**Towards a definition of metaskills**

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**Abstract**

***Introduction:*** *The term 'metaskill' has been used to mean a range of different types of information-based skill. This contribution describes the variation in use across disciplines and industries, and two distinct but related definitions are found.*
***Method:*** *210 scholarly papers were identified across the fields of psychology, work-based learning, education and information using key word searches. These papers are analysed for inclusion of definitions and examples of 'metaskills'.*
***Analysis:*** *Comparisons are made to find similarities and disagreements within both definitions and examples. Excel is used to create word lists, and word clouds used to assess weight and frequency.*
***Findings:*** *Although some agreement can be found, there is no wide consensus. Two separate but related definitions emerge: that of a shorthand for 'metacognitive skill', and a broader 'higher order' technical skill type.*
***Conclusions:*** *Used as a buzzword in work-based learning literature, the idea of 'metaskills' seems to be an increasingly important part of lifelong learning. The two definitions that have emerged have some crossover, which may lead to confusion when designing skill development interventions. While formal education environments have traditionally been the source of participants for skill-based research, further work on the development of well-defined metaskills within the workplace is encouraged.*

**Keywords:** metaskills, metacognition, information processing, workplace studies

## Research questions

The term 'metaskill' has been used to mean a range of different types of information-based skill. This contribution describes the variation in use across disciplines and industries, and two distinct but related definitions are found. The research questions posed here form the basis of further work on assessing and developing metaskills in the workplace.

- Is there a universal definition of *metaskill*?
- What are some universally applicable examples of this term?

## Significance and relevance of the topic

As our education systems work towards helping people to be ready for the labour market of the future, it is easy to see that key technical skills may be regularly and rapidly superseded by others, thanks to advances in both technology and environmental concerns. Thus, there is importance in understanding the *other* information-processing skills that tomorrow's workforce will need to develop. These non-technical abilities have been given many names: generic competences, general skills, soft skills, 21st century skills and metaskills, to name just a few. In order to study the acquisition and development of these non-technical abilities, it is important first to be able to define them and any divisions between them. This definitional work is significant both for the research community and for those people who are building the

skills. The study is part of a PhD studentship sponsored by Scotland's national skills agency, Skills Development Scotland, and so the findings will be relevant to any development frameworks created for workplace learning, as well as having implications for wider education policy.

**Content**

**Introduction:** The fourth industrial revolution has increased the likelihood that job tasks will change rapidly, due to factors such as machine automation (Hirschi, 2018). With this rapidity of change comes a need for skills of adaptation, as well as a focus on 'human' capabilities that machines do not currently possess (Autor, 2015). These capabilities are described in various different terms throughout academic literature; one such term is 'metaskills'. This work sets out to investigate current usage of the term 'metaskills' with the aim of defining it for future study.
**Methods:** Scholarly databases were searched using the keywords 'metaskills', 'meta-skills' and 'meta skills'. Due to search systems within some databases, this search found results including other terms beginning with 'meta-'. These particular results were discarded if not relevant, but included if judged as similar in meaning, e.g. 'meta-competences' or 'meta-knowledge'. There were 210 papers found that were published between 1979 and 2019 across domains including psychology, education and information science using one or more of the included terms. A spreadsheet was created to build a list of each paper's terminology, definitions and examples. Textual analysis was then undertaken to compare usage across papers.
**Findings:** From the 210 papers, 36 included no definition or example of the term. These included the earliest usage found (Reed and Lave, 1979), as well as papers published as late as 2019 (Yildiz *et al*, 2019). Of those where explication existed, 103 provided *examples*. The most common example was 'learning', with 3 instances; others with more than one instance included 'communication', 'creative thinking', 'innovation' and 'self awareness'. Unique examples were used in 73 papers. Of the *definitions* used, none agreed on phrasing, but broad consensus was found across two levels: papers referred either to competences of general working, such as the ability to communicate knowledge well, to make decisions and to solve problems; or to capacities which enable those competences, such as self-reflection, calibration of one's own comprehension, and selection of metacognitive strategies. Three papers (Karoly, 1993; Ahonen, 2005; Finch *et al*, 2013) were referenced in lieu of a rephrased definition.
**Conclusions:** Without invalidating vast swathes of examples used in existing literature, metaskills can seem to be defined in two primary ways, which are separate but related. First, a shorthand for *metacognitive skill* – the ability to use introspection to further develop learning, thinking and understanding (cognitive) capabilities. This matches psychological definitions given by Karoly (1993) and Nigg (2017). An example of this might be formulating an appropriate strategy after recognising a context in which one needs to acquire new knowledge. A second definition of metaskills is *skills above/beyond skills* – higher-order skills that are applicable across domains and disciplines, leading one to improve or accumulate *hard skills* through having built up a metaskill within one or more other *hard skills*. For example, information sourcing may be a metaskill using this definition, as it can assist in many work areas beyond where it is first undertaken and can lead to forming new hard skills; oral communication may be another, as it is pertinent in presenting work, asking questions, and working in teams. The most prolific proponents of this definition are Finch *et al*. (e.g. 2012, 2016).
**Next steps:** Next steps for the author following this research are empirical work on metaskill measurement and development in the workplace, using the first definition of the term found

here. This work will utilise sociological methods such as institutional ethnography, to analyse assessment of these metaskills in Scottish apprenticeship frameworks; intervention studies to investigate conscious metaskill development; and The Imitation Game (Collins *et al*, 2014) to research newcomer adaptability in workplaces. Additional future research suggestions would centre on workplace development of the second definition of metaskills, as well as further discussion of boundary lines between technical and non-technical skill definitions.

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