schools OR education)</td>
<td>88</td>
</tr>
<tr>
<td>Causal inference</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;causal inference&quot;</td>
<td>146</td>
</tr>
<tr>
<td>Cognitive biases</td>
<td>19/10/18</td>
<td>allintitle: &quot;cognitive biases&quot; &quot;decision making&quot;</td>
<td>105</td>
</tr>
<tr>
<td>Epistemic cognition</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;epistemic cognition&quot;</td>
<td>16</td>
</tr>
<tr>
<td>Evidence-based practice</td>
<td>19/10/18</td>
<td>allintitle: &quot;evidence based practice&quot; (framework OR model OR competences OR competencies) (teaching OR teachers OR learning OR students OR school OR schools OR education)</td>
<td>74</td>
</tr>
<tr>
<td>Evidence-informed decision-making</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;evidence based decision making&quot;</td>
<td>31</td>
</tr>
<tr>
<td>Evidence-informed decision-making</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;evidence informed decision making&quot;</td>
<td>6</td>
</tr>
<tr>
<td>Evidence-informed practice</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;evidence-informed practice&quot;</td>
<td>13</td>
</tr>
<tr>
<td>Health literacy</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;health literacy&quot;</td>
<td>221</td>
</tr>
<tr>
<td>Logical fallacies</td>
<td>19/10/18</td>
<td>allintitle: &quot;logical fallacies&quot; (teaching OR teachers OR learning OR students OR school OR schools OR education)</td>
<td>19</td>
</tr>
<tr>
<td>Meta-cognition</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;meta-cognition&quot;</td>
<td>21</td>
</tr>
<tr>
<td>Philosophy of science</td>
<td>18/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;philosophy of science&quot;</td>
<td>186</td>
</tr>
<tr>
<td>Problem solving</td>
<td>19/10/18</td>
<td>allintitle: &quot;problem solving&quot; (framework OR model OR competences OR competencies) (teaching OR teachers OR learning OR students OR school OR schools OR education) (&quot;decision making&quot; OR cause OR causal OR claims OR evidence OR &quot;health literacy&quot; OR reasoning OR science OR scientific OR thinking)</td>
<td>73</td>
</tr>
<tr>
<td>Science education*</td>
<td>19/10/18</td>
<td>allintitle: framework OR concepts &quot;science education&quot;</td>
<td>286</td>
</tr>
<tr>
<td>Scientific literacy</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;scientific literacy&quot;</td>
<td>122</td>
</tr>
<tr>
<td>Scientific reasoning</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;scientific reasoning&quot;</td>
<td>70</td>
</tr>
<tr>
<td>Scientific thinking</td>
<td>16/10/18</td>
<td>allintitle: framework OR model OR competences OR competencies OR concepts OR criteria &quot;scientific thinking&quot;</td>
<td>44</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1521</td>
</tr>
</tbody>
</table>

* Without citations
Appendix 2 Eligibility form
# Critical thinking frameworks eligibility form

For assessing potentially eligible frameworks

<table>
<thead>
<tr>
<th>Framework ID</th>
<th>Your name</th>
<th>Date</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Inclusion criteria (exclude if no)</strong></th>
<th>☐ Yes ☐ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the framework provide a structure for teaching or learning to think critically about at least one of the following:</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>The basis (justification) for claims or arguments about the effects of interventions and the reliability of those justifications</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>The extent to which evidence used to support claims about the effects of interventions (comparisons) are fair and reliable</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Informed decisions (choices about what to do in order to achieve a goal)</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Is there a description of the purpose of the framework?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Is there a list of the framework’s elements?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Are there definitions of the key terms used to describe the purpose of the framework, its elements and domains (in which elements are grouped, if there are any)?</td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Exclusion criterion</strong></th>
<th>☐ Yes ☐ No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the framework a modification of another framework?</td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Conclusion</strong></th>
<th>☐ Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Should the framework be included?</td>
<td>☐ Yes</td>
</tr>
<tr>
<td>• Yes, if yes to all of the inclusion criteria and no to the exclusion criterion</td>
<td>☐ Yes</td>
</tr>
<tr>
<td>• Note the original framework, if it is a modification of another framework</td>
<td>☐ Consider together with another framework</td>
</tr>
<tr>
<td>• Provide a concise statement of the main reason for excluding the framework, if it should be listed in the excluded frameworks table</td>
<td>☐ No, and list in excluded frameworks table</td>
</tr>
<tr>
<td>• Note why, if it is obvious that the frameworks should be excluded and not listed in the excluded frameworks table</td>
<td>☐ No, and do not list in excluded frameworks table</td>
</tr>
</tbody>
</table>
## Consensus

### Names and date

**Should the framework be included?**

- Yes, if yes to all of the inclusion criteria and no to the exclusion criterion
  - □ Yes

- Note the original framework, if it is a modification of another framework
  - □ Consider together with another framework

- Provide a concise statement of the main reason for excluding the framework, if it should be listed in the excluded frameworks table
  - □ No, and list in excluded frameworks table

- Note why, if it is obvious that the frameworks should be excluded and not listed in the excluded frameworks table
  - □ No, and do not list in excluded frameworks table
Appendix 3 Data collection form
### Critical thinking frameworks data collection form

*For included frameworks*

<table>
<thead>
<tr>
<th>Framework ID</th>
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<table>
<thead>
<tr>
<th>Your name</th>
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</table>

<table>
<thead>
<tr>
<th>Date</th>
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<td></td>
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</tbody>
</table>

#### Publications

**List each publication** that was used to provide information about this framework:

<table>
<thead>
<tr>
<th>Data</th>
<th>References</th>
</tr>
</thead>
<tbody>
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</table>

**Who** developed the framework and **where**? (name(s) of the author(s) or organization that developed the framework and the country in which it was developed)

<p>| | |</p>
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</table>

**When** was the framework developed (date of the first publication describing the framework and date of the most recent)?

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What is the **stated purpose** of the framework?

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What is the **background** of the framework? (including, for example, the context in which it was developed, the rationale, and the discipline(s) of the developers)

<p>| | |</p>
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</table>

**What domains** (if any) and **elements** (within each domain) are included in the framework? **NOTE how these overlap with IHC.**

<table>
<thead>
<tr>
<th>Competences (skill, knowledge, or capacity to do something)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

Are any of these clearly or potentially **relevant for IHC**?

<table>
<thead>
<tr>
<th>☐ Yes ☐ No</th>
</tr>
</thead>
</table>

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1 IHC currently addresses two broad competences: assessing treatment claims and making informed treatment choices.
<table>
<thead>
<tr>
<th>Dispositions (frequent and voluntary habits of thinking and doing):</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

Are any of these clearly or potentially relevant for IHC?²
☐ Yes ☐ No

<table>
<thead>
<tr>
<th>Concepts (standards for judgment, or principles for evaluating the trustworthiness of claims, comparisons, and choices)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

How do these overlap with the IHC Key Concepts?³

<table>
<thead>
<tr>
<th>Other elements (that do not fit into any of the above categories)</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How are key terms in the framework defined?⁴</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key terms used to describe the framework’s purpose</td>
</tr>
<tr>
<td>Key terms used to describe the framework’s domains and elements</td>
</tr>
<tr>
<td>Other key terms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation of the framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has the framework been formally evaluated?⁵</td>
</tr>
<tr>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>If so, how?</td>
</tr>
<tr>
<td>What were the key findings?</td>
</tr>
</tbody>
</table>

² IHC does not currently include dispositions. Note here dispositions that are clearly or potentially relevant for IHC.
³ Note any concepts that are similar to IHC Key Concepts and any concepts that should be considered for inclusion the next time we update the IHC Key Concepts.
⁴ Only include definitions that are necessary to understand the framework or that are potentially useful for clarifying IHC in future updates.
⁵ Note any evaluation of any aspect of the framework using any methods. To be considered a “formal evaluation” there has to be a report with an explicit objective, a description of the methods that were used, and results.
Has the framework been informally evaluated?
☐ Yes ☐ No
If so, how?

What were the key findings?

Strengths of how the framework was evaluated

Weaknesses of how the framework was developed was evaluated

Are there ways in which the framework has been evaluated that we might want to consider applying to the IHC Key Concepts?

Development of the framework
Is there a clear description of the methods that were used?
☐ Yes ☐ No

Is the basis for the framework clear?
☐ No
☐ Somewhat
☐ Yes
If somewhat or yes, tick all that are relevant and specify:
☐ It is based on another framework
☐ It is based on a model or theory
☐ It is based on a systematic review
☐ It is based on a non-systematic review
☐ It is based on a formal consensus process
☐ It is based on an informal consensus process
☐ It is based on something else
Notes:

Are the criteria for including and excluding elements clear?
☐ No
☐ Somewhat
☐ Yes
If somewhat or yes, specify:

---

6 Note any evaluation of any aspect of the framework using any methods. To be considered a “formal evaluation” there has to be a report with an explicit objective, a description of the methods that were used, and results.
<table>
<thead>
<tr>
<th>Question</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the framework <strong>coherent</strong> (i.e. does not mix type(s) and specificity</td>
<td>☐ No</td>
<td>☐ Somewhat</td>
<td>☐ Yes</td>
<td>☐ Don’t</td>
<td></td>
</tr>
<tr>
<td>of concepts, competencies, or dispositions)?</td>
<td></td>
<td></td>
<td></td>
<td>know</td>
<td></td>
</tr>
<tr>
<td>What is the basis for this judgement?:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are the elements and domains <strong>distinct</strong>?</td>
<td>☐ No</td>
<td>☐ Somewhat</td>
<td>☐ Yes</td>
<td>☐ Don’t</td>
<td></td>
</tr>
<tr>
<td>What is the basis for this judgement?:</td>
<td></td>
<td></td>
<td></td>
<td>know</td>
<td></td>
</tr>
<tr>
<td>Are there elements or domains that are <strong>included that should not be</strong>?</td>
<td>☐ No</td>
<td>☐ Possibly</td>
<td>☐ Yes</td>
<td>☐ Don’t</td>
<td></td>
</tr>
<tr>
<td>What is the basis for this judgement?:</td>
<td></td>
<td></td>
<td></td>
<td>know</td>
<td></td>
</tr>
<tr>
<td>Are there important elements or domains that are <strong>missing</strong>?</td>
<td>☐ No</td>
<td>☐ Possibly</td>
<td>☐ Yes</td>
<td>☐ Don’t</td>
<td></td>
</tr>
<tr>
<td>What is the basis for this judgement?:</td>
<td></td>
<td></td>
<td></td>
<td>know</td>
<td></td>
</tr>
<tr>
<td>Are the elements <strong>grouped in a logical way</strong>?</td>
<td>☐ No</td>
<td>☐ Possibly</td>
<td>☐ Yes</td>
<td>☐ Don’t</td>
<td></td>
</tr>
<tr>
<td>What is the basis for this judgement?:</td>
<td></td>
<td></td>
<td></td>
<td>know</td>
<td></td>
</tr>
<tr>
<td>Is it <strong>clear for whom</strong> the framework is intended?</td>
<td>☐ No</td>
<td>☐ Possibly</td>
<td>☐ Yes</td>
<td>☐ Don’t</td>
<td></td>
</tr>
<tr>
<td>What is the basis for this judgement?:</td>
<td></td>
<td></td>
<td></td>
<td>know</td>
<td></td>
</tr>
<tr>
<td>Other <strong>strengths</strong> of how the framework was developed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other <strong>weaknesses</strong> of how the framework was developed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Are there ways in which the framework has been developed that we might want to consider applying to the IHC Key Concepts?

What are the strengths and weaknesses of how the framework has or could be used for curriculum development, teaching and learning, and assessment?

Based on references that describe the framework and references citing those:

Is there evidence of that the framework has been used?
☐ Yes ☐ No
If so, what evidence (references)?

Who has used it?
☐ Teachers ☐ Students ☐ Researchers ☐ Others
Specify types of teachers, students, researchers, and others:

Has it been used in curriculum development?
☐ Yes ☐ No

Are there teaching and learning resources?
☐ Yes ☐ No

Are there assessment tools?
☐ Yes ☐ No

Are there other ways in which it has been used?
☐ Yes ☐ No

Are there ways in which it has been proposed that it could be used, but for which there is not evidence that it has been used?
☐ Yes ☐ No

Other strengths of how the framework has or could be used

Other weaknesses of how the framework has or could be used

Are there ways in which the framework has been used that we might want to consider applying to the IHC Key Concepts?
☐ Yes ☐ No

What other strengths and weaknesses does the framework have?

Any other strengths

Any other weaknesses
What potential **implications** are there **for the IHC Key Concepts**?

*For refining the stated **purpose**?*
- [ ] Yes  [ ] No

*For the **scope**?*
- [ ] Yes  [ ] No

*Modification of how the concepts are **grouped**?*
- [ ] Yes  [ ] No

*New **concepts** or refinement of concepts that should be considered?*
- [ ] Yes  [ ] No

*Dispositions that should be considered?*
- [ ] Yes  [ ] No

*Other elements that should be considered?*
- [ ] Yes  [ ] No

*Methods that we should consider using?*
- [ ] Yes  [ ] No

*Ways of making the IHC Key Concepts more **useful**?*
- [ ] Yes  [ ] No

*Other?*
- [ ] Yes  [ ] No

*Is there anything else about the framework that should be noted?*
- [ ] Yes  [ ] No

If yes, what?

**Missing information**

*Is there important information that is missing and, if so, whom should we contact to try to obtain that information?*
- [ ] Yes  [ ] No