# A conceptual approach to validating competence frameworks

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## Introduction

The development of competencies is regarded as an important focus in education and in the workplace. The responsibility for developing competencies in learners at all levels of education is increasingly being laid onto educational institutions (European Commission, 2018). This presents a series of significant conceptual and empirical challenges, including the need to achieve a consensus on what is meant by the term "competence" and related terms such as "competency" and "competencies". A recent review by Vitello et al. (2021) recommended use of Hyland's (1994) definition of "competence" as broad qualities in relation to a defined standard (e.g., a competent medical doctor). On the other hand "competencies" are narrower atomistic components that are linked to overall competence (e.g., appropriate completion of a medical procedure). We follow that definition in this article and hence talk about "competence frameworks" rather than "competency frameworks".

Because competence in any domain is a complex concept (construct), it is useful to have a systematic definition of the overall competence and the competencies that comprise it, along with a statement of rationale (why the definitions are the way they are), and how the definitional system can be used in practice. This combination of definitional system, rationale and proposed use is what we call a "framework". This concept of a framework is quite general. In this article we focus on competence frameworks, but many of the ideas and arguments would apply to validating other similar frameworks.

Competence frameworks have been developed in a range of educational, vocational and workplace contexts. A primary aim of such frameworks is to provide a structure that articulates an overall competence as well as individual competencies (Chartered Institute of Professional Development, 2021).

Competence frameworks typically offer a description of a range of competencies and the relations between them. They offer a "construct definition": a statement of the knowledge, skills, and understanding specific to a context such as a workplace. This definition can then be put to a range of uses including to define assessment criteria, to act as a tool for personal reflection about development needs and

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opportunities, or to offer a set of criteria to support in-role accountability. Competence frameworks reflect values held by their developers (Batt et al., 2019). Thus, they hold the potential to direct and influence models of curriculum, learning and assessment at all stages of education. Competence frameworks, with their emphasis on the application of knowledge in real-world situations, help to ensure that learners who have met the assessment objectives of assessments constructed from them are ready to "function effectively in society" (Mulder et al., 2007, p. 68), equipped with all the necessary knowledge, skills and attitudes required for personal fulfilment and social inclusion. (See European Parliament & Council of the European Union, 2006.)

This article focuses on the important question of how practitioners should validate competence frameworks. In the broadest sense of the term, validation is the process of using a range of methods to check the validity or accuracy of something. In the first section of this article, we explore the question of what it means for a competence framework to be deemed "valid", drawing upon literature from educational measurement. We argue that a competence framework's validity relates to the alignment between defined purposes, its structural elements and the overall credibility of associated claims made by framework developers.

This article then explores four methodological issues that permeate the validation of competence frameworks. On-going validation of competence frameworks is important, for example, because it acts as a defence against redundancy of frameworks over time. This is particularly relevant in workplace contexts, where new innovations, technologies, best practice, regulatory frameworks and so on can quickly render existing competence frameworks out of date. Developing sound and replicable validation methods to support the initial design, review and adaptation of competence frameworks can help users find areas of divergence between the framework and best practice.

We conclude this article by suggesting a practical template of key questions to consider when designing a competence framework to support its initial and on-going validation.

## What is a valid competence framework?

Establishing a definition of validity that supports the investigation of competence frameworks is important because it can guide subsequent validation practice. In this section, we draw on the educational, psychological measurement, and assessment literature to propose reformulations of the concepts of "validity" and "validation" such that they are relevant to competence frameworks.

### Validity as exploring credibility of stated claims linked to the framework

*The Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 2014) state that validity resides in the claims made about assessment outcomes and the strength of the arguments and evidence

made to support those claims. In this view, validity is based on the purpose(s) of an assessment and how well the interpretations and uses of the assessment outcomes (derived scores) serve each of the intended purposes (AERA et al., 2014). For competence frameworks, understanding their intended purposes is important because it underpins the subsequent development of claims that are the focus of validation inquiry. We explore the different types of claims made by competence frameworks in the next section.

When considering the validity of a competence framework, a useful concept is that of *credibility*, that is, the quality of being trustworthy or believable (House 1980, 2014). Credibility is achieved by understanding the requirements of the stakeholders who will be using the framework and providing them with enough evidence that the framework, in their view, is "sound" (AERA et al, 2014). Whether a competence framework argument can be "sound" or not depends on the sufficiency and relevance of evidence in support of the stated claims (see below for a list of types of claims made by competence frameworks). Cronbach (1988) outlined three criteria that link to overall credibility – *clarity*, *persuasion*, and *plausibility* – arguing that a validity argument must reflect the "prevailing beliefs and values" (p. 5) of all relevant stakeholders for it to be a just presentation of the validation evidence (see also Kane, 2013).

We have suggested above that the strength of a validity argument and the evidence in support of its claims resides in its credibility (not in its certainty) and its ability to persuade relevant stakeholders of the "soundness" of the overall claim(s). We therefore define the validity of a competence framework as:

> An interpretive judgement as to the degree to which the claims regarding the use or uses (either declared or implicit) inferred from a competence framework are credible.

And a validity argument as:

> A clear, comprehensible and persuasive defence of the extent to which relevant evidence as well as underlying theory support the purposes and intended uses declared for the competence framework. The argument is subject to ongoing scrutiny and challenge and can be overturned in certain specific circumstances. As such, any validity claim is at best tentative.

These definitions highlight the principal elements that describe validity and validation in relation to the purposes and uses of competence frameworks.

## What claims are made by competence frameworks?

An important step in validating a competence framework is understanding the claims made related to its (potentially many) interrelated purposes. A *claim* in this context is a statement or assertion that something is the case, which creates a position that requires validation. Crucially, however, a claim is typically presented initially without providing evidence or proof – in this sense it is initially unsubstantiated. The stated claims thus become the subject of evidence collection, scrutiny, and challenge. Possible claims could relate to the application of a competence framework to educational stages and cultural contexts, the

effect that embedding the competence framework might have on practice, or the quality of the judgements made when utilising the framework (e.g., for assessment, Newton, 2017; Batt et al., 2019). Below are some illustrative examples of overarching claims made concerning competence frameworks (Table 1).

**Table 1: Illustrative claims made in relation to competence frameworks.**

| Organisation | Competence framework | Example competence framework claim |
|---|---|---|
| Partnership for 21st Century Skills (P21) (http://www.p21.org/) | A framework for twenty-first century skills | "Embedding the 3Rs [reading, writing and arithmetic] and the 4Cs [collaboration, critical thinking, communication and creativity] makes teaching and learning more relevant, engaging and rigorous" |
| Chartered Insurance Institute (2015) | CII Insurance competence framework | "... [The CII Insurance competence framework] can support a wide range of business operations providing insurance services, both in the UK and globally". |
| European Commission (2007) | Key competencies for life-long learning | "The key competences [competencies] are all considered equally important, because each of them can contribute to a successful life in a knowledge society" |

The challenge for practitioners is to find evidence to substantiate the claim or claims that have been made by the competence framework developers. In essence, the validation of a competence framework is an attempt to establish its "fitness-for-purpose".

From an analysis of the competence framework literature (e.g., Baczynska et al., 2016; Patterson et al., 2013), we have identified claims that fall into four main categories, which are summarised in Figure 1 (while acknowledging that other categories may exist). The claims listed in bold represent the main claim categories that we have identified, and the bulleted statements represent the claim sub-categories that are related to the main claim categories. Note that these categories of claims are not made by all competence frameworks, nor are they mutually exclusive to one another.

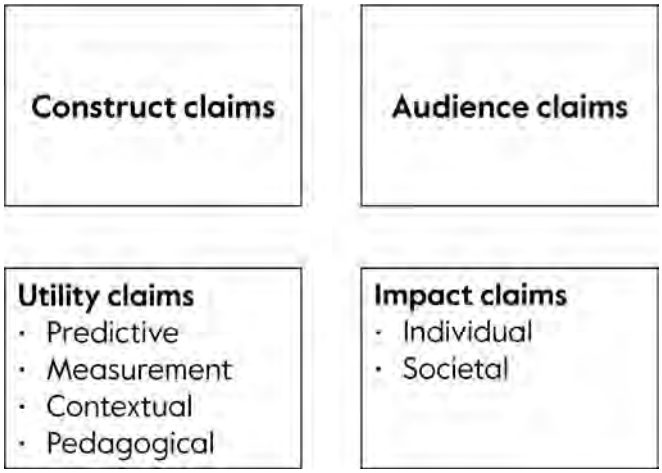


**Figure 1: Competence claim categories and sub-categories.**

### Construct claims

Construct claims are about the definition of the competencies: how the elements are defined and labelled; how they combine to constitute overall competence; and the rationale for defining and organising things in this way rather than some other way. They relate to how well the definitions reflect the stakeholders' general view of the knowledge, skills, understanding etc. required in their context.

### Audience claims

Audience claims refer to the groups of people who should find utility in the competence framework as described. This refers to *users* of the framework – for example those designing assessments based on the framework (such as teachers, exam boards), those who are responsible for making educational decisions based on the competencies within the framework (e.g., employers), and those that are working towards competence within the framework.

### Utility claims

Utility claims refer to the potential *uses* of the competence framework. There are four main types of utility that we identify here. *Predictive* claims concern how acquiring the overall competence (and individual competencies) defined in the framework prepares learners for future educational stages or employment. *Measurement* claims concern the utility of the competence framework for the purposes of educational assessment, for example the development and design of assessment linked to the competencies within the framework. Assessment could serve a variety of purposes, including for future learning (known as formative assessment) or as a summation of a learning stage (known as summative assessment). *Contextual* claims are statements concerning the range of contexts in which a competence framework is meant to apply. For example, competence frameworks may make claims about which stages of education the framework would be useful for, or in which countries or contexts the framework could be used effectively. *Pedagogical* claims refer to the use of the competence framework to inform teaching.

### Impact claims

Impact claims describe the influence that engagement with the described competence framework would have in terms of its broader impact. *Individual* claims refer to the life outcomes of learners who acquire the overall competence and competencies described in the framework, for example in terms of their earnings and social mobility. *Societal* claims link to the broader economic and social effects resulting from adoption of the competence framework (e.g., economic output or productivity).

At least one *construct* or *audience* claim was found in most of the competence frameworks we analysed in the literature. It is likely that these claims underpin the initial development of a competence framework and its structure, and so are a primary target for any validation exercises. *Utility* and *impact* claims were less commonly observed, and we speculate that this might be due to the methodological challenges related to collating data relevant to the validation of these claims. We explore some of these challenges in the next section.

## What are the methodological challenges concerning the validation of competence frameworks?

We have argued above that validation of a competence framework is the collection of theoretical arguments or evidence to provide credibility to the one or more claims made by the developers or users of a competence framework. An important element in exploring the validation of competence frameworks is understanding the common methods adopted and some of the methodological challenges that can potentially undermine validation inquiry. In this section, we briefly describe four main methodological problems common to competence framework validation.

### Validation methods that focus only on construct claims

The first issue arises when the focus of the validation exercise is limited to the definitional aspects of the competence framework, without considering any audience, utility or impact claims. While construct claims are important to validate, there is always a "real-world" application to a competence framework that needs to be acknowledged and investigated (Priestley & Sinnema, 2014).
The limited nature of validation exercises is perhaps in part due to the selection of methods that engage stakeholders in activities that seek to establish agreement of terminology used with the frameworks. For example, a common method to validate competence frameworks is the Delphi method which has been used in a variety of validation studies in diverse areas such as veterinary science (Bok et al., 2011), nursing (Miranda et al., 2018) and mathematics teaching (Muniz-Rodriguez et al., 2017). While the specifics of Delphi methods vary, broadly they require a panel of experts to arrive at a consensus opinion about the overall validity of the competence framework. This might be through panel discussions, questionnaires, or structured interviewing. As Delphi methods are often used at an initial stage of competence framework development, evidence is rarely collected regarding how stakeholders use the framework. Validation evidence is thus limited to whether the definitions, labels and rationale of the framework make intuitive sense.

Other methods include surveys of large groups of practitioners with the intention of checking internal consistency using statistical techniques such as factor analysis. For example, Sastre-Fullana et al. (2017) sent 54 competence framework items to 600 nursing practitioners. Using factor analysis, they identified eight competency domains, reduced from their original conceptualisation of nine. Although this study utilised a three-stage validation approach, Sastre-Fullana et al. (2017, p. 8) concluded that "further criterion and evidence validity is a needed step forward from the actual position". In our view, this statement is an acknowledgement that both the *pedagogical* and the *predictive* claims made regarding the competence framework have not yet been validated, specifically the framework's suitability to be used to support teaching interventions and to predict advanced nursing competence. This highlights a weakness of validation exercises that focus exclusively on the construct claims rather than how they are used in real-world contexts.

## Influence of group interactions on validation outcomes

The Delphi method is regarded as a "group consensus" method for validation (Bok et al., 2011). Groups of experts are asked to rank, rate, and discuss the relevance and/or appropriateness of the developed competencies and reach an agreed position. Other methods that utilise a group consensus approach to validation include the Group Sort Method (Ling et al., 2017) in which participants are asked to sort indicators or statements into predetermined categories representing levels of importance, and focus group methods (e.g., Rissi & Gelmon, 2014) in which experts are consulted on the form and anticipated utility of the competence framework, with the scope to introduce changes.

One of the main issues with validation approaches that aim to reach a group consensus is that the outcomes are influenced by the interactions among group members. While group consensus methods are by their nature collaborative and benefit from a defined outcome, problems can emerge when interactions within the group become non-optimal. For example, dominant individuals can have a pervasive influence on the conclusions reached by the group that are not a fair reflection of the group members' opinions. While some methods attempt to counter this issue by trying to ensure that individual comments are anonymised it is difficult to guarantee, particularly in cases where there are few experts to draw upon (Miranda et al., 2018).

## Anchoring effects of validation exercises

The validation approaches described above also introduce the potential for anchoring effects. For example, in the Delphi method approach, the panel of experts are typically recruited with the expectation that they will comment on, approve, and reject specific competency statements. This post-hoc approach to validation reduces the possibility for the panel of experts to *create* relevant statements based on their experience. There are also validation studies that have largely been confirmatory in nature (e.g., Soh et al., 2012) which limits the potential for experts to influence the final form of the competence framework.

### Collection of validation evidence from users of the framework

A final methodological issue of competence framework validation relates to the range of users that are engaged to substantiate claims made by framework developers. It is usual for only a sub-set of types of user of the framework to be targeted in the collection of validation evidence. For example, Patterson et al. (2013) developed a competence framework for trainee general medical practitioners in the UK. They used a three-stage method in the development of their framework that comprised stakeholder interviews, a validation questionnaire, and a final expert panel review with general practitioners. What is interesting to note about this study is that, although patient representative groups were consulted in the initial development of the competence framework, they were not asked to contribute to the final validation as part of the questionnaire or expert review. Patterson et al. (2013) note that this omission was due to constraints in accessing patients. Given the intended use of the framework was to "explore the optimal construction of the education, training and career pathway to support trainees" (p. 337), this creates a requirement to engage with new groups including medical schoolteachers, and patients to establish the framework's overall predictive impact.

Similarly, Baczynska et al. (2016) used a self-report method to validate the construct claims made by their framework which aimed to describe general job role competence and employability that are "similar in most organisations" (p. 10). While this study aimed to validate a *construct* claim, they themselves admitted that this was not validated sufficiently in their study. Importantly, there were additional *predictive* claims that were not explored, namely the claim that engagement with the framework will lead to better employability outcomes for learners. They noted issues with the sampling range that their validation method had access to in terms of culture and organisation type, and access to higher-level management staff.

## Agenda for determining the validity of competence frameworks

As we have argued above, judgements about the validity of competence frameworks rely on the collation and interpretation of evidence both in favour and against claims made by framework developers. The analysis of some of the methodological challenges observed in the previous section highlight the difficulties in judging what kind of validation evidence is necessary and how much evidence collation and scrutiny is sufficient. In the final section, we ask three key questions that competence framework developers need to ask when considering framework validation, and offer a practical template to support the consideration of initial and ongoing validation approaches at the design stage of competence frameworks.

## *How much* evidence should validations of competence frameworks rely upon?

The quantity of evidence and the rigour of the validation methodology will be dependent on the resources available. The type of evidence required is influenced by views on the degree of rigour that is appropriate given the contexts of use and the framework claims. If a competence framework is making ambitious claims about causal relationships or high stakes decisions (e.g., educational funding) then more evidence might be required compared to frameworks that make more modest or directly verifiable claims (Kane, 2013).

For example, Sastre-Fullana et al. (2017) claim that their competence framework is "useful for application in healthcare policy programmes for APN [advanced nursing] competency assessment in Spain" (p. 1). The ambitiousness of this claim is in part determined by the interpretation of the phrase "application in healthcare policy programmes". A more modest claim could concern the successful embedding of the framework into policy decisions and into advanced nursing training or assessment. This utility claim may require a relatively small amount of resource to evaluate, such as desk-based analysis of how the framework has been used in informing policy documentation. A more ambitious claim, on the other hand, would relate to whether the competence framework, if considered as an intervention, resulted in improved medical outcomes, or career progress for patients and nurses respectively. Validation of this claim would require an extensive set of empirical studies and analyses, which may include both the collection of empirical data and the analysis of secondary data. In other words, an extended research programme for its validation would be required.

## *What* validation evidence should we rely upon?

If, as argued earlier, validity is an interpretive judgement as to the degree to which the claims regarding the use or uses inferred from a competence framework are credible, then it is important for the framework developer (together with other stakeholders) to identify and judge contextually relevant *kinds* of evidence and analysis that can be employed. Moreover, any source of evidence or analysis that helps to establish a case for or against the overarching claim should be considered a legitimate source (Newton, 2017). Importantly, it is essential within the remit of a validation exercise to prioritise the kinds of evidence that are most powerful in directly evaluating the claim or claims made by the competence framework. This prioritisation will allow the resources available for validation to be used as effectively as possible.

## *How* can we support the evaluation of the validity of competence frameworks at the design stage?

We have found that there is often a mismatch between the claims made by competence frameworks and the methods used to validate them. It is therefore important that at the design stage there is a consideration of the claims that might emerge from a competence framework and subsequently how evidence can be collected.

In Table 2, we suggest a template of questions for competence framework developers to consider in determining the range of potential claims to be made concerning their framework, in addition to understanding competence framework users and contexts. This is intended to be a template checklist for achieving an effective validation of competence frameworks at the design stage.

**Table 2: A practical template for evaluating the validity of competence frameworks at the design stage.**

***Initial consultation and planning of the competence framework***

Have the relevant practitioners/stakeholders been consulted for contextual information?
What is the identified need or demand for the framework?
What is/are the purpose(s) of the framework?
Have the intended outcomes or uses for an intended framework been stated?
Do the claimed purpose(s) of the framework relate to proposed uses?

***Identifying the construct(s) the competence framework is designed to measure***

Have the key competencies been identified?
How have the key competencies been identified?
Have the relations between the key competencies been established?
To what extent are the construct definitions and rationale clear and explicit i.e., understandable to key stakeholders?
How well aligned is the framework purpose to the relevant competencies?

***Constructing an appropriate approach to validate the competence framework***

Has an appropriate validation approach been identified?
Does the validation approach need to be adapted to the appropriate context?
Has a validation argument been constructed for each declared framework claim?
Does the argument seek to support (or rebut) the stated competency claim?
Does the argument draw on a variety of relevant sources to test the framework claims?
Have the sources of evidence been prioritised based on consultation with practitioners and stakeholders?
Has a decision been taken on how to prioritise framework claims in terms of their ambition?
Does the validation approach allow for each source of evidence to be critically evaluated, rather than taken for granted?
Does the argument allow each of the framework claims to be tested to evaluate its overall strength?
Have criteria for evaluating the strength of the validity argument been identified in advance?
Will the final decision on the validity of the competence framework involve relevant practitioners/stakeholders?

***Post-validation activity***

Has consideration been given to short-term, mid-term, and long-term impact monitoring studies of the efficacy of initial validation?

## Conclusion – establishing credibility of the claims of competence frameworks

This article, which builds on a methodological approach for constructing a competence framework (Child & Shaw, 2019), argues that validity is an overall judgement as to the degree to which the claims regarding the use or uses inferred from a competence framework are credible. Any validation endeavour will be "a professional exercise, involving insight, judgement and understanding" (Newton, 2017, p. 6).

Competence frameworks are meaningful in relation to the context(s) in which they are intended to function. A judgement of validity will be contextually driven, and evidence relevant to one context may not be relevant to another. This raises the difficult issue of *who is making the judgement* (e.g., the framework developer(s), groups of other stakeholders who may be users of the framework, or those who may be directly affected by its outcomes) and by what process or means.

Credibility is best achieved by identifying the most appropriate audience at the outset of validation, by acknowledging and taking seriously their concerns and values, and providing them with acceptable evaluative evidence (Newton, 2017). Developers of competence frameworks tend to base their design decisions or validation methods on what is meaningful to them. This has led to significant variability in validation approaches even within the same claim category (Batt et. al., 2019). But validation is a "social decision procedure" (House, 1980, p. 249) and there is, therefore, a requirement to engage different competence framework users in social discourse. Affected stakeholders need to be active participants in the practices of the wider validation community by directly engaging in and contributing to validation practice. While this may pose a potential threat to the framework developer in the sense that they might be professionally challenged (Konrad, 1999), the increased transparency will ultimately be beneficial for the competence framework.

Finally, a validation study should not be taken as a "one off" event; contexts change, purposes evolve, as do stakeholder concerns. On-going validation of competence frameworks acts as a defence against contextual changes over time. Continuing validation, however, implies a shared and sustained mutual relationship between all relevant, affected parties. The validity argument for a competence framework does not need to be watertight. It does, however, need to be based on assumptions that are credible to those with a stake in demonstrating its valid use.

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