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Competence-based curriculum development in Higher Education: a globalised concept?

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1. Introduction

In a simple way one might start the introduction of competence-based education and competence-based curriculum development with a statement of Everwijn, Bomers and Knubben (1993) on traditional education. They state that education, particularly professional, technical, vocational education is always facing the problem that knowledge acquisition does not necessarily mean the successful application of the same knowledge. Miller (1990) cites the philosopher Alfred North Whitehead who stated that there is nothing more useless than a merely well informed man. Classical reactions to a discipline-oriented curriculum have been the Harvard "case" method that started in business administration, and problem-based learning that started in medicine studies at McMaster medical School in Canada. But a third answer lies in ability- or competence-based learning and will be elaborated in this chapter.

Important developments in society in the past decades have led to a different view of knowledge, accompanied by an increased attention for the acquisition of competencies and competence-based education and training (Kearns, 2001). Aspects of a different view of knowledge are:

- The classical concept of knowledge as school-based and discipline-based is broadened; knowledge is seen as an integrative capability. The acquisition of knowledge in itself is not the major aim of education and training, but what can be done with this knowledge. Is this a typical Western development? Delors (1996) stated some ten years ago that in many sub- Saharan African countries there is traditionally no formally codified knowledge and the know-how is based on implicit, tacit knowledge.
- The development of knowledge is taking place in more diverse contexts. Gibbons (1998) speaks about two 'modes' of knowledge production. Mode 1 production refers to knowledge of the discipline-based type, typically produced in the 'classical' universities. Mode 2 knowledge development is the production of knowledge in the context of application, that is, it arises in the process of solving particular complex problems in collaborative trans-disciplinary teams and partnerships, situated both within and outside higher education institutions.

The role of universities in this mode of knowledge development has been ambiguous (Gonczi, 2001). In some cases universities want to put a strong emphasis on traditional,

disciplinary knowledge production because timeless, universal knowledge is important in a world where everything is in flow. However, more and more the need is recognised for domain-specific competencies within the disciplines *and* trans-disciplinary, as well as generic competencies (Teichler, 1998). Institutions of higher education in developing countries have mostly kept to the traditional functions and objectives of Western universities (Maamouri & Wagner, 2001), often being 'more Roman than the pope'. However, global developments in science, society and economy affect the developing countries as well and their higher education institutions are closing the gap between 'classical' disciplinary knowledge and know-how required for the new job market. One answer on the demand for more relevant education has been a stronger focus on the world of work, signified by the attention for 'core', or personal transferable skills, such as the ability to co-operate, communicate, and solve problems; skills which are assumed to transfer readily across a range of contexts (Bennett, Dunne & Carré, 1999).

Another result of the developments described above is that the difference between vocational and academic/general education is getting smaller, with increasingly active partnerships between higher education institutions and the worlds of industry, commerce and public service (Stern & Wagner, 1999; Hager & Hyland, 2003).

A way to conceptualise the relation between education and the world of work is through competence-based education. Starting with the simple description of competence as the 'the ability to perform a task up to standard' it is not difficult to see that competence relates to the world of work. Acquiring and developing competence is more than learning a set of skills. A common term describing the acquisition and development of competence is 'Competence-based Education and Training (CBET)', where 'training' is more associated with the mastering of skills. In the rest of this article the term 'competence-based education' or CBE will be used.

CBE is mostly linked to technical and vocational education at secondary level. However at tertiary level we see more and more universities adopt a competence-based approach, starting with areas that have a more direct professional link, such as medicine, dentistry, law, engineering, and accounting.

This chapter starts with a conceptual clarification of competence, competence-based education and the development of competence-based curricula. Attention is paid to the role of personal traits in the concept of competence and competent professional acting. Although sometimes radical choices have to be made when designing competence-based curricula, there is still a great variety of 'solutions" with varying characteristics. Competence-based education, especially in Higher Education has outspoken adversaries. The most important criticisms are discussed in this chapter together with ways to counter the dangers and make most use of the advantages of CBE. As an example the formulation of "academic competencies" by a group of Dutch universities will be presented. Finally some examples from competence-based curriculum development processes will show that CBE is indeed a globalised concept.

Before expanding on competence-based higher education in the Netherlands and in some African countries we need to describe more in detail the concepts of competence (or competency) and competence-based education.

2. The concepts of competence and competence-based education

Throughout this article the word 'competence' will be used in a generic sense, meaning the quality or state of being competent. The term 'competence-based education' will be used assuming to incorporate the American 'competency-based education'. Below a competence model will be presented in which the 'quality of being competent' is explained by the possession of a set of 'competencies' that together are causally related to a competent performance. A competency is conceptualised in the model as the capability to choose and use (apply) an integrated combination of knowledge, skills and attitudes with the intention to realise a task. Competence is then defined as the capacity to realise 'up to standard' the key occupational tasks (see below) that characterise a profession.

Competence-based education aims to make students more competent through the acquisition of competencies and the further development of the newly acquired or already held competencies. This presupposes that there is clarity about how competencies are conceptualised and that, in case of a particular education or training programme, the relevant competencies have been formulated.

The lack of a generally accepted operational definition of competence/competency is generally acknowledged (Garavan & McGuire, 2001). Some authors simply accept the fact and support a pragmatic approach. Stoof et al. (2002) label the search for an overarching definition as an objectivist approach, that is futile in absence of an absolute truth, and advocate instead a constructivist approach where the "…criterion for a competence definition is not whether the definition is true but the extent to which the constructed definition has proved to be adequate in the context to which it is used (i.e. viability)" (p.347).

In the literature many definitions of competency/competence can be found, almost as many as there are authors writing on competence-related matters.

Comparing a selection of competence definitions by various authors, five groups can be distinguished (for a detailed discussion see Kouwenhoven, 2003):

1. Competence as the **ability to perform at a desired level** or according to a certain standard. This refers to competence as output. An example:
   "Competence is the ability to perform in work roles or jobs to the standard required in employment." (Field & Drysdale, 1991)
2. Competence as the **ability to choose and use the attributes** (knowledge, skills and attitudes) that are needed for a performance at a desired level. This involves meta-cognitive attributes. An example:
   "A competent person is, within a certain context (situation) able/capable to choose from a set of available behaviours and to execute suitable behaviours in order to reach a certain goal." (Kirschner et al., 1997)
3. Competence as the **possession of certain attributes (knowledge, skills and attitudes)**, or competence as input. An example:
   "Competence represents the totality of knowledge, skills and abilities required for professional practice." (AAPA, 1996)
4. Competence as a mere **description of what someone can do**. This refers also to competence as output. An example:
   Competence is an action, behaviour or outcome which the person should be able to demonstrate." (Garavan & McGuire, 2001)
5. More **elaborate definitions of competence**, containing elements of the four groups above. An example:

> "Competence is the capability of a person or an organisation to reach specific achievements. Personal competencies comprise: integrated performance oriented capabilities, which consist of clusters of knowledge structures and also cognitive, interactive, affective and where necessary psychomotor capabilities, and attitudes and values, which are conditional for carrying out tasks, solving problems and more generally, effectively functioning in a certain profession, organisation, position or role." (Mulder, 2001)

Based on the various competence definitions and dimensions of the competence concept Kouwenhoven (2003) presents a comprehensive definition of competency that can be further clarified in a model (see Fig. 1, below). Point of departure for the model is the question: "What drives a satisfactory or excellent performance?" The model describes what 'goes on in the head' (i.e. processing at cognitive level) when a task is realised. From this model competency is deduced as the ability to process in an intentional way. A professional performs in his/her work a large number of tasks that can be grouped into 'key occupational tasks' or roles.

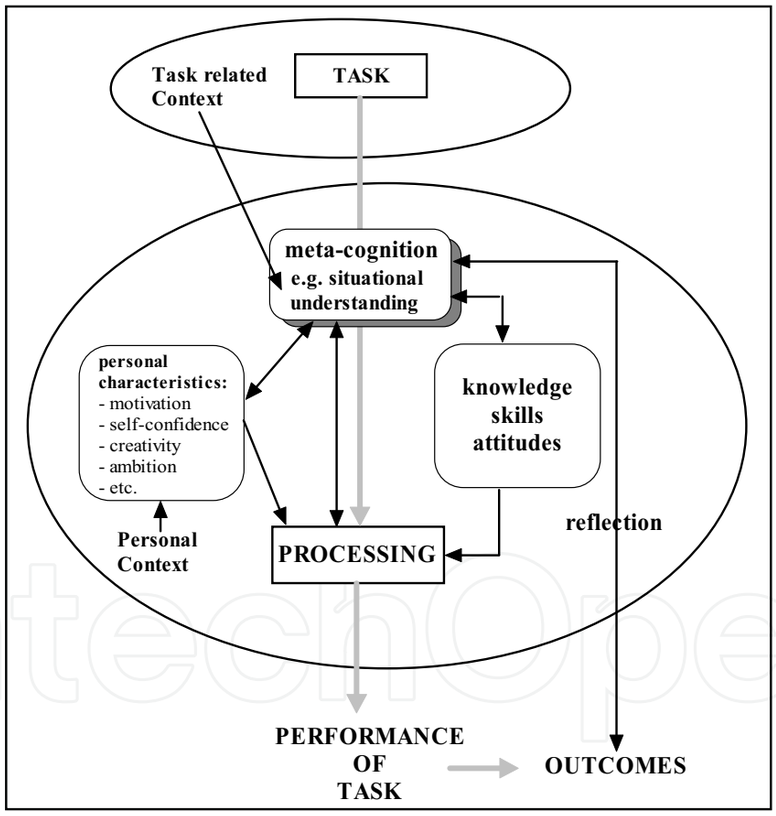


Fig. 1. A model of the cognitive aspects of task performance

The realisation (performance) of tasks implies 'intentional actions', activities that are consciously planned, monitored and regulated and that involve certain attributes (knowledge, skills, attitudes) and personal characteristics of the professional. Knowledge,

skills and attitudes are utilised in an integrated way, although they may be used in varying degrees, depending on the (occupational) task or a task component.
One would expect, for example, in counselling a crime victim more emphasis on attitudes than in building a bookshelf. In order to perform (key) tasks the professional should be able to 'select' and use the appropriate knowledge, skills and attitudes, that is, process them and come to deliberate actions, aimed at realising the task. The mental processing of a task or a problem, characterised by 'intentional action', requires certain cognitive monitoring and regulation activities, labelled 'meta-cognition' (Marzano et al, 1988; Ashcroft, 1994). An example is 'situational understanding' (professionals take account of the varying contexts in which they are operating and are able to transfer, that is, select and apply the necessary attributes in new contexts).
In the model, presented in Fig. 1 the task related context (where and how the task is 'situated') is perceived and processed by situational understanding. The personal context involves (amongst others) emotional, physical factors that directly influence the professional as a person. For example, an individual might just have recovered from an illness and is still feeling tired, or she/he might be worried by family troubles, etc. The personal characteristics determine to what extent these positive or negative factors will influence the processing of the task. Reflection on the outcomes provides feedback to the practitioner, leading, if necessary, to additional intentional actions.
Competency and competence can be deduced from the model and be defined as follows:

- **Competency** is the capability to choose and use (apply) an integrated combination of knowledge, skills and attitudes with the intention to realise a task in a certain context, while personal characteristics such as motivation, self-confidence, willpower are part of that context.
- **Competence** is the capacity to realise 'up to standard' the key occupational tasks (see below) that characterise a profession. A **competent** professional shows a satisfactory (or superior) performance. **Key occupational tasks** are the tasks that are characteristic for a profession. A profession could be described by 20 - 30 key occupational tasks (Hager & Gonczi, 1996).

The broad, general, concept of competence can be related to competencies through the concept of 'core competencies' as is shown in Fig. 2, below.
Core competency is defined as: the set of appropriate competencies needed to realise a key occupational task at a satisfactory or superior level.
Stated in another way: Core competencies are directly linked to key occupational tasks and are integrated clusters of domain-specific and generic competencies.
It should be noted that in the literature the term 'core competencies' is also used in the sense of strategic business capabilities that provide a company with a marketplace advantage (cf. Prahalad & Hamel, 1990). In the UK the term 'core skills' is referring to generic competencies (in this case communication, numeracy, IT, problem solving, and working with others)
Competencies are categorised in this model in two groups. Competencies can be **domain-specific**, relating to clusters of knowledge, skills and attitudes within one specific content domain related to the profession. Another group of competencies is called **'generic'**, because they are needed in all content domains and can be utilised in new professional situations (transfer). The name 'life skills' is sometimes used for the latter group and indicates that

these competencies are, because of their transferability, the basic set of capabilities for the life of today, within and outside the profession.
In the development of a competence-based curriculum a sequence is followed (sometimes called the 'Royal track') involving the formulation of a professional profile with key occupational tasks, followed by graduate profile with (selected) core competencies that relate directly to the professional profile. In the curriculum profile the final attainment levels of the graduate are defined in competence standards for both domain-specific and generic competencies.

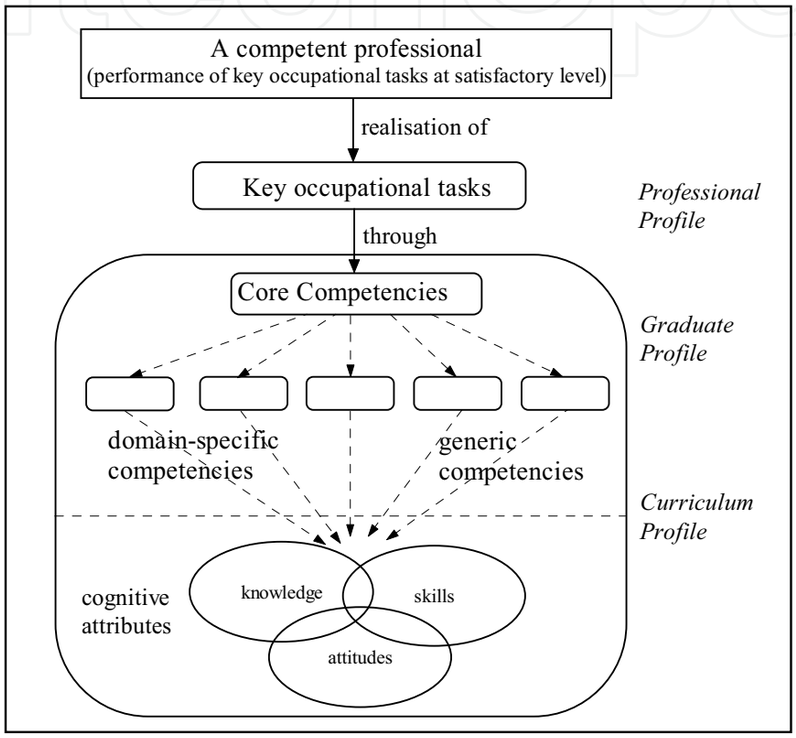


Fig. 2. The relation between competence, core competencies and constituting (domain specific and generic) competencies

Earlier in this chapter Stoof et al. (2002) were mentioned with their "pragmatic" approach towards competence definitions. They distinguish certain dimensions in the various definitions. One dimension refers to how broad or narrow the context is. The context may range from professional field or culture to specific roles in the profession. Another dimension involves generic or specific competencies. Are competencies situated in a certain discipline or domain or are they transcending domains and concern competent behaviour in- and outside the profession? An interesting point is whether a competency definition is on the surface or deep. This concerns specifically the question whether personal traits or characteristics are part of a competency. Some use this elaborated view on competence, others see competencies as instrumental and define competent behaviour as resulting from competencies and personal characteristics. Well known is the "iceberg" model of Spencer and Spencer (1993). Skills and knowledge are "discussable' and observable, as the visible

part of an iceberg, but the self-concept, attitudes, values and personality traits are under the surface , not directly observable but part of the factors that drive professional behaviour.
This is also nicely illustrated by Korthagen (2004) who advocates a more inclusive definition of competence, including personal traits, but presents his "onion" model (see figure 3) that illustrates the more instrumental view of competencies and the integration with personal traits leading to certain behaviour, leading to certain outcomes (change in the environment). This model is mirrored in the integrated view of competence (cf. Hager, 2007) which involves an integration of selected tasks with personal attributes.

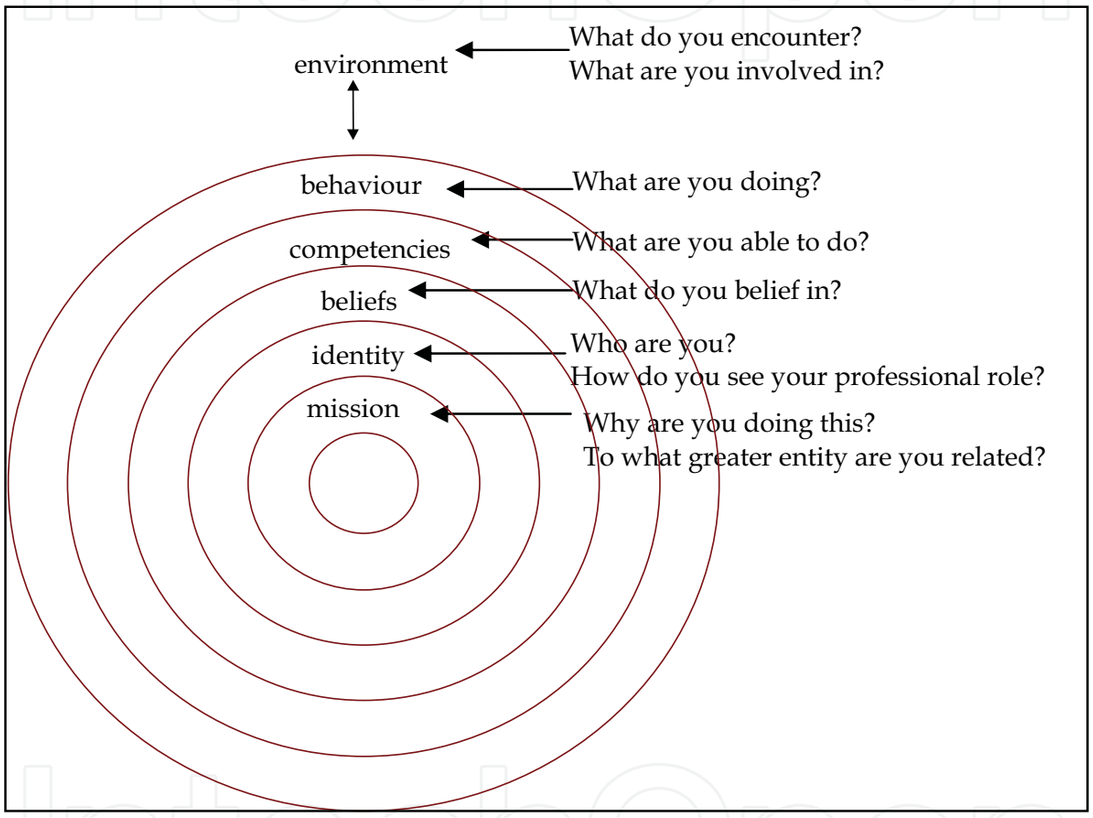


Fig 3. The relation between behaviour, competencies and personal traits. (adapted from Korthagen, 2004)

3. Competence-based (higher) education

The characteristics of competence-based education should be based on the application of recent findings of the cognitive sciences to the concept of competence. Based on the descriptions of CBE by a number of authors Kouwenhoven (2003) has derived a list of characteristics that, together, form the 'archetype' of a competence-based curriculum.

- CBE is oriented to the professional practice. CBE is based on the future occupational practice of the graduate. The curriculum has an integral set-up in which the profession is central (Boyatzis et al., 1996)

- CBE is learner-centred and the learning process is central. The individual worker is central and, based on his 'competence status' (already acquired competencies) the competencies are defined that still have to be acquired and developed. Other aspects of a learner-centred approach in CBE are the use of individualised materials, flexible learning time and a continuous feedback to the learner (Field & Drysdale, 1991)
- CBE has a constructivist approach. Griffioen (2002) uses the metaphor of the network of steel in reinforced concrete to emphasise that the constructivist paradigm together with the concepts of competence forms the backbone of competence-based education. Motschnig-Pitrik & Holzinger (2002) state in a succinct way: "In brief, the main goal of constructivism is competence, not knowledge as in cognitivism, or achievement as in behaviourism." (p. 163). Statements aside, it is known that the quality of the acquired knowledge through active construction is better than passively gained knowledge.
- In CBE the role of the teacher is that of a 'cognitive guide'. Teachers encourage students to engage in active inquiry and make explicit their tacit assumptions. "A constructivist teacher is more interested in uncovering meanings than in covering prescribed material." (Kerka, 1997, p. 1).
- CBE has learning environments focussed on the development of competencies. Disciplinary content is not any more the criterion for arranging the curriculum, but the competencies that should have been acquired and developed by the end of the education programme (Kirschner et al., 1997). In this sense one could speak of designing and developing the curriculum 'backwards', because the knowledge and skills are determined by the competencies that are needed by a competent professional and not by the disciplinary 'body of knowledge'.
- CBE includes the development of generic competencies. Aspects are: generic competencies are integrated throughout the whole curriculum; CBE stimulates the transfer capacity; focus on innovations and problem solving and the explication (definition) of problems; self-reflection and self-assessment play a fundamental role. Everwijn et al. (1993) indicate that in a competence-based curriculum three goals have a role to play. Important is and remains the determination of the disciplinary and functional subject areas. The second goal involves the development of general skills or competencies. Principles and strategies underlying general skills provide the student with an insight that teaches him to abstract from specific situations (decontextualisation) and to purposefully work towards the specific situation from the abstract (contextualisation). Finally the development of the capability of "learning to learn" is important. This is partly realised by a teaching-learning process involving the development of general skills, partly by emphasising a reflective attitude as such. This requires as well assessment that enables the student to reflect on what has been achieved and what still has to be learned. Such assessment may lead to personal learning arrangements, often formulated in a Personal Development Plan.
- In CBE assessment focussed on competencies. Aspects are: mainly assessment of competencies, rather than knowledge and skills; assessment is both formative and summative and forms an integral part of the process of the development of competencies.
- In CBE curriculum development is based on the elaboration of profiles and identification of competencies. Domain-specific knowledge and skills are determined

by the competencies that are needed by a competent professional and not by the disciplinary "body of knowledge".

In practice one might find educational programmes that are to a greater or lesser extent competence-based. Based on research on the practice of competence-based education in Belgian educational institutions, Dochy and Nickmans (2005) describe four categories of competence-based curricula that show an increasing degree of competence-based characteristics. Describing the influence of 'competence thinking' in the categories might be illustrative. This is done in table 1, below.

The influence of 'competence thinking'	
Category 1: **Purposeful education, new objectives and new teaching and learning approaches**	• Professional practice point of departure • Competencies decomposed into knowledge, skills and attitudes • More attention for application of knowledge and for skills • Inclusion of generic competencies • Emphasis on active learning
Category 2: **Integration via cases**	• Knowledge, skills and attitudes formulated as separate objectives, but always strongly linked to professional practice and often leading to integration • Use of realistic (authentic) situations • Cases often used in teaching/learning and in assessment • Also problem-based learning and project work
Category 3: **Learning and development trajectories**	• Inclusion of learning (development) pathways in the curriculum • Systematic and gradual development of competencies • Emphasis on generic competencies • Increasing complexity and decreasing guidance and coaching • Learning to learn is the ultimate goal • Not only assessment and evaluation of performance of student (in terms of knowledge, skills and attitudes) but also of personal development
Category 4: **Demand-driven, aimed at development of competencies**	**Separate teacher directed and student directed parts** • From teacher: authentic tasks with increasing complexity and decreasing guidance • From student: formulation of personal development plan • Practical problems lead to input by teacher
	Completely demand-driven • Start with a broad, open assignment • Student formulates learning questions • Student, guided by teacher, formulate personal development plan and related competency matrix • Student indicates what competencies will developed when and at what level

Table 1. Four categories of competence-based curricula. (From Dochy & Nickmans, 2005)

From the example above the message can be deduced that engaging in competence-based curriculum development requires conscious, more or less radical choices. It is, at the same

time, clear that there is not one competence-based curriculum model that can be considered to be the standard.

4. Pains and pitfalls in competence-based education

Competence-based higher education is not undisputed. One of the dangers that critics often mention is the minor role of disciplinary knowledge, together with a haphazard taking in of pieces of disciplinary knowledge by students. It is feared that students do not acquire a coherent view on the body of knowledge in their discipline that is thought necessary for an academic profession or the scientific endeavour. It is clear that knowledge in CBE supports the development of competencies and that the acquisition of knowledge takes place in the context of (professional) application. However, CBE learning environments include learning assignments and learning practices. Without knowledge the learning tasks cannot be performed, certainly not at academic level. Higher education is characterised by scientifically sound and creative-critical analysis and solving of unstructured, complex problems. Students need therefore to develop academic (generic) competencies that only are transferable when they possess enough high quality knowledge of the discipline. What one knows determines what one sees and not the other way around (Kirschner et al., 1997).

Barnett (1994) elaborates criticism on CBE from the viewpoint of the importance of knowledge and deep understanding in academic education. Developing deep understanding takes time. It implies a broad and firm basis of disciplinary knowledge. Competence-based curricula lead, in the view of Barnett to loosely coupled modules, blocks, projects that undermine the quest for deep understanding. Although modularisation increases the responsibility and the opportunities for the students to determine their own learning paths, but it also leads to fragmented learning experiences for the students. The diminished importance of disciplinary knowledge is seen as a serious danger. Disciplines are considered the 'social facts of academic life'. Research (mainly action research) and all kind of skills (enterprise skills, communication skills, ICT skills) are addressed without much disciplinary groundwork. Barnett introduces a broader concept of professionalism that not only refers to adequately performing tasks that relate to professional practice but also professional behaviour that is fed by an academic-humanistic education. He makes a plea for a curriculum based on a 'liberal vocationalism'.

Developing (academic) competence in a certain discipline requires, amongst other things, a well organised and flexibly accessible domain-specific knowledge base (De Corte, 1996). Everwijn et al. (1993) when writing on transfer emphasise that a rich knowledge base – which contrasts experts' and novices' performances – seems to be the real power behind good thinking within a domain-specific situation. Specific knowledge and skills are necessary to discover similarities and differences between old and new professional situations. Another related danger of the practice of CBE is that it is narrowed down to the acquisition of thinking styles, attitudes and schemes for problem solving related to a specific profession (Wendrich et al., 2005). Scientific knowledge shifts to the background and is subordinate to what is need for solving realistic professional problems. There seems to be no role for reflection on the theory and the relevance of theoretical insights for the professional acting. Perrenoud (1999) speaks, in this context, about creating a new proletariat.

Two more criticisms on CBE that are often voiced concern the behaviourist approach and the view that CBE is basically economically driven. Too much behaviourism in CBE leads to

an excessively reductionist, narrow, rigid, atomised approach (Macfarlane & Lomas, 1994). It ignores connections between tasks and attributes underlying performance (Kerka, 1998). So, CBE should include more generic competencies (core skills, key competencies, essential skills, foundation skills). Emphasis should be put on teaching and learning activities and in assessment on the "..general ability to learn and apply competencies in many different aspects of a person's activities" (Fleming, 1993). Provided the acquisition and development of competence imply a growing ability to choose, develop and adapt abilities to address new situations in a creative, innovative research-like way, CBE will better respond to the demands of daily practice than knowledge-driven traditional models of professional training (Diwakar, 2002). Best seems the broad holistic view (also called integrated or relational). Competence is seen as a complex combination of knowledge, attitudes, skills and values displayed in the context of task performance. In this view there is no trained behaviour but thoughtful capabilities and a developmental process.

In the political criticism CBE is seen as a means to satisfy employers' needs for a skilled work force. Wendrich et al. (2005) speak of CBE as the potentially pedagogical condensation of human capital theory, cognitivism/constructivism and neotaylorism.

Regarding the implementation of the intended curriculum it is extremely important that intended learning outcomes (competencies) teaching & learning approaches and assessment are aligned. There are various threats to this proper alignment. University rules and regulations may prohibit innovative approaches, for example, to assessment. Accreditation Boards may demand strict adherence to a traditional approach. Reforming a curriculum towards a more competence-based approach implies more autonomy for the educational institution offering the educational programmes. This may conflict with existing bodies who are in favour of a centralistic approach, for example through central examinations.

New ways of teaching and learning, creating rich learning environments, designing new forms of (authentic) assessment also require intensive training and coaching of academic staff and a continuously applied monitoring and evaluation of the curriculum in action.

One way of dealing with the pitfalls of superficial learning through CBE in Higher Education has been a focus on the question what makes education "academic" or what academic competencies students should acquire in higher education programmes. In the competence-based education of academic professionals in the Netherlands, including researchers, the acquisition and development of academic competencies has a central role in the undergraduate curriculum. Three technical universities and one 'general' university have formulated seven academic competencies (Meijers et al., 2005). Three are related to the domain/discipline and include being competent in one or more scientific disciplines (refers to existing knowledge), and being competent in doing research and designing (related to knew knowledge and artefacts). Three academic competencies related to 'methods' and include the scientific approach (specific for the natural sciences), basic intellectual skills and competence in co-operating and communicating. The relation with the context is formulated in the seventh competency in taking into account the temporary and societal context. See Figure 4 for an overview and table 2 for descriptions of the seven competencies.

Some academic programmes, such as the academic teacher education programmes are fully based on the formulation of core competencies, including the underlying attributes in terms of knowledge, skills and attitudes. In the design of learning environments meaningful, authentic contexts are essential. As far as teaching and learning methods are concerned, in

CBE various approaches can be found: problem based learning, project based education, case based learning, and dual learning with internships in the world of work.

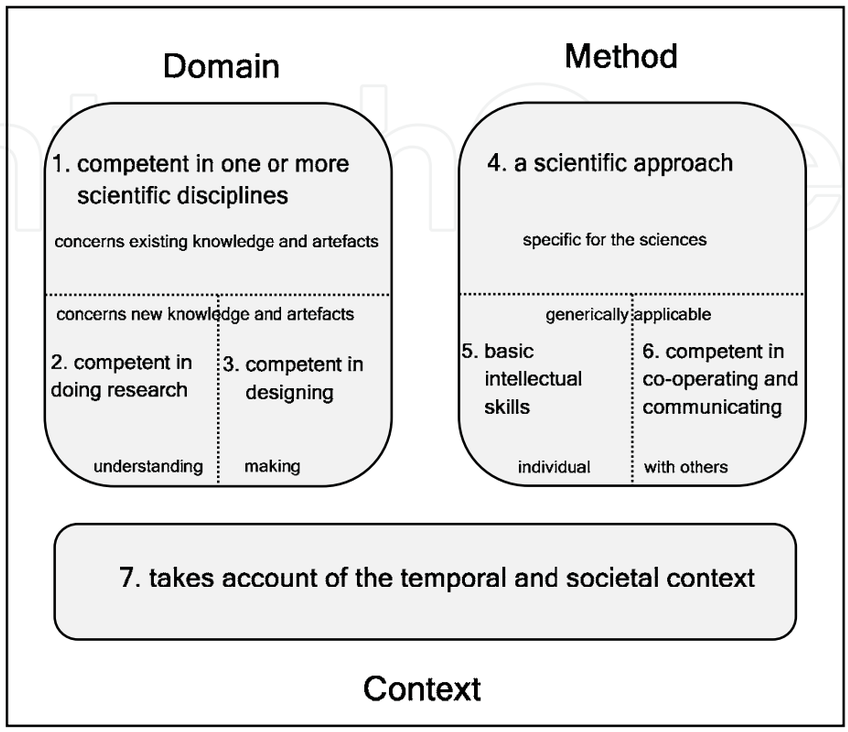


Fig. 4. Academic competences. (From Meijers et al., 2005)

A university graduate:
1. is competent in one or more scientific disciplines
A university graduate is familiar with existing scientific knowledge, and has the competence to increase and develop this through study.
2. is competent in doing research
A university graduate has the competence to acquire new scientific knowledge through research. For this purpose, research means: the development of new knowledge and new insights in a purposeful and methodical way.
3. is competent in designing
As well as carrying out research, many university graduates will also design. Designing is a synthetic activity aimed at the realisation of new or modified artefacts or systems with the intention of creating value in accordance with predefined requirements and desires (e.g. mobility, health).
4. has a scientific approach
A university graduate has a systematic approach characterised the development and use of theories, models and coherent interpretations, has a critical attitude, and has insight into the nature of science and technology.
5. possesses basic intellectual skills

A university graduate is competent in reasoning, reflecting, and forming a judgment. These are skills which are learned or sharpened in the context of a discipline, and which are generically applicable from then on. ***6. is competent in co-operating and communicating*** A university graduate has the competence of being able to work with and for others. This requires not only adequate interaction, a sense of responsibility, and leadership, but also good communication with colleagues and non-colleagues. He or she is also able to participate in a scientific or public debate. ***7. takes account of the temporal and the social context*** Science and technology are not isolated, and always have a temporal and social context. Beliefs and methods have their origins; decisions have social consequences in time. A university graduate is aware of this, and has the competence to integrate these insights into his or her scientific work.

Table 2. Descriptions of seven academic competencies

Students are, through a system of guidance, coaching and formative assessment, increasingly directing their own learning process. The challenge for the lecturers is to integrate the development of meta-cognition of students in their educational activities. Students should, through reflection, develop self-knowledge and insight in their own learning processes.

The teacher in competence-based (higher) education is more the 'guide on the side' than 'sage on the stage'. Apart from this challenge and the important question of designing assessment practices in CBE teachers will also have to answer the following two questions (Van Alebeek & Kouwenhoven, 2006):

- How can teachers learn to construct application oriented learning tasks or select them from contexts that are authentic and meaningful to students?
- How can teachers learn to shape 'steering of self-steering'?

5. Competence-based (higher) education in Africa, some examples

The reshaping of higher education with a more professional orientation is not a phenomenon restricted to Western universities. There is not much literature yet on competence-based higher education in 'developing' countries (Musonda 1999). However, there are design and development projects going on in various countries, often in the context of international cooperation programmes. Mulder (2008) stated in answer on the question what promise competence-based education has for Africa: "In my opinion the same as in other countries: a more relevant curriculum. Graduates who are better prepared. Professionals who are adding more value to development. And university, college and training programs which are more satisfying for students, teachers and potential employers." The author of this chapter has been involved in a Mozambique project and is still involved in the Ghana project as education consultant. In both cases curriculum development projects were undertaken with the aim to design and develop competence-based Masters programmes.

The Eduardo Mondlane University (UEM) in Maputo, Mozambique, decided in 1999 to reopen the faculty of Education that had been closed for 14 years. An installation commission got the assignment to coordinate the process and to design and develop a

curriculum for one graduate and three post-graduate programmes. This project was accompanied by experts from three Dutch universities in the context of Dutch development aid to higher education institutions. At the same time a university-wide curriculum revision process had started with the aim to make the curricula more relevant to the Mozambican society, a sign of the decreasing gap between general (academic) and vocational education. The installation commission for the new education faculty decided to embark on the road toward competence-based education in the faculty. The author of this article worked then at UEM and became a member of the installation commission. Because he decided to start at the same time a research project on the curriculum development process (Kouwenhoven, 2003), he became the "designer-researcher" in the project. His design activities, with input from a curriculum expert of the Dutch Twente University and from various stakeholders led to the formulation of a number of curriculum aspects or elements of an intended (ideal) competence-based curriculum.

The further development towards a formal curriculum (laid down in a curriculum document) started with a needs assessment, administered to representatives of relevant professional communities in Mozambique. The four main questions were:

- Are the options chosen for the educational programmes (graduate programme in psychology, post-graduate programmes in adult education, science & mathematics education, and curriculum & instruction development) legitimised by the professional communities? This question received a positive answer.
- What professional profiles can be described for the programmes? The resulting profiles formed the basis for the formulation of graduate profiles.
- What (generic) competencies should be developed in the educational programmes?
- What input could the professional communities give to methodological and logistical aspects of the curriculum? By and large the competence-based approach was endorsed by the respondents.

The design and development process led to a curriculum document and the description of some courses of the common core programme for the three post-graduate programmes. The programmes would have a duration of two years, 80 weeks. The common core programme would take 30 weeks, followed by a specialisation phase of 20 weeks. The remaining 30 weeks would be used for the research project, leading to Masters title.

The designer-researcher (author) and four external curriculum experts evaluated the formal curriculum on competence-based characteristics. It was concluded that the graduate profiles and descriptions of domain-specific and generic competencies matched the outcomes of the needs assessment. The curriculum document contained guidelines for the development of competence-based learning environments and recommendations for formative assessment through a student portfolio. However, it was not always clear how the (disciplinary) content related to the graduate profiles. Integration of content, especially in the common core programme was not visible. Another concern was that the integration of generic competencies into the various courses was not sufficiently worked out. It was also observed that more study and reflection was needed on the role of (disciplinary) knowledge in competence-based programmes for higher education as well as the importance of institutionalised contacts with professional practice in the Mozambican context.

A reconstruction and analysis of the early implementation of the common core of the Masters programme showed a promising start of most courses in the programme from a competence-based perspective. The input of foreign lecturers meant that not always

competence-based learning environments were created. For example, a strategy to increase the autonomy of students was lacking. The local staff was still not capable to reflect on their educational practices and to guide and coach students towards self-reflection and self-direction. However, results of interviews with students and course evaluations show that students indicated the impact of the programme on their work (most students were part-time) and their further development of generic competencies. Students also showed a sound comprehension of the concepts of competence and competence-based education. A few years after the implementation of the competence-based curricula, further monitoring was undertaken in the area of generic competencies through a formative evaluation exercise (Van der Linden & Mendonça, 2006).

In Ghana, the Institute for Educational Administration and Planning (IEPA) at the University of Cape Coast is presently assisted in the design and development of a new Masters programme in Management in Tertiary Education. The need was felt for a more practice-oriented programme while, at the same time, the nature of the MPhil programme would require a heavy academic (research) input.

In an initial meeting between the author of this paper and staff of IEPA the decision was taken to design and develop a competence-based programme with all (nine) staff of the institute. This served as well the purpose of equipping the IEPA staff with knowledge and skills in the area of curriculum development. Nine workshops have been held in which various aspects of curriculum and course development, and competence-based education were presented and applied to elements of the new curriculum. Various examples of competence-based management education programmes served as an illustration of possible routes to take. In parallel with the workshops the curriculum development process started along the above mentioned "Royal track", indicated by the following steps:

- Formulation of a professional profile. It was decided to concentrate first on a programme for middle-managers of Polytechnics (Deans and Heads of Department). A list was composed of 16 key tasks, subdivided into a total of 74 sub-tasks. This list was submitted for validation to Heads of Department of the ten Polytechnics in Ghana. As a result some tasks were rearranged and reformulated. Table 3, below gives the 16 key tasks.
- Formulation of graduate profile. The list of 16 core competencies related to the 16 key tasks was compressed to a graduate profile with 9 core competencies. These core competencies could be seen as the intend learning outcomes of the Masters programme and describe the competence of a graduate as an academically acting head of Department in a Polytechnic with a strong research attitude towards her/his professional behaviour. Because of the importance of research the ability to carry out and to promote research was added as a tenth core competency. The graduate profile is given in Table 4.
- Elaborating competency descriptions. The ten core competencies were elaborated in terms of a description of the competency, outcomes of the behaviour that requires the competency, and some characteristic situations in which the competency would be used. An example is given below, in Table 5, for the first core competency in the graduate profile.

Educational Leadership
1. Designing, developing and implementing the curriculum
2. Developing, conducting and disseminating research
3. Providing community and outreach services
4. Establishing and maintaining academic quality
Organisational Leadership
5. Managing human resources (academic and non-academic)
6. Managing information and communication
7. Managing finances
8. Managing physical resources
Administrative Leadership
9. Interpreting and implementing institutional policies, rules and regulations
10. Planning and implementing departmental/faculty development
11. Organising and coordinating departmental programmes
12. Linking department with other levels and divisions within the institution
13. Linking the department with the community and external institutions and agencies
Supervisory Leadership
14. Monitoring staff and student activities
15. Evaluating staff and student performance
16. Maintaining staff and student discipline

Table 3. Key tasks of Heads of Department in Polytechnics

Ten core competencies for HoDs
1. Curriculum development and implementation
2. Providing community and outreach services
3. Planning and implementing departmental/faculty development
4. Managing Human Resources
5. Managing records
6. Managing Physical Resources
7. Monitoring staff and student activities
8. Evaluating and supervising staff and student performance
9. Maintaining student and staff discipline
10. Research

Table 4. Graduate profile for the Masters programme in Management and Leadership in Tertiary Education

- A next step involved the formulation of competence components to be addressed by the new curriculum. Knowledge and skills linked to core competencies were listed. Attitudes were combined with personal traits and listed for all key competencies together. The question what traits and motives does a HoD need to have in order to be a competent professional is important, because it asks to discuss whether an educational leader should have a certain personality. As stated before in this chapter required/competent/'up-to-standard' behaviour results from the use of necessary competencies, and is co-directed by personal qualities.

1. Curriculum development and implementation competency **Description** HoDs are competent in curriculum development and implementation when they are able to – design and develop a curriculum, including a description of rationale and mission, aims and objectives, content, learning activities, role of teacher, materials and resources, grouping, location, time , assessment; – write a project plan for the design and development of a curriculum (including timing and budget); – organise try-outs of a new curriculum, including training of teachers, and refine, based on thorough evaluation; and – implement the curriculum (adopt and disseminate it to a target group). **Outcomes of the behaviour that requires the competency** They achieve with this competency a curriculum that is relevant to the (ever changing) needs of society and the learners. **Characteristic situations** – When there is a change in national philosophy/orientation (social, political, economic, technological gap). – When there is a contemporary challenge (problem) confronting the nation (disasters, epidemic). – An educational gap.

Table 5. A (core) competency description or competency statement

- The knowledge items that were formulated based on the ten core competencies could be condensed to 6 themes. These themes could then again be related to key competencies as shown in Table 6.

Themes	Core competencies
Instructional leadership	• Curriculum development and implementation
Leadership in educational institutions	• Planning and implementing departmental/faculty development
Supervisory leadership	• **Evaluating and supervising staff and student performance** • **Maintaining student and staff discipline** • **Monitoring staff and student activities**
Leadership and management in extramural relations	• Providing community and outreach services
Administration management & leadership	• Managing Human Resources • Managing Records • Managing Physical Resources
Leadership in research	• Research

Table 6. Themes and core competencies

- Generic skills were grouped into the following generic competencies:
  - Problem solving skills
  - Communication

  - ICT skills
  - Human relations (rephrased to "Interpersonal skills")
  - Leadership skills:
  - Critical/analytical thinking
  - Learning to learn (meta-cognitive skill)
  - Self-reflection (meta-cognitive skill)
- In the next step the curriculum structure was designed and further shaped with courses. It was decided to start with a part-time programme, consisting of 6 semesters. Each of the first three semesters has two blocks. In a block two courses are given in a face-to-face period of four weeks, followed by four weeks where students apply knowledge, practice skills and work further on their competence development. So, there will be in total 12 courses, given in 6 blocks in 3 semesters. The remaining semesters are used for the research project, leading to the Masters thesis.
- Apart from the 12 courses two "learning lines" have been designed, running throughout the first three semesters. They are dealing with research and with personal development. In general 30 hours in a block will be devoted to course work and 10 hours to activities in the learning lines.
- Guidelines for assessment and for creating rich learning environments have been formulated. IEPA staff has been engaged in further developing the courses and producing course outlines.

It should be noted that the author is in this project not acting as designer or designer-researcher as was the case in the Mozambique project. Although outcomes of the design and development process are validated by stakeholders and external experts it is in first instance the IEPA staff itself that determines what form and content the new curriculum will have. It guarantees ownership by the staff could reduce the distance between intended and enacted curriculum.

The author of this chapter is involved as well in the design and development of Masters programmes in Ethiopia and Vietnam. In these cases the competence-based approach has been introduced at a later stage, when the content of courses had been established already. Although the Ethiopian and Vietnamese curriculum developers and courses designers felt helped particularly in a conceptual sense by the competence-based approach – in the end they both want more practice-oriented programmes – it proves much more difficult to develop internally consistent programmes. The experiences from Mozambique and Ghana show that following the "Royal Track" in one or another way makes it easier to end up with programmes that are academically sound and valuable for the professional practice.

6. Conclusion

Present society is characterised by its growing complexity, dynamics and knowledge intensity. This requires professionals who are able to face confidently and expertly new situations and problems. In case of academic professionals they should possess, next to a broad and profound domain-specific knowledge and skills, the capability to acquire expeditiously knowledge and know-how where and when needed. Learning in a professional context has, therefore, become more important and general academic education is becoming more professional or professionally oriented. In this perspective competence-based education could be an appropriate choice. In such education students learn to act competently in an

academic/scientific way as citizen of a modern society (learning for life), in professional situations (learning for a profession), on the labour market (learning for a career) and in the own learning processes (learning to learn). This requires fundamental changes in curriculum, including the roles of students and teachers. Developments in higher education in Mozambique and Ghana, and many more countries in the Southern hemisphere, show that in a globalised context problems and challenges in education are becoming more and more similar. International cooperation may contribute to the exchange of experiences and discussion of important issues with respect to competence-based education. Some these issues concern the involvement of students and teachers in the design and development of competence-based curricula, how to keep them motivated in long-term processes of curricular change, and, most of all, the question of the (academic) knowledge base of competencies.

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Technology Education and Development

Edited by Aleksandar Lazinica and Carlos Calafate

ISBN 978-953-307-007-0
Hard cover, 528 pages
Publisher InTech
Published online 01, October, 2009
Published in print edition October, 2009

The widespread deployment and use of Information Technologies (IT) has paved the way for change in many fields of our societies. The Internet, mobile computing, social networks and many other advances in human communications have become essential to promote and boost education, technology and industry. On the education side, the new challenges related with the integration of IT technologies into all aspects of learning require revising the traditional educational paradigms that have prevailed for the last centuries. Additionally, the globalization of education and student mobility requirements are favoring a fluid interchange of tools, methodologies and evaluation strategies, which promote innovation at an accelerated pace. Curricular revisions are also taking place to achieved a more specialized education that is able to responds to the society's requirements in terms of professional training. In this process, guaranteeing quality has also become a critical issue. On the industrial and technological side, the focus on ecological developments is essential to achieve a sustainable degree of prosperity, and all efforts to promote greener societies are welcome. In this book we gather knowledge and experiences of different authors on all these topics, hoping to offer the reader a wider view of the revolution taking place within and without our educational centers. In summary, we believe that this book makes an important contribution to the fields of education and technology in these times of great change, offering a mean for experts in the different areas to share valuable experiences and points of view that we hope are enriching to the reader. Enjoy the book!

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Wim Kouwenhoven (2009). Competence-based Curriculum Development in Higher Education: a Globalised Concept?, Technology Education and Development, Aleksandar Lazinica and Carlos Calafate (Ed.), ISBN: 978-953-307-007-0, InTech, Available from: http://www.intechopen.com/books/technology-education-and-development/competence-based-curriculum-development-in-higher-education-a-globalised-concept-

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