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# Classification of work-related competences:
# A critical discussion


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## PREFACE

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## 1. INTRODUCTION

Work-related competences are the knowledge and skills that can be useful to accomplish our jobs. "Competences" should be understood in the widest possible sense, it is virtually anything that make us able to do a job or able to do the job better.

We all know that a given piece of knowledge or capability is not equally valuable in all jobs or in all work environments. Knowledge of statistical data analysis with SPSS does not help me play the violin in the philharmonic orchestra or manage a large organization. This is self-evident.

It is however less trivial how these differences among competences should be analyzed. What are the basic dimensions underlying obvious differences among competences? What is best way to classify competences in order to study the causes and consequences of such competences? Questions like these have inspired various theoretical and empirical analyses.

Managerial competences have been presented as a-theoretical checklists of skills that are important to managers rather than general classifications or dimensions. Others have presented more coherent frameworks such as the technical-interpersonal-conceptual typology (Yukl, 1998; Katz, 1982; Sonntag & Schäfer-Rauser, 1993).

Human capital theory (Becker, 1964) is concerned with the consequences of firm-specific competences – the degree to which employee's competences are tailored to one specific company. There are also a small number of researchers that has reported ad-hoc or inductive classifications. For example (Arnold & Davey, 1992): company know-how, interpersonal skills, product knowledge and specialist skills.

Finally there is Nordhaug's (1994; cf. Døving, 2000) typology that combines task- and firm-specific dimensions in one framework.

## 2. APPROACH

The purpose of this paper is to give a critical discussion of competence classifications with a particular attention to the classification presented in my dissertation (Døving, 2000). However, I will not aim directly at the typology I used, but rather attack it by an indirect route as follows:

1. Classifications in general – what is it, why use it, basic assumptions
2. Classification of work-related competences – what is it, how does it differ from other types of classifications, assessment criteria (section 3)
3. The classification in my dissertation (based on Nordhaug, 1994) – critical assessment (section 4)

### 2.1 Classification(s)

What is a classification and why are classifications important?

In its simplest form, classifications are merely the ordering of entities ("things") into groups or classes on the basis of their similarity (Bailey, 1994). Generally we seek to arrange a set of entities into groups so that each group is as different as possible from other groups while each group is as internally homogeneous as possible. Classification is one of the most central of all our conceptual exercises. It is the foundation not only for thinking, perception, language and speech but also for theory construction, statistics and data analysis.

*Deductive* classifications are developed before any data is analyzed, and is sometimes referred to as "a priori classification" or "logical partitioning". This type of classification procedures may produce categories where no empirical observations are known, so called "empty classes". Empty classes may, however, be important by guiding search for phenomena that otherwise may not have been discovered. The periodic table of the elements led to the search for, discovery or creation of previously unobserved elements.

*Inductive* classifications are generated from empirical data, and are sometimes referred to as "ex post classification", "quantitative classification" or "numerical taxonomy". Whereas deductive classifications impose a grouping on the data or on the data collection procedure,

inductive procedures let the data suggest a classification. Because inductive classifications are developed from specific data sets, they do not include empty classes and may not be generalized or generalizable beyond the original data.

Classifications are rarely obvious. Entities can be differentiated along a number of dimensions. Because there are no inherent limitations to the number of classes, groups, types or categories, we must decide *which* to use. The crucial question is simply: What is the best classification?

One possible general criterion may be that the classification should capture the fundamental or key characteristic of the relevant phenomenon in the easiest possible way. Unfortunately there is no standard formula for identifying key characteristics.

## 2.2 Basic assumptions

A basic assumption is that the classes formed must be both *collectively exhaustive* (there must be an appropriate class for each entity) and *mutually exclusive* (there must be one but only one class for each object).

Multidimensional classifications are often referred to as *typologies* – particularly if labels have been assigned to each cell. Combining several dimensions with many categories may produce an overwhelming number of types. An effective classification procedure should thus be able to reduce the number of types, e.g., by collapsing categories or working only with *polar* types (types with extreme scores on all dimensions). Weber's ideal type bureaucracy may be regarded as a polar type.

## 2.3 Criteria

Classifications, as opposed to dimensional/metric approach, has several advantages:
- inventory of concepts and data
- ease of communication (reduction of complexity)
- comparison of discrete types
- types can be used as variables
- assist theory construction and testing.

Typical disadvantages or problems associated with classification:

- classifications are essentially *untheoretical or pre-theoretical*
    - many or most classifications are merely descriptive
    - aim should be to assist theory construction/testing
- *reification*
    - a feeling that types are not arbitrary but are actually to be found "out there"
- types are not exhaustive and mutually exclusive
- rely too much on *categorical* rather than *continuous* variables
    - categorization of continuous variables may be artificial or arbitrary
- classifications may be *too general*
    - do not capture crucial contextual factors
- classifications may be *ad-hoc*
    - are based on arbitrary, convenient or ad-hoc criteria
    - lack of standardized classifications makes it difficult to compare theoretical propositions as well as to compare and integrate research findings (Hunt, 1991).

## 3.  CLASSIFICATION OF WORK-RELATED COMPETENCES

Let us now turn to the classification of work-related competences in particular.

An individual can posses a number of competences, e.g., for one person it is possible to be capable of playing the violin as well as doing multivariate data analysis with SPSS. The objects we want to classify are these competence components inside the individual. It is the competence-components within the individual that are classified, not the individuals themselves.

My critical discussion will organized according to the following questions:

1. Meaningful: Does it *make sense* or is it at all possible to break down the totality of a person's knowledge and skills into its constituent parts?

2. Why typology: What is the value-added of a *typology* compared to a *dimensional* approach?

3. Explicitness: Does the classification *adequately specify* the phenomenon to be classified and the characteristics (dimensions) that will be doing the classifying?

4. Usefulness: Which are the most appropriate, fruitful or relevant dimensions for categorization?

5. Parsimony: Is the classification more complicated than necessary?

6. Logic and consistency: Are types (categories) specified coherently, are they collectively exhaustive and mutually exclusive? If they are not, so what?

Questions 1 and 2 I will discuss for any classification, whereas questions 3-6 will also be applied to the classification used in my dissertation. Some of these issues are closely related: for instance, # 3 has consequences for # 6 logic and consistency.

1) Is decomposition meaningful and possible?

Can we assume that the totality of a persons competence are composed of discrete entities with clear boundaries, or can we at least treat them as if they are such?

Most people would agree that playing the violin and doing statistical data analysis are very different things and require very different competences. Research suggests that the possession of a particular competence ease the acquisition of related competences (Cohen & Levinthal,

1990). For instance, mathematics may improve your chess performance. Consequently, competences within an individual may be both causally related and conceptually separable.

2) Typology versus dimensional approach

In statistics class we learn that by categorizing continuous data we loose information, it's a waste of data. Why is it better to focus on types than on the underlying dimensions?

For work-related competences types are clearly better than dimensions: Whereas the classification as such is constructed at the level of single competences, our aim is to measure variables at the level of individual employees. Types are transformed into variables. These variables are hard to define and measure with a dimensional approach.

3) Does the classification adequately specify the phenomenon to be classified and the characteristics (dimensions) that will be doing the classifying?

What *exactly* is being classified? To what universe is the classification limited?

We should note that some research is *not* dealing with the *actual* competences of individual employees. Competence specificity may also be defined and measured at the job level as the idiosyncratic competence requirements of that particular job. We should distinguish carefully between the competences an employee needs to do a job, and the competences the employee actually commands.

What exactly are the *characteristics* (dimensions) of these objects that the will be doing the classifying? Are the operational procedures for classification rigorous? At a minimum, the procedures should be intersubjectively unambiguous. The procedures should be such that different people would classify the phenomena in the same categories. (These issues are also discussed under question 6.)

4) Usefulness: Which is the best classification?

Which classification should we use? My point of departure is that no classification by itself is a good or bad. The appropriateness of a classification depends on how well it serves its purposes.

In explorative phases of research we may not know what purposes a particular classification might one day serve. Arriving at a consistent classification may itself be a significant step forward in underdeveloped areas of research.

A classification may be helpful in the exploration of new phenomena or in the search for explanations or explanatory mechanisms. A classification may assist theory construction, define concepts or variables, explore relations among variables, and support development of hypotheses. Although not a theory itself, a good typology borders on theory and may be an important first step in theory construction.

I will argue that the classification's ability to identify unique causal paths from the causes of competences to performance outcomes of competences. There is a unique causal pattern if antecedents or outcomes differ across competence types.

Why is this important? If the competences identified with the assistance of the typology are *not* involved in differential causal relations, no new information is gained from the typology.

A classification may be useful to the extent that it directs managerial attention to crucial issues, issues that otherwise may not have been identified and to the extent that different courses of action can be associated with different categories

There are mainly two kinds of dimensions used to classify competences:

    (i)      classifications according characteristics of the *form* of competence, and

    (ii)     classifications according to competence *domain* (competence specificities).

The most basic classification according to characteristics, the distinction between knowledge and skill, is incorporated in the very definition of competence. Similar distinctions exist: know-how, know-what and know-why. The distinction between tacit and explicit knowledge partly overlaps these distinctions.

Classifications according to domain are more varied in terms of dimensions as well as level of abstraction. A common topic appears to be the distinction between *type* and *degree* of specificity.

Finally we may ask if highly general dimensions that can be applied to any employee in any firm are more useful than a classification adapted to specific circumstances. I would argue that classifications for research should be as standardized and comparable as possible. For practical (management relevant) purposes, ad-hoc and idiosyncratic classifications may prove more useful.

Which specific dimensions or properties for classification are most useful? Earlier I argued that identification of differential antecedents and outcomes is an inevitable criterion for the usefulness of a classification. The most useful categorization should accordingly be one that identifies the largest variety of relationships. A typology that for instance is useful in several research areas is better than a typology that is restricted to one area.

5) Parsimony?

Other things equal, the least complex classification is preferable. Applying appropriate labels to types, may add to the parsimony of typology. Why parsimony? It is true that parsimony may be regarded as unscientific aestheticism. If we, however, have exhausted all other criteria for the appropriateness of a classification, parsimony is a legitimate goal. There is no reason to make things more complicated than necessary.

6) Logic and consistency

It is frequently assumed that classifications should be collectively exhaustive and mutually exclusive. *Exhaustive* means that for each entity in the relevant universe there is an appropriate class.

Any classification can be made exhaustive by simply adding an "other" category. If the "other" category is crowded with diverse items, the classification system should be examined carefully for possible expansion by adding new dimensions or new categories (Hunt, 1991).

*Mutually exclusive* means that there is one but only one class for each object. Classifications may however be hierarchical such that a category can include two or more categories at lower level. Although this is a basic assumption, it is often violated. If cases are classified for statistical purposes, it is also a serious problem. If however classification is used to construct variables, consequences of violation may not be severe there will only a loss in discriminant validity.

At the operational level this is to some degree translated into low discriminant validity: measures of different competences will inevitably correlate substantially if competence types overlap.

## 4. ASSESSMENT

How does the typology used in my dissertation (Døving, 2000, reproduced in Figure 1) perform by the standards outlined above?

| Task specificity | low            Unit specificity            high | | | |
|---|---|---|---|---|
| | low     Firm specificity     high | | | |
| | low   Industry specificity   high | | | |
| low | 1. General Competences | 2. Industry Competences | 3. Intraorgan. Competences | 4. Intraunit Competences |
| high | 5. Standard technical competences | 6. Technical trade competences | 7. Firm specific technical competences | 8. Unit specific technical competences |

*Figure 1: Competence typology (adapted from Nordhaug, 1994:58)*

Because some of the questions I listed have already been addressed, I will focus on the following criteria (question 3-6):

- explicitness
- usefulness
- parsimony
- logic and consistency

3) Explicitness

Is the phenomenon to be classified adequately specified? Are the characteristics (dimensions) that will be doing the classifying adequately specified?

Originally (Nordhaug, 1994) the objects to be classified were sufficiently and explicitly specified. The association with human capital theory and industrial relations may lead to some confusion, for instance if types refer to actual employee competences or company provided training. To some extent the classification may apply to both. The relevant unit of analysis should be specified whenever the classification is used.

The dimensions or categories used for classification, at least the way I extended and specified it (Døving, 2000) may not be entirely clear. Are for example intraunit competences (know-who) irrelevant when the employee moves to another unit? This has consequences for the logic and consistency (mutually exclusive) of the classification.

4) Usefulness

The typology is useful in the sense that it can be applied to any employee, any organization, any job – it is a general typology, not ad-hoc, and can thus facilitate cumulative research and comparisons across contexts. As I have already argued, I believe that a general classification is superior to an ad-hoc. There are other general classifications. The technical-interpersonal-conceptual used by Yukl (1998) for instance, but this one fails on other criteria such as being exhaustive.

It is useful in the sense that it can direct managerial attention to the multiplicity of competences deployed throughout an organization. The typology can highlight which competences the employee possesses and which competence the employee needs to acquire.

It is useful because types are directly related to domain, and consequently performance outcomes. To the extent that differential antecedents and outcomes are in fact associated with each competence type, it can be very useful. In my dissertation I tried to test assumption of unique causal paths (differential effects), although only a minority of hypotheses obtained support it seems clear that the pattern of antecedents changes across the typology. Future research effort should be aimed at identifying the network of causal relations with competences.

Resource based strategy is one particularly interesting area of application. Although some attempts have been made at a very general level, precise theoretical specifications linking micro-level competences, organizational design and strategy are still missing. This typology may prove useful in this field of research; however, alternative classifications may turn out to be *more* useful.

We should finally note that these dimensions could be combined with for instance tacit-explicit (or perhaps knowledge-skill) distinction to form a (complex) three-dimensional typology. Such an extension may turn out to be useful particularly in regard to resource-based strategy.

5) Parsimony

 As already indicated, the basic outline of the classification (dimensions) is simple but powerful. Nordhaug then added *industry* specificity as an intermediate category producing six

types, then I added *unit* specificity producing eight types. If we refine the typology further by adding subcategories within "general competences", the classification may become too complex. For most purposes it may be wise to limit this to two categories on each dimension. However, given that this is a very general classification, some complexity should be acceptable.

6) Logic and consistency

Is the typology exhaustive?

I believe that this typology is exhaustive because any competence can be accommodated. As argued above, any classification can be made exhaustive by adding an "other" category. In this one, there is a "general" category. Although it is a part of a coherent framework, to some extent this is the box for leftovers, the things that do not fit in anywhere else. It is certainly a large and heterogeneous category.

Perhaps we should specify a new classification within the "general" category. The technical-interpersonal-conceptual classification (managerial competences, Yukl, 1998) emphasizes the "general" category at the expense of technical and idiosyncratic competences. But, as already indicated, Yukl's classification is apparently not exhaustive.

Are types mutually exclusive?

I have to admit that categories are not perfectly exclusive; there is some overlap between categories particularly along the task-non-specific dimension. Intra-organizational competence includes some of the same components as intra-unit competence, and industry competence includes some intraorganizational competence. I might have reduced this problem (in operationalizations) by making the definition of each stricter, for example by requiring that within intraorganizational competence "know-who" should refer only to people in *other* units.

Perhaps it could be redesigned into a hierarchical classification in order to specify that intra-unit is sub-category of intra-organizational. Such a classification may in turn become too complex and relatedness of competence types can be obscured.

## 5. CONCLUSION

In this paper I have discussed classification of work-related competences. Despite the virtues of typologies, *any* typology will not do: I proposed six criteria for assessing if a typology is acceptable as well as for identifying the best typology. Usefulness on one hand and logic and consistency on the other are central among these. Based on these criteria, I outlined an assessment of the classification I used in my dissertation (Døving, 2000).

The major weaknesses of this typology appears to be in the area of logic and consistency
- overlap among some categories (loss discriminant of validity)
- "general" category is large and heterogeneous

Minor weaknesses:
- explicit (easily fixed)
- parsimony (not that easy to understand)
- too general? no flesh on the bones
- too heterogeneous categories?
- pitfall: does not indicate the relative importance of types

Minor strengths
- exhaustive
- parsimony

Major strengths
- general and powerful framework that integrates basic dimensions
- useful in terms of its ability to identify variables and unique causal paths

## 6. REFERENCES

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