

This chapter is published after editing as:

Mulder, M. (2014). Conceptions of Professional Competence. In: S. Billett, C. Harteis, H. Gruber (Eds). *International Handbook of Research in Professional and Practice-based Learning*. Dordrecht: Springer. pp. 107-137.

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Conceptions of professional competence

M. Mulder, Wageningen University, www.mmulder.nl

Abstract 150-250 words

Professional and practice-based learning is a process which manifests itself in many different forms. It differs by personal characteristics of the learners, levels of their professions, fields of practice, intentionality of their learning, and formalisation of the learning activities. Notions of competence have entered this diverse practice in many ways. The question is whether conceptions of professional competence have helped the practice of professional and practice-based learning. In this chapter it is argued that this is indeed the case. Although various attempts to implement competence-based professional learning programmes were heavily criticized, later developments in competence theory and research gave new insights which emphasized the integrative meaning of competence within professional practice. It helped in mapping professional fields from a domain-specific as well as a generic behavioural perspective. This chapter goes into the roots of the competence movement, and evaluates the contributions of these to the field of professional and practice-based learning. This is further illustrated with examples of different professions in which competence models have been and still are an effective means to map requirements for professional practice and to guide the evaluation and development of professional and practice-based learning programmes. What worked and did not work is then explained by distinguishing three approaches of conceptualizing competence which have been used in different contexts, and which have wide implications for professional and practice-based learning. The chapter concludes with the claim that current competence conceptions help mapping, focusing and assessing professional and practice-based learning.

Introduction

The concept of competence is probably as old as humankind. Homo sapiens have always been desiring to master skills and to find ways to solve practical, professional and scientific challenges. Certain individuals always received the prerogative to perform certain activities which had a highly symbolic meaning. The attribution of authority was originally strongly related to tradition but that gradually moved to cognition and ability. In the current meritocratic society, people are generally allocated to jobs based on educational achievement and their profile of capabilities and other personal characteristics. The drive of individuals to learn to perform in certain fields of activities, however, never changed, and is to a large extent based on eagerness to master certain skills, become independent and get recognition. This is very well visible in babies and toddlers when they want to turn in their cradle, crawl on the floor and walk in the room, stimulated by their parents who are cheering when the first steps are taken. Young children constantly move around until they are able to do what they desperately want at the end of the day: to gain independence; or: to become competent. For gaining an independent position in society nowadays, individuals need to pass through formal education trajectories and complete examinations. The higher the education levels students achieve, the higher their chances of getting a good position at the labour market and an appointment in a better-paid and stable job. Independence, however, is a relative notion. In society, people are interdependent by definition, but individual ego development is necessary for getting a personal identity in the first place and a professional identity later in life, for which recognition is needed, by getting an appropriate education qualification, and subsequently by being

appointed in a job, being promoted, rewarded, and having a career perspective. Development opportunities are the top priority of graduates from higher education and considered to be a major labour condition. Because of the massification of education, it became an industry. And because of its limited innovation capacity, it somehow alienated from society. Getting a diploma became a goal in itself, many educational institutions were not well-aligned to societal demands anymore, and became pedagogical islands. Sometimes this process is called the 'diploma disease', but it can also be named the 'competence crisis', as the big issue was whether graduates who were qualified really were able to perform according to standards in the profession and expectations in the working situation. Having a college degree was no guarantee for being able to perform well on the job or in society in general.

The disconnection between education and the labour market was the main cause of the competence movement (Grant et al, 1979). Therefore, professional associations began to articulate performance requirements and develop competence profiles with which candidates had to comply to enter the profession. Educational institutes reworked their curricula to adjust them to what was expressed as being important by professional associations and industry organisations. However, as the concept of intelligence, the concept of competence was multi-dimensional, and various conceptions of professional competence emerged. Sometimes, the concept was praised and, at other times, it was cursed because of the differences between its intrinsic meaning, quality promises and disappointing application and results (Mulder, 2011). Nevertheless, at present, the concept of competence is institutionalized, for instance in the European Qualification Framework, and thereby in national qualification frameworks of EU member states, where competence is seen as the ability to apply knowledge and skills at a certain level of independency and autonomy (Mulder, 2012). It is also used in education or training profiles for certain professional groups such as medical specialists, and in the design of educational programs, especially in vocational education and training. Although these applications are quite straightforward, different theoretical insights have developed, which contradict one another on several dimensions. Certain authors stress the importance of the integral nature of the concept of competence, while others separate knowledge, skills and attitudes. Another major issue is the distinction between competence-oriented and competence-based education which has major implications for the extent to which principles of competence development are implemented in education programs.

In this chapter, the concept of competence is placed in the context of professional and practice-based learning. This learning is a process which manifests itself in many different forms. It differs by personal characteristics of the learners, levels of their professions, fields of practice, intentionality of their learning, and formalisation of the learning activities. Notions of competence have entered this diverse practice in many ways. The main question in this chapter is whether conceptions of professional competence have helped the practice of professional and practice-based learning. In this chapter it is argued that this is indeed the case. Although various attempts to implement competence-based professional learning programmes were heavily criticized (Mulder, Weigel and Collins, 2007), later developments in competence theory and research gave new insights (Biemans et al, 2004) which emphasized the integral meaning of competence (Wesselink, 2010) within professional practice. It helped in mapping professional fields from a domain-specific as well as a generic behavioural perspective. This chapter goes into the roots of the competence movement, and evaluates the contributions of these to the field of professional and practice-based learning. Examples of competence models will be given; these models have been and still are an effective means to map requirements for professional practice and to guide the evaluation and development of professional and practice-based learning programmes. What worked and did not work is then explained by distinguishing three approaches of conceptualizing competence which have been used in different contexts, and which have wide implications for professional and practice-based learning.

To link the concept of competence to professional and practice-based learning, the chapter commences with a review of the historical roots of the concept of professional competence, which are related to competence *motivation*, human *intelligence*, professional *performance* and *professional education*. This description will show that the concept of competence was used in the context of learning and performance from the outset, and that competence and professional and practice-based learning are intrinsically related to one another. The next section, on competence

and professions, will make that even clearer. Various professional fields are selected, in which competence profiles have helped to improve professional and practice-based learning in terms of learner assessment, selection, education, training and development. The fields which are selected are *management, human resource development, medicine, and purchasing*. This selection is not meant as being complete but serves as an example of ways in which the competence movement has entered professions and professional development. This section is concluded with a description of an attempt to capture all competence in one behavioural competency framework, which can be used for implementing processes for professional and practice-based learning and self-reflection and development.

The link between competence and professional practice however differs by the way in which competence is defined. Three broad approaches of competence and professional development are distinguished here: 1. Competence and behaviouristic functionalism, which stresses the importance to specifically determine the discrepancies between actual and desired competence, leading to training of sometimes miniscule skills; an important pitfall of this approach is fragmentizing learning; 2. Competence as integrated occupationalism, which is visible in the present qualification frameworks and competence-based education approaches in which it is stressed that knowledge, skills and attitudes should be integrated in the curriculum, teaching, learning and testing; 3. Competence as situated professionalism, which indicates that competence only gets meaning in a certain context; an important pitfall here is holism, when details of competence are covered under generic expressions of abilities of people, which may be sufficient in personal development processes, but not for professional certification purposes (Mulder, 2011). Although these three different approaches have different implications for professional and practice-based learning, we contend that in all three there are strengths and weaknesses, and that they can be combined in practice. The optimum mix depends on the purpose and the specific context of the professional learning, which can vary from learning to change winter tyres to leading an open heart surgery team. Related to the latter, there is another fundamental difference in the relationship between competence and professional practice which has important implications for professional and practice-based learning, which is the difference between generic competence and task-oriented competence. An example of the first is the communication capability of a medical expert, whereas an example of the second would be the ability to make the right diagnosis given a series of certain medical examinations. Again we contend that both are important in professional practice and for professional and practice-based learning.

The chapter concludes with the claim that current competence conceptions help mapping, focusing and assessing professional and practice-based learning. But first we go into the meaning of the concept of competence.

What is professional competence?

A professional is competent when he/she acts responsibly and effectively according to given standards of performance. One can also say that this professional possesses sufficient competence. Professional competence is seen as the generic, integrated and internalized capability to deliver sustainable effective (worthy) performance (including problem solving, realizing innovation, and creating transformation) in a certain professional domain, job, role, organisational context, and task situation.

Competence consists of various competencies. A competency is a part of generic competence; it is a coherent cluster of knowledge, skills and attitudes which can be utilized in real performance contexts. For instance, in a crime scene investigation a forensic expert needs to produce a DNA profile of a piece of evidence. This requires knowledge (disciplinary knowledge), skills (working with artefacts) and attitudes (accuracy, coping with pressure, integrity). Together these constitute professional competence. Or traders at a flower auction: they require knowledge (about the products, quality indicators, market developments, prices), skills (multi-tasking, processing information, instant decision making), and attitudes (stress-tolerance, feeling for sales). These are elements of professional competence as well.

What has not yet been discussed often is the twofold meaning of competence in terms of capabilities and rights. These two are different, yet go together. Competence as capabilities is the field professionals feel comfortable with. Because of their education and experience in practice they have gained a certain level of competence, which goes together with a feeling of confidence, self-efficacy and professional identity. But educational institutions have declared graduates to be competent by approving their completions. The diploma is the formal piece of evidence of the competence level of the graduate, which is nowadays more transparent because of the education levels specified in the European Qualification Framework and printed on diplomas or in diploma supplements. Professional associations also declare individuals as competent when they comply with certain standards. Educational institutes and professional associations have the right to do so if they are acknowledged by the relevant institutions. We can also say that educational institutions have the competence to take decisions regarding the licensure of candidates who complete educational programs. Other institutions may have other rights, such as law courts and European institutions. Examples of institutional competencies of law courts were already described in the dissertations of Viruly (1890) and Roes (1885) at the University of Leiden in the Netherlands. (Both dissertations counted 31 and 41 pages respectively). Individuals who have received a professional licence of an educational institute or a professional association, or the state, also have certain rights to act (e.g. as teacher), perform interventions (e.g. as medical expert), and take decisions (as lawyer). Citizens also have their rights (to vote, to raise children, to move in freedom), but if there are grounded reasons to do so, the legal system can also deny these rights by declaring people incompetent.

The meaning of competence discussed above is mainly related to professional competence, as used in key competencies, competence domains, competence clusters, enabling competencies, and competency dimensions or competency components. However, there is also a branch of literature in which organizational competence is being discussed. The most prominent source of this is probably the work of Prahalad and Hamel (1990) on the core competence of organisations. Core competencies are capabilities of organisations in which they excel, with which they earn most of their profits, and which cannot easily be copied by competitors. This is an interesting line of research, and at organisational level core competencies should be included in the corporate strategy, which should be aligned with corporate human resources management strategy, which in turn should be related to the corporate competence development strategy.

The relationship between competence and professional performance is complicated. There are multiple connections between the two at various levels of aggregation and relationships between detailed competencies and specific performance results are not exclusive. Utilizing criterion differentiation and canonical correlation in the search for common dimension of competence and performance as suggested by Bartram (op cit) is nevertheless useful.

Theoretical notions regarding competence and competence development

Historically, there has been a close link between the concept of competence and professional practice. This already appears from the work of Dewey (1916), who used the term various times in his book 'Democracy and Education'. Examples are: 'Translated into specific aims, social efficiency indicates the importance of industrial competency. Persons cannot live without means of subsistence', 'A democratic criterion requires us to develop capacity to the point of competency to choose and make its own career', 'It is, of course, arbitrary to separate industrial competency from capacity in good citizenship', and 'But there is a great difference between a proficiency limited to immediate work, and a competency extended to insight into its social bearings; between efficiency in carrying out the plans of others and in one forming one's own' (Dewey, 1916). From these citations it appears that Dewey saw competency as the general public did, as the ability to create a livelihood, but also as the minimum requirement to enable the pursuit of an independent career that is chosen in freedom, the broad mastery of professionalism which needs to be related to citizenship, which enables people to participate in the democratic society and a vocation or profession in a self-determined way.

Citations like these can be found in more places in publications in the early 20th century, such as in the report of Childs (1910). This report is of a delegation of agricultural education experts from the United Kingdom who went to the USA and Canada in the first decade of the 1900s. They studied agriculture and agricultural education in those countries in different places, and prepared a report in which they, as Dewey, used the concept of competence in various ways. The most meaningful quotes are about the following issues: '... competence of professionals (farmers), competence in professional tasks and responsibilities (manual farm operations), competence in professional practice (scientific agriculture), competence of teachers (and competence of researchers as teachers), competence of assessors, competence management (enabling and securing good working conditions), and last but not least: incompetence of all mentioned above' (Mulder and Pachau, 2011, p. 397).

These examples show the early concerns with the competence of students in, graduates of, teachers in and administrators of education, or the level of their professional knowledge in practice. However, in these writings competence development was not yet a professional practice in itself. It took nearly half a century for the concept of competence to move beyond general use and to enter the literature as a concept that was being studied as a theme.

Competence and motivation

As far as we know White (1959) was the first to introduce the concept of competence in the psychological literature on motivation and then to conceptualise it as a key notion to explain behaviour. Until that time the use of the concept was not thematic but more instrumental, and related to day-to-day use of it. White voiced the discontent with personality psychology of Freud and others in which 'drives' were perceived as being the central concept by which human behaviour could be explained. Instead, he proposed 'competence' as the central concept by which he meant '...an organism's capacity to interact effectively with its environment.' (op cit, p. 297). He believed that competence in human beings was not the result of a natural maturation process, but that it '... is slowly attained through prolonged feats of learning' (op cit, p.287). White (1959) provided examples from biological experiments and underlined research that showed that behaviour motivation is much more complex than responding to certain drives. For instance he mentioned research from which it appeared that dogs which need certain nutrients are going to search for specific food that contains these, and hormone levels in lead to more complex sexual behaviour than was accounted for in the theories of drive-reduction, insights that were breakthroughs in the fifties of the last century. After various other examples from general psychology and child psychology he proposed to conceive of competence as a 'motivational concept'; '... there is a *competence motivation* as well as competence in its more familiar sense of achieved capacity.' (op cit, p. 318). White called the motivation to become competent 'effectance'. He did not believe that drives were not sufficient to explain activities that are carried out to become competent. 'Such activities in the ultimate service of competence must, therefore, be conceived to be motivated in their own right. It is proposed to designate this motivation by the term effectance, and to characterize the experience produced as a feeling of efficacy' (op cit, 329). This line of thinking still prevails in current debates on competence. Children, students and professionals in general are motivated to learn to understand more or less complex phenomena and master certain skills to make the able to effectively function in their environment. To capture this motivation in education, performance motivation tests were developed, which included tests on failure anxiety, which appeared to be a major barrier for in making educational tests and education achievement in general. When a problem is complex or a performance situation is demanding, becoming competent and, thus, confident that one understands the problem and can effectively perform in a given situation is rewarding, and still seen as self-efficacy (Bandura, 1977). The insight of competence being performance motivation has been essential in the field of learning in general and professional learning in particular. It is helped to understand that without performance motivation, or the will to master a certain level of professional skill, there would be no professional learning at all.

Competence and intelligence

Next to motivation, intelligence was another central concept by which behaviour was explained. The criticism of this concept has also been severe, and was aimed at disputing the invariability and one-dimensionality of it, which ultimately resulted in the notion of multiple intelligence (Gardner, 1983). If competence is seen as being able to effectively interact with the (social and intellectual) environment and the result of intensive and continuous learning, professional education has to obviously prepare for that. To do so, curricula need to be adjusted to essential competence domains, teaching and learning materials need to be in place, teaching staff need to be prepared to implement these curricula, and educational tests need to be aligned to the curriculum and course objectives, course content and learning tasks. However, McClelland (1973) stated that education was testing more for intelligence than for competence, whereas intelligence tests did not predict job success very well. He cited a work of Thorndike and Hagen (1959) in which 12,000 correlations were reported of more than 10,000 respondents. That study showed that the relationship between aptitude testing and job success was insignificant. He also cited work of other researchers like Berg (1970) and Taylor, Smith and Ghiselin (1963) who demonstrated that job performance and educational success were poorly related. McClelland suggested that educational tests should be based on competence: 'How would one test for competence, if I may use that word as a symbol for an alternative approach to traditional intelligence testing?' (op cit, p. 7). More specifically, he proposed the following competence-oriented testing principles (op cit, p. 7-12): 1. Use criterion sampling; 2. Test change in what has been learned; 3. Make publicly and explicitly known how one can improve on the characteristic that is tested; 4. Competencies which are part of 'clusters of life outcomes' should be sampled and included in assessments; 5. Tests should not only rely on asking responses on clearly defined problem statements but also on vague instructions as real-life situations are in most instances not well-structured (this distinction is named 'respondent' versus 'operant' behaviour); 6. Item sampling should be aimed at operant thought patterns, as these are more general and of a higher level than small skills, and therefore enable better generalization. So, where White (1959) was emphasizing the importance of the motivation to learn and to perform, McClelland (1973) was stressing that assessment of learning needed to be more relevant. It should go beyond the measurement of small skills, which does not have sufficient predictive validity for life and job success. This has direct implications for the design of professional education and professional development. Next to motivation, appropriate assessment was seen as essential for the preparation of graduates for the world of work.

Competence and performance

Next to motivation and assessment, there was another influential development which tried to link systems thinking and learning with competence and performance. Commencing in the 1960s, the movement of performance improvement grew which was not only aimed at explaining behaviour, assessing competence, and training and development, it was dedicated to productivity improvement and performance in practice. The systems approach implied that it was insufficient to look at individual behaviour; instead workplaces with their group dynamics, work units with their organisational constellations and people management policies and practices, organisations themselves in their environment and societal context were conceptualized as mutually dependent. Performance improvement technology was developed to assist the industrial society to become more efficient and effective.

Gilbert (1978) strongly linked competence and performance, which appears from the title of his influential book called 'Human Competence: Engineering Worthy Performance'. During this time, the belief that performance could be 'engineered', or that societies and organizations could be made, was still prevalent. Systems theory became popular: Von Bertalanffy (1969) had developed systems thinking originating from biology, but which was applied in a wide range of disciplines, including psychology, sociology and education.

Gilbert (1978) proposed three theorems, which he calls 'Leisurely Theorems'; he uses 'leisure' as '...a synonym for human capital, which is the product of time and opportunity' (op cit, p. 15). His first theorem is that performance is the effect of behaviour leading to consequences. But that not all consequences of behaviour are valuable or socially acceptable. So he moves on to defining performance as the effect of behaviour leading to accomplishment, this being a consequence of desirable value. However, accomplishments are being reached by behaviour that can be too

excessive and too costly, which would imply that the performance is not worthy: the costs would be too high, and the accomplishments too expensive. Therefore, Gilbert introduces the worth ratio: worth equals value divided by costs. He then links this to competence: 'Roughly speaking, *competent* people are those who can create valuable results without using excessively costly behaviour' (op cit, p. 17). This line of reasoning results in his first leisurely theorem: 'Human competence is a function of worthy performance (W), which is a function of the ratio of valuable accomplishments (A) to costly behaviour (B)' (op cit, p. 18). This first theorem and its explanation show that competence is the capability to realise worthy performance. This means that Gilbert distinguishes competence as a capability, behaviour and valuable results of that behaviour, of in his words, he distinguishes behaviour and accomplishment (which as a certain value).

It is also interesting to note that introducing his second theorem Gilbert states that '...performance alone is not competence. Competence is a social concept, a comparative judgement about the worth of performance' (op cit, p. 29). He speaks about a social standard for being able to measure competence. The second theorem is about the potential for improving performance, or the PIP. It is defined as '...the ratio of exemplary performance to typical performance' (op cit, p. 30). Exemplary performance is the best performance of a certain activity over time, in other words a historical record. It is noteworthy to see that Gilbert states that it is only meaningful to calculate PIPs for specific or identifiable accomplishments, as '...there is no "general quality of competence"' (ibid). Elsewhere he also speaks about the context in which worthy performance gets meaning. Examples of values of PIPs Gilbert gives are 1.5 or less for professional athletes, 3 for management professionals, and 10 or more for sales professionals. He also gives examples of PIPs he found for reading teachers (10) and 'teaching certain mathematics topics' (30) (op cit, p. 43). Gilbert contends that PIPs have the advantage of showing potential or opportunity, and are thus much more positive than IQ measures which can have a stigmatizing effect. 'Poor performers usually have great potential' (op cit, p. 31).

The third leisurely theorem of Gilbert he refers to as the management theorem, which is about the selection of professionals, arranging their working environment, specifying standards of performance, performance monitoring, rewarding and problem analysis. The point Gilbert makes is that for establishing accomplishments, professionals need a certain behavioural repertoire (P) and an environment (E) that enables worthy performance; examples are production tools and support systems, but appropriate reward schemes are also needed. Employers need to pay for both: the repertoire and the environment, so the costs of behaviour are the sum of P and E . From this follows that worthy performance, that was defined as the ratio of (value of) accomplishment and (costs of) behaviour can be refined as the ratio of accomplishment and the sum of the cost of the repertoire (the remuneration of the professional) and the environment, or $W=A/(P+E)$. Management also incurs costs, so the formula should read as $W=A/(P+E+M)$ (op cit, p. 139). Gilbert notes that performance problems can be the result of limited competence of a professional, insufficient support systems, limited rewarding, poor motivation or other personal problems like disease. But, overall, Gilbert attributes performance problems to management problems: 'For any given accomplishment, a deficiency in performance always has as its immediate cause a deficiency in behaviour repertoire (P), or in the environment that supports the repertoire (E), or in both. But its ultimate cause will be found in a deficiency of the management system (M)' (op cit, p. 76). He shows that information, instrumentation and motivation both in the repertoire of professionals (P) and their environment (E) serve as essential components of and conditions for effective behaviour. The sequence of analysing performance problems is first to look at the information, responses and motivation in the environmental support (is the information given sufficient, are the instruments to enable performance available, are there sufficient incentives provided), and then at the factors in the professional repertoire (does the professional have sufficient knowledge, is there sufficient capacity to respond to challenges in the workplace and is the motivation to perform present?) (op. cit., p. 92).

So, next to competence as performance motivation and assessment object, Gilbert has emphasized the issue of competence engineering. The engineering perspective Gilbert advocates is not one that is purely technological, nor is the notion of competence, as we have seen already. By definition competence is related to worthy performance and valued accomplishments. This is also the implication of the engineering framework Gilbert uses in his work, which he distinguished from pure

science. Engineers always have to take value considerations into account as to how to construct new solutions, like bridges or buildings. The process of production and construction is always constrained by social conventions, legal regulations or values. This is also visible in the model he proposes for performance analysis, which has several layers, the philosophical (about ideals), the cultural (about goals), the policy/institutional (about missions), strategic (about responsibilities), tactics/tasks (about duties) and logistics level (about schedules). At all levels there are performance measures, such as integrity, conformity, worth, value, cost and material need, and methods, such as commitment, policy, programs, strategies, tools and supplies (op cit, p. 132). The contribution of Gilbert to the field of professional development cannot easily be over-rated. His theorems look somewhat rigid and quasi-mathematical, but are in fact essential lessons for the practice of professional education and development. First: his notion that all individuals have a potential for performance improvement is very positive; much more positive than the notion that all persons have an intelligence score: half, or maybe even more than half, of the tested population feel bad, because of the intelligence score they received. Second: performance should not be achieved at excessive costs. This means that professionals should be competent enough to conduct certain professional tasks at acceptable costs. Third: if there is a situation of poor performance, the Pavlov-reaction should not be to look at the competence of the worker only, there should be attention first for the working conditions of the worker: is there a healthy working culture, is there effective employee management, are the tasks and expectations clear, is the worker allowed to use his/her competence to its full potential, are effective motivation and reward schemes in place, are the tools and instruments available which are needed for effective performance? In reality it happens too often that these factors are not taken into account, and that performance problems are tried to be 'solved' by letting workers go to professional training programs.

Competence and higher education

The concept of competence gradually made its way into higher education. Grant, Elbow, Ewens, Gamson, Kholi, Neumann, Olesen and Riesman (1979) published a series of case studies on competence-based education programs in the United States which were implemented in the 1970s. The case studies were conducted with a grant of the Fund for the Improvement of Postsecondary Education of the United States Department of Health, Education and Welfare. The same fund supported higher education institutes to redesign their curricula in the direction of competence-based education. Concerns with the *competency* movement in the USA that was spreading around at that time can be read through the lines in the Preface, where Grant is saying that the book does not touch upon the 'minimum competency testing' (in elementary and secondary schools on reading and mathematics for example where student has to pass standardized tests), 'competency-based teacher education' (which were aimed at training specific teaching skills) and 'competency-based certification' movements (op cit, p. X). Apparently there was already significant discontent with these approaches. These concerns were amplified by Gamson (1979), who stated that 'competence-based programs have had a high mortality rate', meaning that the programs were not well-received by students and faculty at various colleges, especially those with tenure. Their natural tendency was to maintain the status quo and teach the subjects they liked according to their personal preferences.

The book is aimed at describing competence-based curriculum development projects at undergraduate college level in various liberal arts and non-teaching professions. It starts with reviewing the reasons as to why American colleges were invited to convert their programs into competence-based programs. The reasons mentioned signal a sense of urgency to improve the quality of undergraduate education. Riesman (1979) points at the international competition that in certain fields scores better than the USA, for instance in the automobile industry, and at problems regarding the environment, over-population, food security, and nuclear terror, that requires higher education to prepare young people for being able to cope with this essential challenges. Grant et al (1979) tried to define competence-based education, but were not especially satisfied with it, since the author team could list several objections against this definition. Nevertheless the following definition was proposed in the book: 'Competence-based education tends to be a form of education that derives a curriculum from an analysis of a prospective or actual role in modern society and that attempts to certify student progress on the basis of demonstrated performance in some or all

aspects of that role. Theoretically, such demonstrations of competence are independent of time served in formal educational settings' (op cit, p. 6).

In summary, the work of White, McClelland, Gilbert and Grant et al, have contributed significantly to the understanding of what the concept of competence means for the practice of professional learning. It shows the importance of competence in relation to performance motivation, assessment, performance improvement and education innovation. These are all essential in establishing professional and practice-based learning of good quality. To make the general observations a bit more practical, the next section will go into competence in a number of professions. There have been and still are numerous examples of competence models that have served standardization in professions, certification, licensure and professional development and assessment.

Competence and professions

As said, there are a number of professions for which and organizations in which competence models have been developed. A wide overview with examples is given by Rosier (1994). In the four Volumes of his handbook (binders with numerous competency models) he has included core competency models, leadership, managerial, professional, sales and marketing, finance, information systems, operations/logistics, human services competency models and competency tools and applications. Apart from professional domains there are other domains in which competence plays an important role are language and communication (Chomsky, 1965;1968; Canale and Swain, 1980), mathematics (Gelman and Greeno, 1989), intercultural communication (Hampden-Turner and Trompenaars, 2000), and life (Rychen and Salganik, 2001; 2003). The examples which will be given below are oriented towards professions, and are documented in the scientific literature. They have all been used in a wider context than in one organisation.

Management

Management was one of the first domains in which competence models were developed to assist the selection and training of professionals. Boyatzis (1982) presented a competency model consisting of various clusters: 1. the human resources management cluster (including the use of socialized power, managing group processes, accurate self-assessment and positive regard), 2. the leadership cluster (including self-confidence, conceptualization, logical thought and use of oral presentations, 3. goal and action management cluster (including efficiency orientation, diagnostic use of concepts, concern with impact and proactivity), 4. directing subordinates cluster (including use of unilateral power, developing others and spontaneity), and perceptual objectivity (op cit, p. 194). Boyatzis starts his thinking with the notion of effective performance, just as White was doing in defining competence as effective interaction with the environment. Boyatzis speaks about attaining specific results through specific actions which have to be consistent with organizational policies, procedures and conditions (op cit, p. 12). Effective specific actions or behaviour are at the intersection of the competencies of the individual, the demands of the job, and the environment of the organization (op cit, p. 13). Boyatzis defines competence following Klemp (1980) as '...an underlying characteristic of a persons which results in effective and/or superior performance in a job' (op cit, p. 20-21). He further describes the underlying characteristic as being a 'motive, trait, skill, aspect of one's self-image or social role, or a body of knowledge...' If the work of White is interpreted well, motives, traits and aspects of one's self-image or social role are not competencies. Motives are drivers of behaviour, and competence effectance is one of these. Traits are rather permanent personality characteristics, such as the big five. Self-image is the result of competence, and related to self-efficacy. Social roles are positions on the labour market to which certain activities, rights and responsibilities are attributed in social interaction, perception and agreements. Competence of professionals is part of that, because without competence the professional would not be able to play the role in question. But that is not the same as saying that the role is an underlying characteristic of competence. It is rather the other way around. Competencies are performance requirements without which professionals would not be able to

effectively function in their professional situations. Knowledge, skills and attitudes are components of competence. We will come back to that.

Boyatzis used a five-step method to arrive at the competency model (op cit, p. 42): 1.

Identification of the criterion measure (this is about choosing an appropriate measure of job performance and data collection, resulting in job performance data of managers); 2. Job element analysis (this is about identifying characteristics in clusters which lead to effective or superior performance as perceived by managers); 3. Behavioural event interviews (this is about interviewing, coding interviews for characteristics, relating these to job performance data, and listing validated competencies); 4. Tests and measures (this is about choosing and administering tests to assess competencies and relating them to job performance data); 5. Competency model (determine causal relationships between competencies and job performance, which lead to the validated competency model). Boyatzis is stating that there are three differences between this approach and traditional task and function analyses (op cit, p. 43): during the analysis the focus is not only on the job but also on the person, the process results in a competency model and not just a laundry list of unrelated competencies, and the model is validated by performance data. A major concern in this approach is establishing a valid relationship between competence and job performance data. Boyatzis acknowledges that in certain professions there are no clear performance criteria. Education is a good example of that, although there is a strong tendency to make teaching performance more results-oriented. But one of the difficulties is that the performance of one teacher can depend on the performance of a teacher in another subject. For instance: the performance of a teacher in chemistry or physics is depending on the performance of a teacher in mathematics. The same holds for teachers in languages. The quality of language teaching in the mother tongue is to a certain extent influencing the learning of other languages, especially regarding sentence parsing. Also: there does not seem to be a linear and uni-dimensional relationship between competence and performance. One can perform tasks within acceptable but different ways and yet arrive at desired performance results. This is very well visible in doing research and teaching. Faculty can do their work in various ways, comply with standards of performance and still get positive student evaluations, sufficient credits for publications and desired promotions. Bartram (2005) points at this issue when he, just like McClelland (op cit), calls for criterion differentiation. Without sufficient specification of competence in terms of relevant professional acting, it is difficult to grasp the meaning of professional development.

Quinn, Faerman, Thompson and McGrath (1996) also produced a competency framework for managers, although they used an approach of theory synthesis. They reviewed and constructed an overview of key management models and defined eight general directions of management roles in a competing value-framework. These directions are defined by four models of management, the rational goal model, the internal process model, the human relations model and the open systems model, and by two dimensions: control-flexibility and internal-external. The eight orientations are aiming at: maintaining the system, consolidation/continuity, centralisation/integration, maximizing outputs, competing position of system, developing human resources, decentralisation/differentiation, and expansion/change. It is interesting to note that the authors promote the creation of multi-orientation teams in organisations because this diversity creates a more solid basis for success than having representatives of one perspective only. This vision relates to the notion of collective competence, by which the composition of the team and the current distribution of competencies is reviewed before a new team member is added to the group. The team member in many cases should not be a duplicate of existing team members, but add competencies the team needs and which is does not have yet at the desired level.

Roles and competencies of HRD experts

The competency profile of Boyatzis has been used extensively in management assessment, selection and development. The HRD profession in the USA has been using competency profiling for self-assessment purposes. McLagan (1983; 1989) has conducted various studies in which competence models were generated. The first study resulted in an overview of competency statements, based on extensive research within the profession. It is remarkable that this study was called 'models for excellence' because excellence is not synonymous with competence, whereas the rest of the study title is about the competency study which was done. The connection between

competence and excellence is located in the fact that both are points at a continuum of professional development. Dreyfus and Dreyfus (1986) pointed at the various stages of this professional development of skill acquisition as they called it: 1. Novice; 2. Advanced beginner; 3. Competence; 4. Proficiency; 5. Expertise. Although these levels of skill acquisition are generally accepted, the phrasing of these levels is somewhat problematic given the developments in competence and expertise theory and research. Apart from the fact that levels 1 and 2 are referring to beginning professionals and levels 3-5 are referring to levels of mastery of professional skills, the fundamental problem is that competence itself consists of various levels, as does expertise, and proficiency is a characteristic of mastery at various levels as well: in other words, professionals can have different levels of competence and professional expertise, and are thus differently proficient at these levels. Rather we suggest to use the following phases in the development of professional expertise: 1. Ignorance, referring to novices who by instructions; 2. Nascence, referring to apprentices who work under guidance; 3. Competence in the sense of doing independent work, referring to the basic level professionalism; 4. Excellence, which stands for delivering outstanding performance as by an expert or specialist; 5. Brilliance, which indicates great talent and superb performance, as delivered by stars in the organisation, the profession or society. Coming back to the work of McLagan, one could say that competence and excellence models are different things; they represent models of different mastery of knowledge, skills and attitudes in a given domain, in which competence is related to the minimum standards of achievement, and excellence is beyond that level. This difference can easily be understood when one is hit by a life-threatening disease. In such a case one would rather go to an excellent specialist than to one who is competent, although the competent physician may effectively be able to cure the disease. Trust in the 'excellent' physician however will be greater and chances are that unforeseen complications will be handled in a better way than by the 'competent' colleague who may have less experience with potential complications.

The empirical part of the second study of McLagan (date) comprised of a review of future forces for the role of HRD professionals, outputs of HRD professionals (products and services), the definition of standards of outputs, the level of expertise of competencies and the formulation of ethical issues which the HRD professionals may encounter.

Since the studies of McLagan (1983; 1989) the American Society of Training and Development has commissioned further studies to make a competency model for the profession, called 'The ASTD Competency Model. Training & Development Redefined to Create Competitive Advantage' (ASTD, 2013). The model distinguishes foundational competencies (which are relevant for success in most occupations, being business skills, global mind-set, industry knowledge, interpersonal skills, personal skills, technology literacy) and training & development areas of expertise, for which is specified what professionals need to be able to do. The areas of expertise are performance improvement, instructional design, training delivery, learning technologies, evaluating learning impact, managing learning programs, integrated talent management, coaching, knowledge management and change management. These fields resemble the HRD-roles defined in 1989, which were 1. Administrator; 2. Evaluator; 3. HRD manager; 4. HRD materials developer; 5. Individual career development advisor; 6. Instructor or facilitator; 7. Marketer; 8. Needs analyst; 9. Organization change agent; 10. Program designer; 11. Researcher. They are also related to the roles, (the learning strategist, the business partner, the project manager and the professional specialist) areas of expertise (career planning and talent management, coaching, delivering training, designing learning, facilitating organizational change, improving human performance, managing the learning function, managing organizational knowledge, and measuring and evaluating) and foundational competencies are Interpersonal, Business and Management and personal competencies as identified in 2011.

In sum, an interesting difference between the models of Boyatzis and those of the ASTD is that the one of Boyatzis employed assessment and is also been used as foundation of assessment of management candidates and management education and training curriculum design, whereas the model of the ASTD was developed for self-assessment and self-development of workplace learning and performance improvement professionals. In general, different professional groups use competence profiles for different reasons; there is a tendency that professions in which errors cause injuries to people, damage to the environment or significant capital losses (such as in

operating complex capital-intensive technical systems) use competence profiles for education and training, professional licensure and mandatory retraining.

The medical profession

Another current example of a more tight use of a competency model is the CanMEDS 2005 Framework which is used by the medical profession (Frank, Jabbour et al, 2005). This model is developed for medical experts. The roles of expert are defined and elaborated in this Framework, which consists of key competencies and enabling competencies. Medical expert is the central role of the physician in the framework. Apart from this role of medical expert, the other roles are communicator, collaborator, manager, health advocate, scholar, and professional.

Key competencies of the medical expert role are amongst others: 'function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical and patient-centred medical care' and 'establish and maintain clinical knowledge, skills and attitudes appropriate to their practice' (op cit, p. 1). The key competencies are elaborated systematically into enabling competencies. Examples of enabling competencies for the first key competency are for instance: 'effectively perform a consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal form in response to a request from another health professional', 'demonstrate effective use of all CanMEDS competencies relevant to their practice', and 'identify and appropriately respond to relevant ethical issues arising in patient care' (op cit p. 1). Examples of key competencies of the role of communicator are 'develop rapport, trust and ethical therapeutic relationships with patients and families', 'accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues and other professionals', and 'accurately convey relevant information and explanations to patients and families, colleagues and other professionals' (op cit, p. 3). Examples of the first key competence in this role are 'recognize that being a good communicator is a core clinical skill for physicians, and that effective physician-patient communication can foster patient satisfaction, adherence and improved clinical outcomes', 'establish positive therapeutic relationships with patients and their families that are characterized by understanding, trust, respect, honesty and empathy', and 'respect patient confidentiality, privacy and autonomy' (op cit, p. 4). Key competencies of the role of scholar are for instance: 'maintain and enhance professional activities through on-going learning', 'critically evaluate information and its sources, and apply this appropriately to practice decisions', and 'facilitate the learning of patients, families, students, residents, other health professionals, the public, and others, as appropriate' (op cit, p. 9). This rather elaborate description of the CanMEDS 2005 Competency Framework is given (although the whole Framework is over 10 full pages) to explain that this competency model is mainly content- or task-driven. This is visible in the wording of the key and enabling competencies of the core role of the medical expert, but also in the other roles, key competencies and enabling competencies. It is all about being able to provide optimal medical care. Some of the key competencies and enabling competencies read as tasks, which the physicians need to be able to do; this is also the format of the competency statements: 'Physicians are able to ...'. Examples of this are establish and maintain clinical knowledge, effectively perform a consultation, accurately elicit and synthesize relevant information, respect patient confidentiality, privacy and autonomy, critically evaluate information and its sources, and facilitate the learning of patients, families and students.

Models or frameworks like those of the management, human resource development and the medical profession certainly help in mapping the domain of professions, and thus developing curricula for professional education and training and development programs for continuing professional development. How much specificity is needed is a question which is difficult to answer. Certainly, overspecialisation should be avoided, but sufficient description is needed to define course and instructional development. The core professional tasks graduates and more experienced professionals are confronted with should be at least included in the education and development programmes. This means that in specifying competence statements for professional learning, ample attention should be paid to the content-matter of the professional tasks.

The purchasing profession

An example in which we experienced the necessity of sufficient specification of content-related competence profiles is from the purchasing professions (Mulder, Wesselink and Bruijstens, 2005). This project also resulted in a predominantly task-driven competence framework. In this study a variety of research and development strategies were used within an association of purchasing professionals (N of population=3,083; N of pre-survey=806; N of main survey is 261; a test for sector-bias of the main survey given the population distribution was satisfactory). These activities that were conducted are (op cit, p. 188-189): 1. qualitative multi-perspective iterative interviews for trend analysis in the literature, research and practice about purchasing; 2. stratification discussions regarding the structure of the profession in term of main roles, and group interviews for generating and structuring task and competencies lists; 3. a large-scale task performance survey; 4. a test of sector-specificity of job profiles; 5. job profile mapping; 6. job picture development; 7. competence mapping. The results of the project were an overview of the major trends in the profession, regarding strategic importance of the purchasing function, the importance of internal marketing of the purchasing function, the further development of e-business, the focus on core competencies of the organizations, the emerging necessity of working in multi-disciplinary teams, the urgency of chain management, further globalization of trade, the creation of purchasing alliances, differentiation and specialization within the purchasing function, and the increasing attention for ethics and corporate social responsibility. Four job and competence profiles were developed, for four key competencies: purchasing management, information and communication, initial purchasing and operational purchasing respectively. In total 105 tasks were formulated which were generated in the different interviews and included in the large-scale survey. Job profiles were composed which consisted of the four roles and task specifications by task domains and activities. An aggregate job profile was constructed for the four roles as well and the four general tasks and thirteen subtasks. A Subtasks in the field of initial purchasing was 'specifying the purchasing need', and examples of tasks in that field were 'Supporting and advising the development of functional and technical specifications of purchasing needs with the internal customer', 'verifying whether what has to be purchased measures up to functional and technical specification of the organization', and 'evaluation the completeness of the specifications'. As will be clear there is a strong relationship between this example and the example of the medical profession. In both examples roles and tasks are specified and these are used as input for stating that the professional should be able to perform these tasks. All professional competence models described above have contributed significantly to the professional and practice-based learning in the respective fields. They also all include an overview of the tasks professionals need to be able to perform in their professional field. These tasks may be closed and open, and of reproductive and productive nature. For instance, in the field of innovation professionals may be asked to cope with situations, products and processes, but they also may be expected to contribute to the creations of innovations.

A generic behavioural competency framework

Above we have raised an important question regarding the specificity of competence models for various professions. This specificity is necessary for the development of relevant and current curricula and professional development programs. But there is also a line of research in which it is tried to explain human behaviour and predict job performance and career success just as White tried to explain motivation and human behaviour. The work of Barrick and Mount (1991) is a clear example of this. They proposed the following five dimensions with which they tried to explain all professional behaviour: 1. openness (inventive/curious versus consistent/cautious); 2. conscientiousness (efficient/organized versus easy-going/careless); 3. extraversion (outgoing/energetic versus solitary/reserved); 4. agreeableness (friendly/compassionate vs. cold/unkind); 5. neuroticism (sensitive/nervous vs. secure/confident). Secondly, they were also very interested in testing the intelligence of candidates, again, to predict their later job performance.

A comparable approach is followed by Bartram (2005). As with the work of Boyatzis (1982), the work of Bartram is from the consultancy world. Bartram is associated with the SHL group, a global player in employee testing, selection and training. Bartram conducted a meta-analysis of twenty-

nine studies with a total n of 4,861 cases; an impressive number. The studies employed the so-called Great Eight competency factors published earlier (Kurz and Bartram, 2002). The Great Eight competencies are: 1. Leading and deciding; 2. Supporting and cooperating; 3. Interacting and presenting; 4. Analysing and interpreting; 5. Creating and conceptualizing; 6. Organizing and executing; 7. Adapting and coping; 8. Enterprising and Performing (Bartram, 2005, p. 1187). These competencies are further defined, and the twenty competency dimension as well as the 112 competency components are listed in the appendix with the article. Also, the hypothesized relationships between the competencies and Big Five factors are listed. The purpose of the study is to determine the relationship between competence and job performance. The author states that this relationship has been difficult to prove, since in many studies job performance was only rated by one item (one score on overall job performance). Therefore he calls for criterion differentiation: 'The key point of all this work is the demonstration that differentiating the criterion, in only in two broad areas, provides a considerable gain in the clarity of how personality-based predictors relate to performance' (op cit, p. 1187).

The approach presented in the study of Bartram is typical for the quest to try to explain variation in performance by a set of predictors that is a limited as possible. While this is understandable from the perspective of assessment, selection and generic advice on competence development, it is not sufficient for more detailed content-oriented professional development. Whereas the Great Eight competencies and the more detailed competency dimension and competency components are absolutely essential for the management profession, but content-driven professions like medical experts, engineers, scientists, lawyers, but also accountants, operators, nurses, teachers, technicians, logistic professionals and construction workers need a solid basis in competence in terms of knowledge, skills and attitudes that are strongly related to their work environment, and thus more content-specific.

So regarding the contribution of the generic behaviour-oriented models of competence, we conclude that these are of limited value for professional and practice-based learning, unless they are further specified for a certain profession and professional contexts.

Three fundamental approaches of competence and professional development

In the preceding sections of this chapter an overview of developments is given in the use of the competence approach in professional and activity-based learning. As indicated, since the 1950s the concept of competence entered the professional literature. Main developments in the conceptualisation of competence since then have been described. The interim conclusion was that competence models have significantly contributed to the mapping of professions, and to the design and implementation of professional education and development programmes.

The total body of the competence literature however is much richer. For other accounts of the developments in the field of competence theory and research see Rothwell and Lindholm (1999) and Hodge (2007). Rothwell and Lindholm reviewed the competence identification, modelling and assessment literature until the late 1990s, focusing on the literature in the USA; Hodge reviewed the origins of competency-based training as the theory of vocational education that formed the foundation of the national qualification framework in Australia. Rothwell and Lindholm (1999) reviewed a number of the same authors whose most important competence works have been explained above. They elaborate competency identification, modelling and assessment practices at operational level in greater detail than has been done in this chapter. Hodge's review is limited to the origins of competency-based training, and does not go back as far as this chapter does in exploring the psychological roots of the concept. He refers to Houston (1974), Norton, Harrington and Gill (1978), Tuxworth (1989), and Harris, Guthrie, Hobart and Lundberg (1995) as sources who describe the origins of the competency-based training approach.

Advocates of the concept (Zemke, 1982; Dubois, 1993; Spencer and Spencer, 1993) have stressed the added value of the concept of competence. However, critics have pointed at its negative properties like conceptual confusion (Westera, 2001), standardization of education (Hyland, 2006) and lack of measurability. Although definitely many attempts of applying competence in

professional development (such as in competence-based teacher education) failed, there is no doubt about the importance of professionals being competent in their jobs. Rather, ways of using competence or operationalizing it in practice has raised many questions. However, the right comments on the concept have to be pointed in the right direction. That competence is being used in the debates on enhanced cooperation in education, the creation of one education space, facilitating mobility of students, the Bologna process of higher education, and the enacting of the European Qualification Framework (EQF) within the European Union does not mean students would not need to be educated to become competent and that professionals would not be needing further professional development. On the contrary, the complexity of the demands for occupational performance in contemporary workplaces is so high that all means must be employed to warrant competence development. And by denying the added value of the concept of competence in educational planning and professional development, and subsequently including it in a model for competences as sub skills (Westera, op cit, p. 86) only adds to the confusion, and leads to hardly any further operationalization and use in practice. As to the lack of measurability, there is a host of recent literature that especially deals with competence measurement and assessment (Hartig, Klieme and Leutner, 2008; Shavelson, 2010; Winther, 2010; Blömeke, Zlatkin-Troitschanskaia, Kuhn and Fege, 2013).

Although critics have a point in saying that the concept of competence lacks clarity, it cannot be denied that the concept has a long and strong history (Mulder, 2007), and that it has achieved a solid position in common language, professional practices and institutional regulations (Mulder, 2012), such as in the European Qualification Framework and the competences of the European institutions.

Various authors have proposed different epistemological approaches to conceptualize and study competence. As mentioned already, these is the big difference between task and behaviour orientation, the comprehensive approach, stressing the importance of combining knowledge, skills and attitudes in competence statements (Wesselink, 2010), and the interpretative-relationship approach, which is close to naturalistic phenomenology (Velde, 1999; Sandberg, 2000). The latter approach means that competence only gets meaning in the 'dynamic conception' of work and individual's relationships to it. To capture competence and stimulate professional development one first needs to fully understand the meaning of competence of individuals, which can be achieved by this approach.

As an attempt to create some structure in the enormous amount of publications in the field of competence theory and research, and thus be better able to evaluate the use of competence models for professional and activity-based learning, a trichotomy in approaches of the concept of competence is proposed. The three approaches are: 1. Competence and behaviouristic functionalism; 2. Competence as integrated occupationalism; 3. Competence as situated professionalism (Mulder, 2011).

1. Competence and behaviouristic functionalism

Initiatives like competence-based teacher education (CBTE) in the 1970s were heavily influenced by behaviouristic psychology and education philosophies which entailed the preparation of students for certain functions. The basic idea of this approach of education and professional development was to specifically determine the discrepancies between mastery of actual and desired specific competencies, which often resulted in training sometimes miniscule skills; an important pitfall of this approach was over-specification and fragmentation of learning. This approach was heavily criticised by proponents of the humanistic-based teacher education movement, and those who were convinced of the fact that reflection on action is more important than practicing endless small skills. Researchers showed that experience and personal epistemologies had a stronger influence on professional behaviour than the training of isolated skills. Because of these insights CBTE and with that many competence-based education initiatives fell out of favour. Nonetheless, via corporate strategy literature and practice as well as human resource management theories and instruments, the competence-based education movement became popular again, but then especially based on the second approach.

2. Competence as integrated occupationalism

Instead of focusing on functions, or narrow job profiles, the approach to stimulate integrated occupationalism was based on notions of holistic, generic and integrated sets of knowledge, skills and attitudes which are needed in core occupational roles and situations (instead of tasks and activities). Not only the what of task content is important, also the way in which tasks are carried out. For instance, a dentist who has to fill a whole in teeth of a child for which drilling is needed, reassures the child and performs the necessary actions with care. Current vocational education policy is aimed at implementing competence-based education practices in which it is stressed that knowledge, skills and attitudes should be integrated in the curriculum, teaching, learning and testing. In present qualification frameworks and competence-based education models it can be seen that attempts have been made to link core roles and work situations, work-processes, and competencies. Within the European Union this process is being stimulated by the development of national qualification frameworks in relation to the European Qualification Framework (Mulder, in press). The approach is called occupationalistic as a lot of weight is attributed to the demand side of education, as part of the neo-liberal theory of market-led economies. The needs in the labour market are considered to be leading in the articulation and definition of the functional specifications of education. So in many countries industry defines the needs for education. However, not only do industries find this difficult, this approach is also fundamentally limited, which can easily be understood as not all companies and institutions, large or small, and in different economic sectors, are working with optimal organizational models, nor are they all sufficiently innovating or transforming their business models which is needed given developments in technology, markets and society. So educational institutes themselves have an autonomous role in formulating their educational philosophy on preparing young generations for the future. Balance is needed in the influence of various stakeholders in educational planning and professional development.

3. Competence as situated professionalism

This approach is based on the observation that competence only gets meaning in a certain context, in which professionals interact with each other. For instance, when a competence domain of communication is at stake, it means something totally different for a secretary giving standard information to students than for researchers who are defending a thesis. Also, communication for the researcher means two very different things when he/she is interviewing a respondent or having a job interview. The professional context on the other hand also enables competence development because of its affordances (Gibson, 1979). Gibson conceived of affordance as characteristics of a given context which provide possibilities for professional action and development. Affordances can be perceived and acted upon, given the abilities of agent. These abilities, defined as effectivities by Shaw, Turvey, and Mace (1982) who saw these as functions of a being in relation to its context, or formulated a bit wider, as the abilities of an agent. These affordances and effectivities have a lot in common with competence development in context, although the work of Shaw et al (1982) has a more perceptual base.

Competence also develops during experience with certain activities and in varied situations. This approach of situated professionalism is related to notions of situated cognition: 'Knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used' (Brown, Collins and Duguid, 1989, p. 32). In situated professionalism the development of a professional identity is also important, which is an idea that is related to the theory of situated cognition. While growing in the role of beginning manager, consecutive experiences of successful performance, positive feedback on successes, and the feeling of learning of and with colleagues, results in a positive self-image of the individual. The work context then takes shape as a community of practice in which players interact and share and negotiate meaning (Lave and Wenger, 1991; Wenger, 1998; Wenger, McDermott and Snyder, 2002). It is also closely related to theories and practices of professional development which show that personal epistemologies (Hofer and Pintrich, 2002) have a stronger influence on professional behaviour than isolated skills training. It also touches upon the notion that competence is heavily influenced by what important stakeholders expect of the professional in terms of wishful professional action. Professional associations (such as associations of medical specialists or pilots), but also local players (such as

hospital directors, chefs de Clinique, and airline executives) have a strong influence on the desired competence fields and the extent to which the professionals need to be proficient in these fields. The theory of situated cognition (and thereby situated professionalism) has not remained without criticism. Anderson, Reder and Simon (1996) state that not all learning is necessarily depending on a real context, transfer is possible if tasks are similar, learning of abstractions is possible by giving concrete examples, and not all learning needs to be individual. Nevertheless, social-constructivism learning theory has been quite influential in professional education and development, and as a consequence authentic learning and competence-assessment have become widely distributed in professional learning arrangements. An important pitfall here is holism, when details of competence are covered under generic expressions of abilities of people, which may be sufficient in personal development processes, but not for professional certification purposes.

Evaluating these approaches against their potential use for professional and activity-based learning, it can be said that it is difficult to say which one is most effective. That mainly depends on the situation and the specific task for and in which a professional has to develop. Training specific behaviour can be very effective in sports and music, but also in medical education. On the other hand, education for certain occupations can be very effective in vocational school settings. Finally, professional development of teachers can be very effective in an in-service-situation. In short, there is added value in all three approaches, and the interim conclusion here is that competence-based initiatives contribute to the quality of professional and activity-based learning. It appears that learning needs (whatever closed or open they are) are being specified, which guide the direction of professional development programmes and activities.

Conclusions, discussion and further research

The main question in this chapter was whether conceptions of professional competence have helped the practice of professional and practice-based learning. The interim answers on this question throughout the chapter have been positive, and the general balance regarding this question is also positive. Indeed, we think that the development of competence models (frameworks or profiles) help in mapping professions. We also think this should not be done in a rigid way. The reality of professional practice is dynamic, but on the other hand quality requirements in certain professional domains require a certain level of standardization, especially in hazardous occupations and professional domains which have an important influence on health, safety and risks. Approaches of competence development such as those described (in the training, education and development context) have to be made context-specific as their added value is situation-specific. Important variables to take into account are the level of the profession, the field of practice, the intentionality of learning, and the formalisation of learning activities. Professional and activity-based learning practices vary considerably by these variables.

As has become clear in this chapter, many conceptual studies appeared regarding the concept of competence, competency, competencies, competence models, competence systems, competence dictionaries, competence-based management, competency-based education, competence testing, competence assessment, competence centres, etc. The number of empirical studies has been increasing however.

Mulder, 2004 established a series of principles of good-quality competence-based education, which was adapted by Wesselink, 2010) who constructed a matrix for competence-based vocational education, which consists of eight principles of education and four levels of implementation. Experiences of teachers with the matrix were studied (Wesselink, Dekker-Groen, Biemans and Mulder, 2010). This model for curriculum design practice was further elaborated and now consists of ten principles of education and five levels of implementation. The model is validated in senior-secondary vocational education, and proven to be useful in assessing and developing competence-based vocational education programs (Sturing, Biemans, Mulder and De Bruijn 2012). As such, this instrument contributes to the quality of professional and activity-based learning. Furthermore, Mulder (2006) studied the inclusion of sectoral social partners in European competence development projects, and concluded that this leaves a lot to be desired. Biemans et al (2009)

studied measures to overcome the most common pitfalls of competence-based vocational education and reported on the effects of these measures. There are also advancements regarding authentic student assessment (Gulikers, Baartman, & Biemans, 2010). Gulikers, Biemans & Mulder (2009) described evaluations of the quality of competence-based assessments as perceived by curriculum developers, teachers, students and employers. Experiences of education developers, teaching staff and students regarding competence-oriented learning environments have been studied to evaluate the different perceptions of these stakeholders regarding the intentions and practices of this educational innovation (Wesselink, Biemans, Mulder and Gulikers, 2011). Furthermore competence studies were conducted in various professional domains which were not yet mentioned in this chapter: agricultural extension to develop a competence profile for agricultural instructors (Karbasioun, Mulder and Biemans, 2007); rural consultancy in the field of HIV/Aids in Africa, in which key competencies for the socially sensitive issue of extension on reproductive practice and the dangers of infection were identified in a participatory way (Brinkman, Westendorp, Wals and Mulder, 2007); environmental education for which competencies were identified (Wesselink and Wals, 2011); entrepreneurship in greenhouse horticulture (Mulder, Lans, Verstegen, Biemans and Meijer, 2007; Lans, 2009; Lans, Biemans, Mulder and Verstegen, 2010; Lans, Gulikers and Batterink 2010; Lans and Gulikers; 2010); teacher competence on inquiry-based science teaching (Alake-Tuenter, Biemans, Tobi, Wals, Oosterheert and Mulder, 2012); corporate social responsibility, a field that is just being explored (Osagie, 2012).

There is also advancement in the field of competence development and knowledge arrangements. New arrangements for cooperative knowledge creation have been explored (Beers, Sol and Wals, 2010), as well as regional learning arrangements, and competencies for the establishment of regional learning (Oonk, Beers, Wesselink and Mulder, 2011), to see whether process-based reflection in multi-stakeholder groups can help overcome the barriers that existed in the older models of knowledge dissemination. Furthermore, there is progress on the acquisition and fostering of interdisciplinary, intercultural and argumentative competence. Many of the problems students and professionals in the natural, life and social sciences encounter in their field of work are related to these issues. Since professionals need to be able to justify their choices and practices in a more and more digitalised working environment, it is also interesting to look at research on learning in advanced digital collaborative learning spaces. Studies were conducted in the domain of interdisciplinarity (Spelt, Biemans, Tobi, Luning and Mulder, 2009), intercultural learning (Popov, Brinkman, Biemans, Mulder, Kuznetsov and Noroozi, 2012) and argumentation-based learning in online collaboration spaces (Noroozi, Biemans, Busstra, Mulder and Chizari 2011; Noroozi, Biemans, Weinberger, Mulder, Popov and Chizari, 2011; Noroozi, Busstra, Mulder, Biemans, Tobi, Geelen, Van 't Veer and Chizari, 2011; Noroozi, Weinberger, Biemans, Mulder and Chizari, 2011; Noroozi, Biemans, Busstra, Mulder, Popov and Chizari; 2012).

The relationship between competence and professional performance has not yet been studied intensively. There has been research by Lans (2009) in small and medium sized companies and Du Chatenier (2009) in open innovation teams in large organizations. However, since establishing worthy performance is costly, and performance outcomes (accomplishments) should justify the costs of performance, it seems to be worthwhile to further investigate the effects of competence development on professional performance improvement.

Various competence studies have been based on large surveys on opinions and perceptions of competence as needed in professional practice. Some experiments have been done to study specific aspects of competence development. However, more ecological validity is needed in this type of research. Professionals in given contexts performing certain tasks and exerting certain responsibilities need to be studied to see what is actually going on at the intersection of working and learning. In other words: competence development in workplace learning settings should further be explored. It would also be worthwhile to further study the effects of different competence development strategies in specific domains.

As a final caveat, this chapter is concluded with a general pitfall in competence-management and development practices. Competence-based professional development often starts with modelling professional competence. The development of competence frameworks for professions is informed by empirical research, but in the final stage it is an act of normative decision making. These frameworks are being used as standards within certain professions or organisations with which

professionals have to comply, either for registration or for re-registration. Once models for professional competence have been developed and professionals assessed, learning needs can be aligned to these models. This does not automatically happen, since learning processes are taking place anyway, intentional or incidental, organized or informal, conscious or unconscious. The default mechanism for professional development plans is to revert to training. However, in many cases training is not effective for professional learning and other development activities have more potential. Transforming a workplace in a smart collaborative learning place, or creating scripted online knowledge sharing networks with embedded tutoring, may be much more effective. In general, competence development is a socio-constructivist learning process in which social interaction and situation-specific searching for quality improvement of working processes is of utmost importance.

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