# european
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30 YEARS – EUROPEAN JOURNAL

**30**

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to present analyses and various, at times
contradictory, points of view. The journal
wishes to contribute to critical debate on
the future of vocational training at
European level.

Cedefop assists the European Commission in encouraging, at Community level, the promotion and development of vocational education and training, through exchanges of information and the comparison of experience on issues of common interest to the Member States.

Cedefop is a link between research, policy and practice, helping policymakers and practitioners, at all levels in the European Union, to have a clearer understanding of developments in vocational education and training and to draw conclusions for future action. It stimulates scientists and researchers to identify trends and future questions.

The *European journal of vocational training* is provided for by Article 3 of the founding Regulation of Cedefop of 10 February 1975.

The journal is nevertheless independent. It has an editorial committee that evaluates articles following a double-blind procedure whereby the members of the Editorial Committee, and in particular its rapporteurs, do not know the identity of those they are evaluating and authors do not know the identity of those evaluating them. the committee is chaired by a recognised university researcher and composed of researchers as well as two Cedefop experts, an expert from the European Training Foundation (ETF) and a representative of Cedefop's Governing Board.

The *European journal of vocational training* has an editorial secretariat composed of experienced researchers.

The journal is included in the list of scientific journals recognised by the ICO (*Interuniversitair Centrum voor Onderwijskundig Onderzoek*) in the Netherlands and is indexed in the IBSS (International Bibliography of the Social Sciences).

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# Celebrating 30 years
# of the Cedefop Bulletin

**Éric Fries Guggenheim**

VOCATIONAL TRAINING
INFORMATION BULLETIN
of the European Centre
for the Development of Vocational Training

This was the exact title given to our magazine when it appeared in summer 1977 as a 24-page A4 booklet published in six languages, Danish, Dutch, English, French, German and Italian.

The very first Bulletin featured the following CONTENTS:

and EDITORIAL

This is the first issue of the Vocational Training Bulletin to be published by the European Centre for the Development of Vocational Training.

In doing this the Centre is continuing the work done by the Directorate-General for Social Affairs of the Commission of the European Communities in establishing and developing the Bulletin.

The Bulletin will be published as part of the Centre's Information Service and will carry information and articles in support of the Centre's work programme of seminars, conferences and study projects.

It is the wish that the Bulletin should also further the discussion and exchange of ideas on matters relating to vocational training of interest on a Community-wide basis.

Readers are invited to express their views on the Bulletin and to make proposals for subjects to be dealt with in this publication.

In view of the amount of material arising from the inauguration of the Centre and the Zandvoort Seminar the Information and Bibliography sections of this issue have been curtailed.

The Bulletin was the forerunner to the *European Journal of Vocational Training*. While we might not necessarily look back on these early years with nostalgia, they nonetheless evoke fond memories of this brave little magazine which would grow into the scientific Journal which you all know and of which we are so proud today.

To celebrate its thirtieth birthday, the European Journal held an Agora Thessaloniki on a subject which, although important, still receives relatively little attention in our field of competence: 'Higher Education and Vocational Education and Training'.

By the time you read this editorial, the Agora will have been held in Thessaloniki, on 22 and 23 February. In line with the 'Agora' concept created at the instigation of Jordi Planas ten years ago, in July 1997, and further developed by Cedefop in Thessaloniki since then, this Agora was an opportunity for a small number of researchers, policy-makers, social partners and all those engaged in the field –teachers, trainers, heads of vocational education and training (VET) – to meet and freely discuss the relationships existing between secondary VET and university education and between VET at tertiary level and general university education. It dealt with a whole range of fundamental issues concerning the difficulty in establishing a genuine equal status between vocational and general education and training, both at secondary and at higher level. It also provided a forum for discussing the bridges and pathways that already exist between vocational education and general education, and those that may be developed, both when moving from secondary to higher level and within higher education itself. Lastly, it was a chance to take stock of the influence of European initiatives [the Bologna Process, the European Qualification Framework (EQF), the European Credit Transfer System (ECTS), etc.] on the shifting boundaries between vocational higher education and general higher education.

Participants came to initiate a dialogue based on the information they provided and to contribute to this dialogue, drawing on their expertise in the issues discussed. But they also had another mission. Their involvement in fact constituted the first public unveiling of the framework of articles to be published, after review by the Journal's editorial team, in a special edition due out in 2008.

The basic idea behind this Agora was to ensure the authors discuss face to face not only with the academic researchers present, something they are used to, but also with Cedefop's other stakeholders attending the Agora, policy-makers and those working in the field of vocational education and training – undoubtedly a new experience. The authors can now incorporate the lessons they learned from the discussions into their articles, enabling us to publish an edition of the European Journal of Vocational Training containing scientific articles that integrate a significant element of collective thinking ([1]).

Thirty years after its creation, the journal remains faithful to the tone set in the editorial of Bulletin No. 1 back in 1977.

It still considers its primary mission to be to 'further the discussion and exchange of ideas on matters relating to vocational training of interest on a [European Union]-wide basis'.

And 'readers are [of course still] invited to express their views on [the Journal] and to make proposals for subjects to be dealt with in this publication.'

On its thirtieth birthday, we invite you all to join us in wishing the journal 'many more years to come!' Or, as we say here in Greece, Cedefop's adopted country, 'Να ζήσει' ([2])!

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([1]) The philosophy behind this Agora, the 25th held by Cedefop, and the agenda can be viewed on the website: http://www.trainingvillage.gr/etv/news/default.asp?idnews=2245
([2]) 'Long may it live!'

Introduction to the special issue on competence

# Competence – the essence and use of the concept in ICVT

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## Introduction

The concept of competence has gained a lot of attention over the past decades. Some scholars believe we do not need the concept at all, because the vocabulary to describe, plan, implement and evaluate (vocational) education and training is sufficient, others do not see much proliferation of the concept, and still others believe competence development is difficult to measure. Many of these judgements depend on the context in which the sceptics are working. When one is focused on the concept of competence in education and training and its application in practice, it is hard to avoid it, at least in Europe.

Let me describe what happened during my travels to and from Thessaloniki while I was working at Cedefop during the academic year 2004-05. On a mountain road, the SR 48, through the Dolomites near Cortina d'Ampezzo I came across a road sign with the words 'tratta di competenza'. When on mission from Thessaloniki to Wageningen with a car rented at Cologne airport, the first thing I saw was a car with a German number plate, beneath which I read the advertisement: '*Kompetenz für Volkswagen*'. And a little further on I overtook a lorry bearing the huge characters: '*Kompetenz für Gemüse*' (competence for vegetables).

## Historical roots

Walking through the Louvre I saw the code of Hammurabi (1792-1750 BC), with the epilogue translated into French: '*Telles sont les décisions de justice que Hammurabi, le roi compétent, a établie pour engager le pays*

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(¹) Available from Internet: http://www.papert.org/articles/freire/freirePart1.html [cited 2.6.2006].

*conformément à la vérité et à l'ordre équitable.'* Of course I also took the opportunity to search for roots of the concept in the ancient Greek language, since I was already aware of the Latin, English, French and Dutch roots. Dictionaries give the following meaning for the (English) concept of competence: 'To a sufficient extent possessing means for livelihood, and the quality or state of being competent. Possessing required or adequate abilities or qualities, being judicially qualified or adequate and having the availability of the capacity to function or develop in a certain way'. In Latin one can find '*competens*', as being able and allowed by law/regulation, and '*competentia*', as (cap)ability and permission. The use of the western European words 'competence' and 'competency' date back to the early 16th century. The first use in the Dutch language dates back to 1504.

Indeed, in ancient Greek there is an equivalent for competence, which is *ikanotis* (ικανότης). It is translated as the quality of being *ikanos* (capable), to have the ability to achieve something; skill. *Epangelmatikes ikanotita* (επαγγελματικής ικανότητα) stands for professional/vocational capability or competence. This should not be confused with *dexiotis* (δεξιότης) which is more related to cleverness, as in the expression 'αμαθία μετά σωφροσούνης ωφελιμώτερον ή δεξιότης μετά ακολασίας' (*amathía metá sofrosoúnis ofelimóteron í dexiótis metá akolasías*) (Lit: ignorance together with wisdom (is) more useful than cleverness together with immorality). The first use of the concept is found in the work of Plato (Lysis 2I5A. 380 BC). The root of the word is *ikano* (ικανό) of *iknoumai* (ικνούμαι), which is to arrive.

In Turkey, while walking through the archaeological museum in Istanbul, I was astounded to see the oldest list of occupations (that I know of) in the world, sculpted in a tablet of terracotta in the form of a heptagonal prism, which comes from the old-Babylonic period in the 18th century BC (the same period as the Code of Hammurabi).

Thus, we see the clear double meaning of the concept of competence, namely 'authority' and 'capability', goes very far back in history.

## The concept of competence in an everyday context

Many authors have struggled with this double meaning, which is no wonder, since the concept is difficult to translate, and gets its meaning in the context of text and practical use. Let me give some examples from the EU translation service (http://europa.eu.int/eurodicautom/Controller [cited 23.2.2006]) (the texts are from this site, with small modifications). When entering the Dutch equivalent of qualification, authority, power, jurisdiction ('*bevoegd*'), one finds examples of equivalents as listed below:
- an appropriate body;
- an approved medical officer;
- an accredited laboratory; a testing laboratory to which accreditation has been granted;

- authorised use;
- an authorised user of data;
- a certificated mechanic; a person who holds a valid mechanic's certificate
- a certified pilot; a pilot who has a licence to fly an airplane;
- a competent authority; this can be the Minister, ministers or other equivalent authorities responsible for social security schemes in respect of each Member State, throughout or in any part of the territory of the State in question;
- an area of Community competence.
- a competent institution; which can be (a) the institution with which the person concerned is insured at the time of the application for benefit; (b) the institution from which the person concerned is entitled or would be entitled to benefits if he or a member or members of his family were resident in the territory of the Member State in which the institution is situated; (c) the institution designated by the competent authority of the Member State concerned;
- a competent witness;
- the court entertains jurisdiction;
- a judge entertaining jurisdiction;
- a licensed aircraft engineer; a person licensed by the competent authority to certify that the inspection tests required by the current regulations have been done;
- a qualified official;
- a qualified person; a person who, having complied with specific requirements and met certain conditions, has been officially designated to discharge specified duties and responsibilities.

So there is a mix of meanings for the concept of competent that are related to: accreditation, appropriateness, approval, authorisation, certification, entitlement, jurisdiction, licence, responsibility, qualification and right. The contexts in which the concept is used can be categorised as institutional, jurisdictional, organisational and personal.

All this can make the concept of competence quite confusing, and it is no surprise that so many differences of opinion exist about the meaning of it. We can say that the concept has only two essential meanings, which is authority (in the sense of possessing the responsibility, licence or right to decide, produce, serve, act, perform or claim) and capability (in the sense of having the knowledge, skills and experience to perform), as mentioned above. But the more concrete meaning of the concept depends strongly on the context.

# Competence: professional use in recent history

In this section I will describe the development of the concept of competence as it emerged during the second half of the 20th century (based on Mulder, 2002).

McClelland (1973) stated that the predictive validity of the classical way of testing intelligence was limited, and he stated in front of the testing community that testing competence would be better in predicting success. In this line, the often cited work of Boyatzis (1982) can be posited. He developed a list with 10 skills and two traits, which could differentiate more successful from less successful managers. Similar lists have been produced by Schroder (1989) and Spencer (1983). These lists are compiled according to a certain method. In short, this is a normative process with which different assessors generate and evaluate lists of characteristics of excellent performers. This leads to a list with general competencies of different categories of management jobs. The list is referred to as a competency model and can be used as a reference framework for assessing and developing managers. By applying this methodology in management selection and development, the method of management assessment centres is created.

The method of developing competency models was also adapted for use in organisations.

Developing competency profiles to select managers and top managers remained particularly popular throughout the 1980s and 1990s and many researchers were involved. Finn (1993) refers to the related work of many other researchers, such as Klemp (1980; 1981) and Cockerill et al. (1989). He also refers to related work in the United Kingdom, such as that by Dulewicz and Herbert (1992), by Kakabadse (1991) and Barham and Devine (1990).

In 1978, Gilbert's influential *Human competence. Engineering worthy performance* appeared, one of the first contributions in which the concept of competence was linked to performance. Gilbert defined competence as a function of worthy performance (W), which is a function of the ratio of valuable accomplishments (A) to costly behaviour (B). He expressed this in the formula $W = A/B$. He thereby established that the value of performance was a function of accomplishments (that which is achieved, for example, goals accomplished) and the costs of behaviour (for example, wage costs, time or energy). The value of performance rises as results achieved increase and the costs of the behaviour necessary to achieve these results decrease.

The measure for competence used by Gilbert is the performance improvement potential. This states that actual behaviour is inversely proportional to the potential for improving performance (the PIP). The PIP is the ratio of exemplary performance to typical performance. He adds that the

ratio must be established for an identifiable result, so that no general quality of competence is created. This produces the following formula: PIP = Wex/Wt.

Gilbert also developed a performance matrix in which there are three horizontal elements: models, measures and methods. There are six vertical elements: the philosophical level (starting points, values and norms), the cultural level, the leadership level (institutional), the strategic level (performance as a function), the tactical level (tasks) and the logistic level. This matrix enables users to chart performance and to improve it with the aid of various methods and techniques.

In the 1970s and 1980s there was considerable interest in competency-based teacher education and corporate training. The problem was to identify on which basis teachers should be trained. Educationalists influenced by behaviouristically-oriented systems theorists such as Skinner (1968), and Mager (1984), favoured the competency approach. Maslow's (1954) work was also popular at the beginning as was Rogers' (1969) later. They gathered much support and there was a dispute between champions of competency-based teacher education and advocates of a humanistically-based form of teacher training. Soon afterwards the socially critical school, with protagonists such as Beyer and Apple (1988), emerged, accusing the two other schools of lacking interest in the social issues underlying education. Nevertheless, an approach to teacher training based on competencies did lead to developing improved competency profiles for teachers (Turner, 1973; Joyce and Weil, 1980). Teachers' behaviour formed the basis of the competency approach to teacher training. Later research showed that the behaviour of teachers was more strongly influenced by their own views (concepts) and personal theories than behavioural training. Research by Argyris (1976) into the development of leadership and by Schön (1983) into the reflective practitioner is also along these lines. As for continuing vocational training, for brevity's sake I shall merely refer to the work by Zemke (1982), Burke (1989), Fletcher (1991) and Blank (1992). Romiszowski's work (1981; 1986) should also be mentioned, as well as that of Dubois (1993). He developed a strategic systems model based on competencies for improving performance in organisations and provides many directions for the steps which must be followed to arrive at a competency-based training offer.

In the United States much attention has been paid to analysing competence to assist autonomous professional development in several occupational groups. McLagan's work is the most well known. In 1983, the pioneering study on training and development competency appeared. This study encompassed intensive research into the competencies of HRD professionals. The HRD competencies identified in 1983 were brought fully up to date in the equally important study 'Models for HRD practice' in 1989. The area of HRD is delineated and divided into three subfields: training and development, organisational development and career development (McLagan, 1989). Some professional associations use competency profiles as a

basis for professional licensing. The American Society for Training and Development (ASTD), by contrast, elected for open use of the profiles. HRD professionals can make independent use of these profiles for their own professional development. Shim (2006) has recently provided a survey of other competency models, both in continuing vocational training and in extension and consultancy. Internationally, work is currently in progress on professional standards for teachers. In the Netherlands these are set out in the Educational Professions Act.

While the amount of interest in competency-based education eased off (temporarily) during the 1980s, thinking about competencies bounced back strongly in the 1990s, but predominantly from writings about management. This time, however, it was not concerned with the selection and development of managers, but with strategy forming instead. The increased importance of thinking about competencies in the 1990s can principally be attributed to the work of Prahalad and Hamel (1990). They argued that organisations in the 1990s should be judged on their ability to identify, cultivate and exploit core competencies to achieve growth. According to these writers, the success of an organisation depended on core competencies. They backed up their ideas with convincing examples taken from business life and made increased turnover the result of concentrating on core competencies. Organisations had to move towards developing products that were 'irresistibly functional', or where clients had requirements they had not even imagined they had. As the writers had given various convincing examples concentrating on core competencies, making considerable use of Japan as an inventive country with rapid innovation, new products and new markets, many organisations then based their strategies on clearer competencies. Core competencies were understood as being at the root of core products. An organisation with no core competencies would not be capable of developing and producing core products. Pralahad and Hamel also viewed core competencies as collective learning in an organisation, with special relevance to the way in which various production skills were integrated and multiple technology streams coordinated.

A direct continuation of thinking in terms of core competencies of organisations is provided by large undertakings, which as part of large-scale reorganisations stimulate performance and competency policy (Tjepkema et al., 2002). They translated concentration on core competencies in organisations into the management of personnel competencies. Competency management was born, strongly supported in the first instance by international and other consultancies.

Organisations went on to follow different strategies. Some examples of this are: internal development, internal development with external assistance (such as consultants), commercial off-the-shelf solutions (for example by buying in specific competencies) collaborative associations (working together with other organisations to develop competencies within one's own organisation) and fusions and take-overs (Helleloid and Simonin, 1996).

To summarise the developments of the professional use of the concept

of competence, McClelland (1973) pointed at the value of testing based on competence rather than on intelligence, and his work was used in the practice of management selection and development. Gilbert (1978) put the competence concept in a wider framework of performance improvement, at societal, organisational and individual levels. Various authors, including Zemke (1982) and Dubois (1993), applied the concept of competence in education and training. Various professional associations developed competency profiles for professional licence reasons, as well as for self-evaluation and development. Public authorities also developed profiles, such as those for teachers, for assessment and examination purposes. Prahalad and Hamel (1990) were to a large extent responsible for the successful introduction of the concept of core competence in corporate strategy. Because they focused on core competencies, with which processes could be directed, the concept was appealing. It was translated to systems of competence management, which functioned as vocabularies in which expectations and processes could be made transparent. Parallel to these developments the concept was used intensively in developing competency-based vocational training.

## Competence and competency

The concept of competency has undergone considerable development. This is shown not just in academic writings but also in real life.

In my study on competence development in organisations (Mulder, 2002) I compared over 40 definitions of the concept of competence, and I distinguished differences on the following dimensions: job versus role focus, context free versus context specificity; knowledge versus capability, behaviour versus ability, specificity versus generality; learnability versus unchangeability, performance versus development orientation; core versus peripheral capabilities, and the person versus the system as carrier. During the project I was concerned about the difference between competence and competency, but I think this question is less difficult than I previously thought. In an educational context, competence is the general capability of persons (or organisations) to perform (such as an activity, a task, solve a problem) that is developing, and if a programme is successfully completed, the candidate receives a licence. A competency is a part of competence. So I see the relationship between competence and competency as a whole-part relationship. Some colleagues have argued that competence is the UK and competency the US approach, but I am not sure about that. From what I have read I think both terms are being used interchangeably in both language areas.

# Competence in VET development

Given the wide variety in definitions, a legitimate question is whether there exists any coherence in the concept of competence. Weigel and I (Weigel and Mulder, 2006) examined this question in the context of VET development in England, France, Germany and the Netherlands, using work of, among others, Achtenhagen (2005), Arnold et al., (2001), Colardyn (1996), Delamare-Le Deist and Winterton (2005), Ellström (1997), Eraut (1994; 2003), Handley (2003), Mandon and Sulzer (1998), Mériot (2005), Mulder (2006), Mulder et al., (2005), Norris (1991), Rauner and Bremer (2004), Sloane and Dilger (2005), Smithers (1999), Straka (2004), Weinert (2001), and Winterton, Delamare Le-Deist and Stringfellow (2005). The critical analyses of the concept were also reviewed. Summarising the comparative analysis of use and criticisms of the concept of competence in the Member States mentioned, we came to the following conclusions.

1. **England**. VET development is driven by objectives of productivity improvement. Since the way to do this best differs a lot by sector, a sector skills development strategy is followed. Initiatives are also strongly outcome-driven, which is directly connected with opportunities and procedures for assessment and accreditation. Competencies are embedded in national occupational standards, in which five levels of competence are distinguished, and national vocational qualifications.
The major criticisms are that the emphasis on competence assessment is unbalanced, and that it frustrates learning and development more than it supports it. Use of the competence concept is reduced to assessment and the ability successfully to demonstrate skills and abilities. Further, a critical comment is that competence is formulated in terms that are too general, which means they do not have any discriminative power in assessments. The link between competence and performance is also not direct. Various competencies can influence certain performance, and certain competencies can influence various fields of performance.

2. **Germany**. In Germany VET is characterised by the dual system. This is the first observation of all studies on VET in Germany. We will not elaborate on the system, since it has been described many times, but we just mention here that it is a strongly regulated system of vocational training with a theoretical and practical part, in which workplace learning plays an important role. Over time, emphasis has been put on general competencies (key qualifications), with a higher level of abstraction and better transfer potential. At present five competence fields are distinguished: action, subject, personal, social and methods and learning competence. Further, learning fields are being introduced (Fischer and Bauer, this issue). Competence development is aimed at work activity, or work process knowledge (Rauner, this issue).
The main criticisms are aimed at the superficial character of competence fields. They should be analysed more thoroughly, directed to-

wards analysis of performance requirements. There is also a fear that the logical order of knowledge domains (traditionally known as subjects) may be lost. In Germany, there is also a question how to determine whether a competency is achieved or not. Another general problem is that developing competence takes a long time, and that some competencies are only applied after graduation, which makes it difficult to assess them during the training programme. There is a discrepancy between the actual testing that takes place at present and the requirements of competence assessment.

3. **France**. Use of the competence concept is dominated by the 'bilan de compétences' (competence management). Based on a long-standing tradition of regulating continuing VET, France has also regulated this competence management process. There is strong emphasis on competence assessment, to have informally acquired competencies acknowledged. The purpose is to stimulate lifelong learning, and overcome skills shortages. The way in which competence is used in management influenced the development of VET. Competence development has a double focus: the individual who tries to master a certain occupation and structural characteristics that determine the way in which an occupation develops, including professional experience (Suleman and Paul, this issue). There are methods to study occupations and to formulate competencies relevant to VET.

The most critical comments are aimed at the way in which assessments are conducted: contrary to the intentions of the *bilan de competences*, they tend to focus more on VET diplomas than on informally acquired competencies. Use of participatory instruments with a development focus is being neglected. Further, the *bilan* is also accessible to others than the persons who did the *bilan*, and who initially were not meant to get them. The quality of the assessors and the time allowed for assessments is also a problem. This leads to problems in accepting the results of candidates.

4. **Netherlands**. There is a long tradition in using attainment targets in VET, but it was felt these should be more general, have more transfer potential, and contribute to flexibility and mobility. A qualification structure in VET was introduced by law, which, when implemented, led to many complaints about the mismatch between skills demand in the labour market and skills supply by the VET system. Therefore, at present, VET development is aimed at introducing a competence-based qualification structure (Van der Klink et al., this issue), to prepare new generations of students for more effective performance in their jobs. A system for acknowledging non-formally acquired competencies has also been set up. Many VET institutions are now trying to implement competence-based learning and competence assessment. The experiences are mixed (Wesselink et al., this issue).

The main criticisms are the following. Although not intended, knowledge, skills and attitudes are divided in the competence-based quali-

fication structure. Competencies are being emphasised so strongly that the knowledge component in programmes tends to get too little attention. General subjects are difficult to integrate according to the teachers of those subjects. There are problems with a tendency to lower mastery of basic skills, reliability and costs of assessments (Roelofs et al., this issue), difficulty in using the concept in lower levels of VET, less information and instruction teachers provide, reorganising schools, and varying learning trajectories that make educational programming more difficult.

We concluded there has been, and still is, considerable variation in the meaning of the concept of competence. However, we do not think the concept is useless, although there are many pitfalls (Biemans et al., 2004). The concept is especially relevant in the current discussion on qualifications and skills requirements for the knowledge economy, for employees as well as independent workers and employers in large and small or medium-sized enterprises (Lans et al., 2004). We argue the knowledge world is not enough. Competence is needed.

## The 1994 *European journal of vocational training* (EJVT) issue on competence

I am therefore delighted that this special issue on competence-based vocational education and training appears. It gives a current review of developments of this important concept. It is the second issue on the topic. Various authors (Grootings (1994), Bunk (1994), Parkes (1994), Wolf (1994), Steedman (1994), Alaluf and Stroobants (1994), Méhaut (1994) and Oliviera Reis (1994)) contributed to the previous issue. Let me address two contributions to show that the field has advanced over the 13 years between issues.

Grootings (1994) gave a review of how the concept of competence entered the vocational education development process in various countries in the EU. He stated that in the UK the concept entered the field especially for assessment, output and standards. In Germany, according to the author, discussion on the concept of competence already started in the 1970s, and was related to despecialisation of vocational education, the definition of occupations, and improving learning processes. In Denmark, the same developments took place. In France, the concept of competence was introduced as criticism of traditional knowledge-oriented pedagogy, and became more popular when employee training further developed. The competence approach in vocational education conflicted with existing structures and institutions in vocational education. In the Netherlands at that time, discussion on vocational education was not yet aimed at competencies; competencies were regarded as being similar to qualifications, which were perceived as diplomas and certificates. In Spain and Portugal the

concept of competence was used to develop a system for vocational education and training. There were influences from the UK on developing standards for vocational education, and from France, on employee training. The author draws the conclusion that there were basically two distinct uses of the concept of competence: (a) using a competence-based approach for innovating vocational education; (b) identifying new competences emerging from new ways of organising work and employee selection, and to integrate these in programmes for vocational education.

Use of the concept has changed markedly since then. In the Netherlands, innovating vocational education uses a competence-based approach. The focus of that, however, is not clear (Wesselink, this issue). This became evident in a large college for professional education (Hogeschool) in the Netherlands (41 000 students). Some students complained about the quality of certain programmes this institution provided. The media paid attention to it, and there were several reports on national TV. The defence against the complaints was: the college is implementing competence-based education, which means students have to work independently, in groups, and teachers should be coaches. It takes some time to get used to this way of working. However, there was also a complaint that too much time was taken away from the primary process and that the number of teacher-student contact hours sharply decreased. Comments in the media stated that the introduction of competence-based education takes a long time, and that in general the concept is not always clear. I agree. I suggested carefully selecting experimental locations in which the concept could be studied, such as children's diseases. If successful, the concept could then be transferred to other locations. However, this did not happen, and the concept was embraced by practically all institutions and experts, without having good examples of good practice.

Bunk (1994) described the concept of competence. He stated that it was originally an organisational concept, and he distinguished between use of the concept to regulate responsibilities and decision-making power in organisations or States, and use to indicate the ability of craftsmen. He used the terms formal competence and material competence. Formal competence is the imparted responsibility and material competence the acquired ability. He further stated that only material competence is significant for discussions on vocational education (one can disagree since graduates receive diplomas allowing them to perform certain tasks).

Bunk also distinguished occupation ability, occupational qualifications and occupational competence. For all three concepts, the occupational elements are the same. These are knowledge, skills and abilities (not attitudes). It is strange to have knowledge, skills and abilities as occupational elements of occupational ability, as the concepts differ in scope of action, character of work and organisational level. Occupational ability is defined and founded on individual occupations, is relevant for fixed operative work and externally organised. Occupational qualifications are based on flexibility within occupation, are relevant in unfixed operative work, and are

self-organised. Occupational competence is associated with occupational fields and work organisation, is relevant to free planning of work, in which individuals organise work by themselves. The distinction between these concepts is somewhat problematic. Occupational ability and competence is practically the same. It is the capability to perform an occupation. In fixed operative work, externally organised, for which individual occupations existed, competencies were equally important rather than in occupational fields characterised by a high level of self-management. The point is that different competencies are needed in both contexts. Defining occupational qualifications as something in between occupational ability and occupational competence is also not productive. Indeed, there are work contexts, and ways in which work is organised, but as stated, there are different competencies needed in different work contexts. Qualifications are much more output-related acknowledgements of mastery of certain competencies, mostly represented by diplomas and certificates from educational institutions.

Bunk also gave a productive review of the different categories of competencies. He distinguished between 'specialised competence' (continuity), 'methodological competence' (flexibility), 'social competence' (sociability), and 'participatory competence' (participation). Specialised competence consists of knowledge, skills and abilities: interdisciplinary elements, occupation-specific; extended vertical and horizontal knowledge about the occupation, enterprise-specific, and experience related. Methodological competence consists of procedures: variable working methods, situational solutions, problem-solving procedures, independent thinking and working, planning executing and assessing of work, and adaptability. Social competence consists of modes of behaviour: individual and interpersonal. Individual competencies are the willingness to achieve, flexibility and adaptability, and willingness to work. Interpersonal competencies are willingness to cooperate, fairness, and honesty, and the willingness to help, and team spirit. Participatory competence consists of structuring methods: coordination skills, organisational skills, combinatory skills, persuasion skills, decision-making skills, the ability to assume responsibility, and leadership skills. However, there are also some flaws in this argument, since adaptability is listed as a methodological and a social competency, and under participatory competence only skills are listed. This leads to how the concept of competence is related to skills. Can competencies be separate skill domains? If so, why would it be necessary to use a different concept for these skills? Bunk stated that the four competencies together make up the ability to act, which in his opinion cannot be broken down. Van Merriënboer (1997) showed that tasks are learnt best if they are perceived from a holistic perspective.

# About this issue

There are eight articles from different regions of the EU (albeit six of the eight articles come from Germany and the Netherlands) and different perspectives. They address the meaning of the concept of competence in the didactics of vocational training and curriculum development, implementation of competence-based vocational training, the importance of socio-emotional competence in vocational training, the role of professional experience in competence development, and the key issue of competence assessment.

Reinhold Nickolaus, Bernd Knöll and Tobias Gschwendtner in their contribution describe and critically analyse the didactic change of forms of teaching and learning of vocational training since the mid-1980s.

Renate Wesselink, Harm Biemans, Martin Mulder and Elke van den Elsen present their research on competence-based vocational training as seen by Dutch researchers. They state there is no consensus on a model for competence-based learning and try to achieve consensus by developing a matrix for competence-based vocational training with which teams of VET experts and teachers can assess to what extent an educational programme is competence-oriented.

Felix Rauner, in his article *Practical knowledge and occupational competence*, states '*Gestaltung*'-oriented didactics of vocational training requires a differential analysis of work process knowledge as a relationship between practical and theoretical knowledge. He examines practical knowledge that gains a fundamental meaning for developing vocational action competence. The article is an essential contribution to the theoretical development of the meaning and place of the concept of competence in vocational education, and its implications for practice.

Marcel van der Klink, Jo Boon and Kathleen Schlusmans describe the developments of competence-based higher vocational education (*hoger beroepsonderwijs*). They present the state of affairs in this field and analyse the most important issues.

Juan Carlos Pérez-González and Elvira Repetto Talavera focus on the importance of socio-emotional competence. Practical experience in companies or institutions is a powerful stimulus to develop these essential competencies for entering the labour market and career development.

Fátima Suleman and Jean-Jacques Paul also stress the importance of professional experience in the production and destruction of individual competence.

Erik Roelofs and Piet Sanders address the issue of competence assessment, and take the assessment of teacher competence as an example to set up a framework. They link this to current standards for assessment instruments.

Finally, Martin Fischer and Waldemar Bauer present a case study on competing approaches towards work process orientation in German cur-

riculum development. They describe the implementation of a new curricular framework for vocational education in schools, called learning fields, which has been implemented in Germany. This approach indicates a work-oriented make-over in curriculum development. In their article two important approaches for designing these curriculum frameworks are described and analysed.

I wish you many happy hours reading the contributions in this issue. Perhaps the European Journal will return to competence-based vocational training in another 13 years, i.e. in 2020.

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# Innovations in vocational education and difficulties in their empirical substantiation

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SUMMARY

**As a consequence of findings and theses on the change in demand for qualifications, the debates on lifelong learning and a large number of articles on the theory of didactics, since the mid-1980s the concept has become established that traditional methods of teaching and learning in vocational education are dysfunctional and should be replaced or complemented by methods which are more activity- or problem-oriented, as well as being of a self-regulated nature. However, as concerns vocational education, empirical verification of the assumptions which form the basis of this shift in didactic theory is largely lacking. This article aims to help reduce this deficit and may serve as a basis for a critical questioning of the viability of common assumptions.**

## Initial problem

Following on from findings and theses on the shift in demand for qualifications, supported by constructivist theoretical articles and further strengthened by the debates on lifelong learning, since the mid-1980s the concept has become established that traditional methods of teaching and

learning in vocational education should be replaced or complemented by methods which are more activity- or problem-oriented, as well as being of a self-regulated nature ([1]). Above all, this is explained by the international discussion on and spread of the approaches of cognitive apprenticeship, cognitive flexibility theory, anchored instruction and guided inquiry (see Carver and Klahr, 2001; Magnusson and Palincsar, 1995; Straka, 2002). A central characteristic of the new learning/teaching strategy is groups of learners actively working out contexts, independently and if necessary with the support of teachers as required (see Mulder 2002, p. 59 et seqq; Reinmann-Rothmeier and Mandl, 1998). Traditional forms of teaching are considered to have more of a complementary function, supporting the process of self-construction of knowledge (see Mulder, 2002, p. 60). The expectations attached to the current paradigm on the international educational/psychological research scene are extremely promising: the aim is to avoid passive knowledge being amassed, to ensure that relevant existing knowledge is more profoundly assimilated, to effectively encourage problem-solving abilities specific to each subject and to promote cross-curricular abilities. OECD research such as PISA, TIMSS and others shows that these are aspects which it would be advantageous to promote in many countries. Apart from this, the new teaching/learning strategy is meant to help improve social skills; after all, the point is to bring the development of skills into line with changes in demand.

The theoretical assumption is that teaching/learning strategies oriented towards the construct of an activity-centred approach and stronger self-regulation are more effective than traditional teaching methods in:
- ensuring that connections are made with preconceptions and/or misconceptions are brought to light and can therefore be dealt with,
- ensuring that the learner asks questions independently and gains a deeper understanding of the subject matter,
- encouraging the application of knowledge and
- promoting metacognitive abilities and motivation (see Bransford, Brown and Cocking, 2000; Nickolaus, 2000; Sembill et al., 1996).

In the Federal Republic of Germany an attempt was made, after initial problems which it must be said still exist today, to find a fixed place for the current didactic paradigm in lessons at vocational schools, and to push on the reform process by means of stipulations in the curriculum (e.g. see Halfpap, 2000). This was preceded by numerous pilot schemes during which new methodical approaches were tested out.

However, the academic studies which accompanied these pilot schemes were limited to formative evaluations, which do not allow any certain conclusions to be drawn on the effectiveness of the educational activity programmes. Recently, some rather tentative studies have been carried out which have been able to fill some of the existing gaps. To some ex-

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([1]) For example, see Achtenhagen and Grubb, 2001; Achtenhagen and Thâng, 2002; Bruijn 2004; Halfpap 2000; Nickolaus 2000; Ott 1999; Mulder 2002.

tent, however, the results throw doubt on whether the expectations connected to the current paradigm will be fulfilled. For an overview of the research results and desiderata for Germany in the field of industrial and technical vocational education, reference should be made to the summary by Nickolaus, Riedl and Schelten (2005). In a handbook article, Achtenhagen and Grubb (2001) sum up the general situation regarding findings in the international field of vocational education, describing it as deficient. This article introduces some results from empirical studies carried out in the school sector of technical vocational education in the Federal Republic of Germany.

## The effects of basic methodological decisions in lessons at technical vocational schools on the development of skills and motivation

In the Federal Republic of Germany, after the paradigm shift in didactics and methodology, some initial comparative studies were made involving preliminary business courses; their results confirmed assumptions on the advantages of constructivist learning environments in developing skills and motivation. For example, in 1998 Sembill et al. came to the conclusion that the development of knowledge in activity-centred experimental classes is at least no poorer than in classes taught in the traditional manner, and on the other hand, problem-solving skills and motivational development are considerably better. In his investigation, also set in the commercial sector, Bendorf (2002) established above all that the ability to transfer knowledge is more developed in those classes taken as case studies which fall under the heading of an activity-centred approach as it is understood here.

In industrial and technical vocational education, only a small number of studies have been carried out in the last few years into the effect of methodological strategies, chiefly in preliminary electrotechnical training. As well as the findings and assumptions reported above (see also Nickolaus 2000, Nickolaus 2001 and Weinert 2000), another significant reference point for these studies was the ATI research findings, as considerable differences must be assumed in this sector and between individual skilled occupations as concerns aspects of cognition and motivation, and in various studies, students with weaker cognitive skills have been diagnosed as having considerable problems regulating their own learning. The ATI research has produced findings which, despite considerable constraints (e.g. see Terhart, 1997 pp. 81-84; Bracht, 1975; Helmke and Weinert, 1997) provide evidence that inse-

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[2] Generally it must still be taken into account that teaching methods are comparatively weak predictors of learning success. On this subject, see the results of Helmke and Weinert (1997) replicating a meta-analysis following on from Fraser et al. 1987 (see also Nickolaus 2000; Wang et al., 1993). Variance explanations are often in the 2 - 4 % range.

cure, timid, less well-achieving learners are overtaxed in less structured forms of teaching, or document advantages for this group in directive teaching methods (Flammer, 1975) ([2]). Weinert (2000) summed up the findings on the influence of choice of method on skills development, primarily as related to the field of general education. According to this summary:

- variable forms of directive instruction are especially suited for acquiring factual knowledge,
- forms of situated learning and didactic strategies using project work, group teaching and creative exercises are particularly effective in promoting the acquisition of life-related procedural knowledge, and
- teaching methods involving independent learning, which enable subjective learning experiences to be acquired in a targeted manner and metacognitive insights to be developed under supervision, prove advantageous in encouraging the acquisition of metacognitive skills and learning strategies (Weinert, 2000, p. 46).

In the run-up to implementing the new didactic paradigm, there was no investigation into whether and to what extent the findings outlined above could also be replicated for preliminary industrial and technical education. As mentioned previously, in the field of technical vocational education, studies have until now mainly been carried out in the field of preliminary electrotechnical education; this topic will be discussed in the following. A universal aspect of the studies is the fact that they are limited to specialised vocational skills, mapping them in a skills model discriminating between three aspects:

(1) Declarative knowledge, whose development can be investigated on the one hand in the sense of differentiation or the increase in elements of knowledge, and on the other hand with regard to depth of knowledge, in the sense of the elements being more closely interconnected.

(2) Procedural knowledge, i.e. knowledge of the procedures and strategies needed to deal with a task, which must be adapted according to each situation.

(3) The ability to work out subject-related problem-solving tasks at an everyday level.

In two of the studies (Nickolaus and Bickmann, 2002; Nickolaus, Heinzmann and Knöll, 2005) the group chosen for investigation was electrical fitters ([3]), whose education consists mainly of learning their trade and who are a rather weak group in terms of cognition in the field of electrotechnology.

These studies showed that, in the case of electrical fitters, contrary to all expectations, benefits for skills development did not appear in activity-

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([3])Training courses for electrical fitters are among those for which there is greatest demand in the skilled trades sector (Howe 2004; BMBF: Berufsbildungsbericht 2004). The job includes fitting, testing (taking measurements) and correcting faults in electrical installations in homes and manufacturing plants. They should be able to perform all steps independently: customer-friendly planning, preparation, installing and putting into operation of all wiring, sockets, switches and fuses in complete systems or subsystems.

centred classes, but instead in those taught using a directive method; following this, another study was carried out involving electronics technicians ([4]), a group including better-achieving alumni from schools of general education.

Going back to the findings outlined briefly above ([5]) the following hypotheses were formulated on the skills aspects of the skills model:

H1: *'Declarative contextual knowledge (i.e. factual structural knowledge), which also includes a necessary basic understanding of the technical system required to work out everyday problem-solving tasks, is more finely developed in systematic instructional teaching than in self-guided methods of acquiring knowledge.'*

H2: *'The ability to independently work out everyday problem-solving tasks develops better in self-guided methods of acquiring knowledge than in systematic instructional teaching; the same is true of procedural knowledge relevant for examinations.'*

H3: *'Any remaining differences at the end of the first year of training in the ability to work out everyday problem-solving tasks are reduced just by going over the problem (with guidance) a few times in succession.'*

H1 follows on directly from the findings summarised by Weinert (2000). As concerns the ability to work out everyday subject-related problem-solving tasks, we also primarily draw on findings made outside vocational education (Weinert, 2000; Helmke and Weinert, 1997). As regards this kind of ability, however, it must be borne in mind that the nature of the problem is an important factor in problem-solving performance (Bransford et al., 2000) and its relationship to relevant predictors. The more concrete (and thus easier to grasp) the formulation of the problem is, the stronger linear relationships between intelligence and problem-solving ability become, for example (Strohschneider, 1991). As concerns typical everyday problems confronted by electrical fitters, which are generally characterised by a relatively low level of complexity and clearly-defined targets, and possible solutions which are known in principle, the question arises of whether poor training in the skills required for this may actually mainly be because problem-solving strategies are generally not systematically taught as a subject in training. In this context, another factor which must be taken into account is the note by Schelten and Riedl on the final organisation of the learning activity in activity-centred lessons (Nickolaus, Riedl and Schelten, 2005); if there are no systematic teacher-led reflections and generalisations of experiences acquired situatively, there is a risk that knowledge will not be transferred to other contexts. Another factor which could prove problematic is the other danger connected with activity-centred strategies: not enough

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[4] Electronics technicians fall into the category of industrial occupations. Electronics technicians also carry out installation, tests and maintenance work, but on more complex electrical systems. The different requirements for these electrical vocations range from selection processes to significantly different entry requirements for school-leavers, related to IQ, school background, aspects of previous knowledge and motivation (see Knöll, Gschwendtner and Nickolaus, 2006).

[5] For an overview, see Weinert 2000, in more detail Helmke and Weinert 1997.

declarative knowledge being acquired, which can be seen as a necessary prerequisite for the ability to work out problem-solving tasks. Some of the questions raised here apply equally to the development of procedural knowledge. With this in mind, and returning to the current paradigm, it seems urgently necessary to examine H2, especially in courses of dual (combined theoretical and practical) education.

The reason for examining H3 was the circumstance mentioned above: typical problems which skilled workers are confronted with every day generally have known solution processes and can therefore, in principle, be taught in a traditional, directive manner; and in the past, at least, there was not (enough) systematic training in lessons, for example in fault analysis. Another point to be made is that deficits of this kind can probably be compensated for quickly in practice, on the job.

As regards the framework of conditions for motivational variables (Deci and Ryan, 1985, 2002) a great variety of data is now available on preliminary business courses thanks to the works of Prenzel et al, 1996, 1998; Hardt et al, 1996, 1998; Lewalter et al, 1998; Wild and Krapp, 1996 (see also Beck, 2002). Nonetheless there is still a lack of data on motivation development in the context of different teaching strategies. The findings of the research group headed by Sembill et al., 1998, indicate that motivation develops better with self-guided methods of acquiring knowledge in settings which are relatively restricted in terms of time. Based on this, we have formulated Hypothesis 4 ([6]):

'Self-guided methods of acquiring knowledge also have a positive effect on learning motivation over prolonged periods.'

## Structure of the investigations

The hypotheses were examined or are being examined within the scope of field experiments, to ensure that the studies are also valid for teaching practice. The field experiments each covered the first year of training. In the first study, involving electrical fitters, four classes (N=69) were studied, two of which were mainly taught using the directive method and two mainly using the activity-centred method. A more extensive replication study involving electrical fitters covered ten (N=224) classes, and one involving electronics technicians covered eight classes (N=189). For information on the development of skills and motivation, data were gathered at three points (initial, midway and final test). The information on problem-solving ability

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([6]) In this paper, Hypothesis 4 will be tested only in a cursory manner for reasons of space, with central findings being pointed out (Knöll, Gschwendtner and Nickolaus, 2006).

([7]) To give an idea of the tasks chosen and to see how they are related to the skills aspects, here we will describe one task each for declarative and procedural knowledge. The following task addresses the subject of procedural knowledge: 'An apprentice has rented a room and would like to roughly work out the energy costs (electricity charges) he will have to pay. His room is furnished with a ceiling lamp, a television, a fridge and a hotplate. What variables does he have to work out, and how can he do that?' The following task addresses declarative knowledge: 'What groups can materials be divided into according to their electrical properties?

was collected in a one-off survey at the time of the final test. The test materials used to gather data on declarative and procedural knowledge were developed with experienced teachers and approved by both the activity-centred teachers and those teaching using the directive method ([7]). Problem-solving ability was tested using a simulation programme in which two (electrical fitters) or three (electronics technicians) faulty electrical systems were simulated ([8]). The ability to analyse the faults simulated in the systems was evaluated using a documentation system performed at the same time.

The lesson itself was documented thoroughly to determine the level of self-regulation and practical orientation (SRPO). An evaluation of this data shows that a mixture of methods is used in all the classes and that the SRPO values achieved in the classes taught using the directive and the activity-centred methods differ considerably. As well as the data on the development of skills and motivation, and the documentary data on the instructional/methodological structure of the lesson, data was also gathered to monitor conditions, e.g. on teaching quality and to match up the results for training carried out in school and in a company.

### Selected results of the studies

The results are set out below as they relate to the hypotheses. The setting for this article means that only selected results can be presented; more results will be described in articles to follow. Further reference may be made to the more detailed descriptions by Nickolaus and Bickmann, 2002; Nickolaus, Heinzmann and Knöll, 2005; Nickolaus, Heinzmann and Knöll, 2006 and Knöll, Gschwendter and Nickolaus, 2006.

*The effects of basic methodological decisions on the development of declarative knowledge*

In the first investigation, restricted to four classes of electrical fitters, the classes taught using the directive and the activity-centred methods did not differ significantly in the initial test in declarative knowledge; in the midway and final tests, however, there was an extremely significant difference in favour of the classes taught using the directive method. As expected, previous knowledge proves the strongest predictor (explains 22 % of the variance), but the teaching method also helps explain 5.5 % of the variance ([9]).

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([8]) The software used can simulate faults in two technical systems (hotplate and cordless electric screwdriver) and faults diagnosis using testing processes (current, voltage and resistance measuring). To do this, a simulated measuring device was available which could be applied to pre-set measuring-points in the technical systems. For the hotplate simulation, there were several possible measuring points: directly at the power supply (mains), at the input and output of the six-step switch, in the path of the current to the three heating elements). The switch controls three heating elements using different switch methods (serial, parallel and non-uniform connections) which produce varying electrical results in the hotplate. The fault to be diagnosed is faulty heating elements. In the electric screwdriver the following faults were simulated: a faulty control system (rep. 3), a faulty motor (rep. 4) and a faulty storage battery (rep. 5). The repair tasks were ordered so that they became progressively more complex and difficult.

In the second, wider study of the electrical fitters (ten classes), the classes taught with the directive method achieved better mean results than those taught with the activity-centred approach, despite slightly worse initial results in declarative knowledge in the midway and final tests. However, the differences remained below the significance level.

There were similar results in the classes of electronics technicians, where slight advantages were recorded in all the tests in favour of those taught with the directive method; however, statistically these did not prove significant. As concerns the hypotheses, we ascertained that although there tend to be some advantages in the development of declarative knowledge as expected for the classes taught with the directive method, the differences generally remain below the significance level.

*The effects of basic methodological decisions on the development of procedural knowledge*

Here the results from the two studies involving electrical fitters proved to be absolutely contrary to expectations; nor was the hypothesis that procedural knowledge develops better in classes taught using the activity-centred approach confirmed by the electronics technicians. In the first study involving electrical fitters, there were distinct, but not significant, differences in favour of those taught using an activity-based approach in the initial tests. By the time of the midway test (after 6 months) there was a distinct shift in the range of results in favour of those taught with the directive method; in the final test, the differences between the mean results becomes significant, in favour of those taught with the directive method. In the second study involving electrical fitters a similar picture emerges. Initial differences in favour of those taught using the activity-centred approach switch around so that in the midway test there are already significant advantages for those taught with the directive method; in the final test, however, these are considerably smaller and are no longer significant. From a comparative, international point of view, it seems interesting that in this study, the organisational form of the preliminary training, which also varied (full-time schooling v. dual education), also goes some way to explaining the variance. The systematic education of those attending school full-time proved more favourable for developing procedural knowledge; with the electrical fitters, the combination of a dual education and activity-centred lessons at a vocational school proved problematic. This may conceivably be attributed to the fact that the electrical fitters' unsystematic education in small companies tends to increase, rather than reduce, problems with building up a good foundation of knowledge using activity-centred teaching methods with relatively poor learners. In the study of classes of electronics technicians, the teaching methods had no significant effect on the development of procedural knowledge.

As concerns the hypothesis, we are still able to record that this has

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(9) For more detail see Nickolaus, Heinzmann and Knöll, 2005.

clearly been proven false for the vocational fields studied here. Contrary to expectations, where apprentices are somewhat less able (electrical fitters), there are solid advantages in favour of those taught with the directive method; with more able apprentices (electronics technicians) the methodological approach proves irrelevant for the development of procedural knowledge.

*The effects of methodological decisions on the development of subject-related problem-solving abilities*

In this regard, the results for the classes of electronics technicians are not yet available, and we will therefore restrict ourselves to describing the results for the electrical fitters. As mentioned above, the ability to solve subject-related problems was established by measuring ability to diagnose faults in electrical systems. In the first study, the analyses of the apprentices were restricted to three different types of fault in an electrical system (cordless electric screwdriver) with no intervention by the teacher between the fault analyses. For the second study, as well as the cordless electric screwdriver, another electrical system (hot-plate) with two faults was simulated. After all the repair tasks had been dealt with, there were some additional teacher-led reflections on systematic fault analysis processes. These interventions were limited to about 5 minutes each.

First, the following overview shows the problem-solving frequency in the first and second studies, without taking into account the quality of the solution (quality of the explanation, number of steps to the solution).

Whereas the variation in the percentage of solutions in the first study is primarily caused by the nature of the problem, in the second study the interventions added between the problems, reflecting on the problem-solving process, play a major role. This interpretation is mainly supported by two partial findings: a) the extremely varying development of problem-solving frequency in repair tasks 3 and 4 involving the electric screwdriver and b) the significant rise in problem-solving frequency between repair tasks 1 and 2 as well as 3 and 4 in the second study. Whereas the degree of difficulty in the problem set is the same for repair tasks 1 and 2, there is a distinct rise in difficulty between repair tasks 3 and 4. In the first study there is a correspondingly distinct drop in the percentage of solutions between repair tasks 3 and 4. In the second study, on the other hand, despite the

**Figure 1**: Problem-solving frequency in fault analysis in %

| | 1st study (N=69) | | 2nd study (N=152) | |
|---|---|---|---|---|
| | solved | unsolved | solved | unsolved |
| Repair 1, hotplate | — | — | 52.6 | 47.4 |
| Repair 2, hotplate | — | — | 73.5 | 26.5 |
| Repair 3, electric screwdriver | 63.8 | 36.2 | 55.3 | 44.7 |
| Repair 4, electric screwdriver | 21.7 | 78.3 | 69.7 | 30.5 |
| Repair 5, electric screwdriver | 59.4 | 40.6 | 62.7 | 37.3 |

higher degree of difficulty the interventions lead to a considerably higher percentage of solutions, about three times as high as in the first investigation. This means that substantial increases in skills can even be initiated by only short interventions explaining the fault analysis or reflecting on it together by asking questions and developing ideas, when the intervention is system-related and directive, i.e. with instructions and explanations about the fault analysis path.

According to hypothesis H2, the ability to deal with everyday problems should be better
- developed in classes taught using the activity-centred approach in than those taught using
- the directive method. Comparisons of the mean values do not, however, confirm this assumption.
- In the first study, there were some advantages for those taught with the activity-centred approach for repair tasks 3, 4 and 5 (Figure 2); however, these remained below the significance level.
- In the second study, contrary to expectations, in individual repair tasks there were advantages for those taught using the directive method. The main surprise here is the partial finding that those taught using the directive method do better when there is a change of system (transfer). This surprising finding seems to us primarily to be explained by the more strongly developed knowledge in classes taught using the directive method, which does not at least prove to be any more passive than in those taught with the activity-centred method, and which can be identified as the strongest predictor for the ability to solve subject-related problems.

Another apparent point of note is that in contrast to their procedural knowledge, the problem-solving ability of those apprentices taught in school does not develop as well as in those who have gone through the dual system of vocational education.

In summary, it was ascertained that contrary to expectations, the classes taught using the activity-centred approach do not by any means generally do better, but in part actually do worse; that short system-related directive interventions reflecting on the fault analysis procedure can have a substantial positive effect; and that declarative and procedural knowledge

**Figure 2**: Mean values and results of mean value comparisons in fault analyses

| | 1st study (N=69) | | 2nd study (N=152) | |
| --- | --- | --- | --- | --- |
| | Directive | Activity-centred | Directive | Activity-centred |
| Repair 1 (hotplate 1) | | | 3.50 | 3.22 n.s. |
| Repair 2 (hotplate 2) | | | 4.40 | 3.90 * |
| Repair 3 (electric screwdriver) | 3.05 | 3.12 n.s. | 3.89 | 3.31 * |
| Repair 4 (electric screwdriver) | 1.60 | 2.06 n.s. | 4.25 | 3.84 n.s. |
| Repair 5 (electric screwdriver) | 3.06 | 3.44 n.s. | 3.92 | 3.91 n.s. |

contribute the most to explaining problem-solving ability. According to our findings, Hypothesis H2 does not stand up. In our opinion it would be of interest to look into the question of whether the alignment of results found in the second study, which at least partly confirms H3, should be understood as an indication that any remaining differences in achievement soon balance out in practice on the job. In the current discussions on the didactic/methodological organisation of education, too many expectations may have been placed on the contribution this can make to practical vocational skills, with more important variables, such as the potential for learning arising from related employment (e.g. see Curtain, 2000, p.41), not being taken into account.

An additional point is that the tendency is for H4 to be confirmed, but that the differences in the development of motivation between the teaching methods remain below the significance level. With the electronics technicians in particular, there are distinct trends towards the development of motivation in classes taught using the activity-centred approach, and sometimes also significant advantages. What is significant here are the differences between extrinsic and intrinsic motivation. With the electrical fitters, in the first study there were some advantages tending in the same direction, i.e. the participants in the classes using the activity-based method were more often intrinsically motivated while those in classes taught with the directive method were more often extrinsically motivated. In the second, wider study, however, no significant differences in the development of motivation could be established in classes taught with the directive or the activity-centred methods. Generally, i.e. irrespective of the teaching method, during the first year of training, the development of motivation proves poor ([10]).

## Discussion of the results

In general we have ascertained that some of these findings give reason for serious doubt to the general validity of current theoretical assumptions about relationships between basic methodological decisions and the development of skills and motivation in preliminary electrotechnical courses. It is still open whether this can also be confirmed for further courses and in other industrial and technical occupations. However, the current state of research, which is rather unsatisfactory, suggests that in other industrial and technical occupations there are also serious difficulties in corroborating current assumptions (Nickolaus, Riedl and Schelten, 2005). There are various possible explanations for the findings, which are largely both contrary to expectations and well-founded.

**First**, it is conceivable that the field involved plays a role and that the com-

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([10]) As motivation and extrinsic motivation increase; introjected, identified, intrinsic motivation und interest drop.

paratively high degree of abstraction in electrotechnical subject matter blocks the effect of the advantages of a constructivist learning environment.

**Second**, it is worth considering whether one possible cause to be included in reflections should be the quality of teaching in each method selected. It is possible that teachers are also not yet as used to putting the current paradigm into action as they are to traditional teaching methods. However, the data on quality collected to monitor conditions do not support this supposition.

**Third**, it is fair to assume that the unexpected findings could be attributed to the studies being conducted at this particular stage of the course. In other words, it is possible that activity-centred lessons only reach their full potential at the specialised stage (e.g. in the third year of the course) when the emphasis is on specific use of basic knowledge on the basis of a foundation built up earlier (also see Tenberg, 1997).

**Fourth**, it is worth checking whether the causes may be found in some learners having a more successful balance of self- and outside regulation, or of situation and systemisation in the subject. The assumption formulated before the study involving electronics technicians, that the electrical fitters' comparatively adverse initial circumstances are the reason why their achievement develops in this unexpected manner in activity-centred classes, is partly supported by our overall results. At least, in contrast with the electrical fitters, the achievements of the electronics technicians, who are cognitively stronger, do not improve significantly in the classes taught with the directive method.

In our opinion, the results put forward here give reason to provide much more detailed justification for methodological decisions than currently is often the case, at the same time questioning the validity of current assumptions. Further studies also prove necessary, including studies on the effects of the vocational field and the type of course involved. It would certainly also be of great interest to carry out comparative international studies on the subject which could also look at the effects of macro-structural conditions (dual education system and full-time schooling).

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# Competence-based VET as seen by Dutch researchers

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SUMMARY

**The concept of competence is increasingly the basis for (re)designing VET. In competence-based VET academic disciplines are no longer starting points for curriculum development. Competence needed for working in practice, however, is. Competence-based learning is a dominant trend in VET in several countries because of fewer expected problems in the transition from school to work. In this study, by means of a focus group session and a Delphi study, a model for competence-based VET is developed. It has been constructed by Dutch researchers and can help VET institutions develop competence-based learning.**

## Introduction

Competence-based learning is able to help learning in an economy characterised by rapid changes and complexity (Velde, 1999). Therefore, competence-based learning is a dominant trend in VET in Australia, the

United Kingdom, the United States, Germany and the Netherlands (Velde, 1999; Mulder, 2003; Descy and Tessaring, 2001). Competence-based learning is also a trend, because of fewer expected problems in the transition from school to work (Biemans et al., 2004). Many countries are currently experiencing problems with the transition of graduates to the labour market. Students still have a lot to learn before they can perform as expected as employees. In competence-based VET academic disciplines are no longer the starting point for curriculum development. Competencies needed for working in practice, however, are. So there is an expectation that students, because they are prepared for the labour market based on the competencies needed for the labour market, can perform better from the beginning of their working careers.

In the Netherlands there is lively discussion about the 'usefulness and uselessness' of competence-based learning (Korthagen, 2004; Tillema, 2004). Biemans et al. (2004) describe, besides its added value, several possible pitfalls in applying competence-based learning. One concerns the definition of the concept of competence. According to Nijhof (2003, in Mulder et al., 2003), designing competence-based curricula, learning processes and assessment procedures can only be done when the concept of competence is defined as unambiguously as possible. Another significant pitfall is assessment which can be seen as the Achilles heel of competence-based learning. According to Biemans et al. (2004), assessment of competencies is time-consuming and labour intensive. Moreover developing and using valid and reliable assessment is crucial, but difficult. Despite these pitfalls and some valid criticism, the concept of competence-based learning is popular in VET. Several authors made a start at defining

**Figure 1**: Educational system of the Netherlands
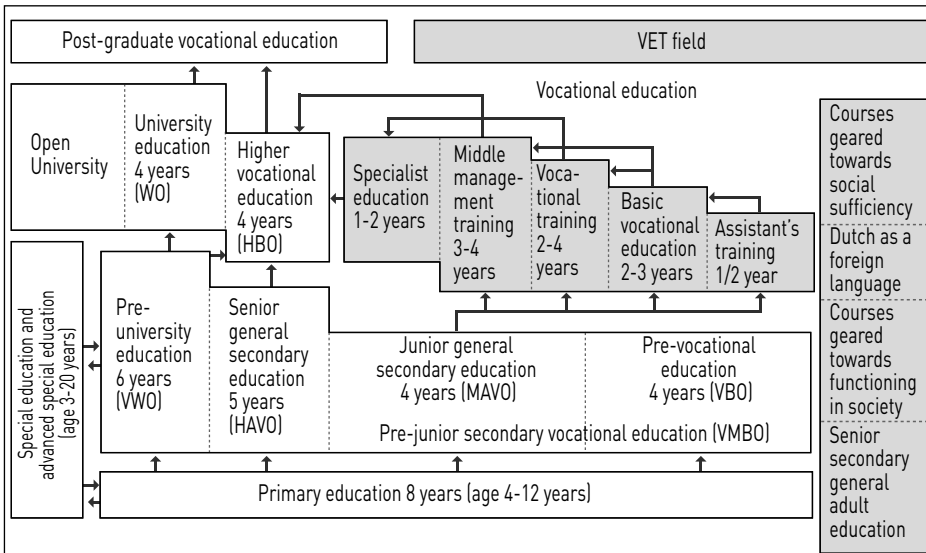
competence-based learning (Klarus, 2004; Mulder, 2004; Onstenk, De Bruijn and Van den Berg, 2004), but there is still a need for a thorough study to reach consensus on a model. This is the objective of this study. Consensus and clarity are especially necessary as from August 2006, Dutch VET institutions for senior secondary education will start working with competence-based profiles as the starting point for their curriculum. Although politicians are in favour of competence-based learning, it is for researchers to reflect critically on these developments. Before describing the study a short explanation of the Dutch educational system is provided.

Figure 1 shows the Dutch educational system. Two routes can be distinguished that lead either to university or a job; one is via general education and the other is via vocational education. With the latter route a student can end up at university, but mostly this route leads to a qualification for a professional job. The model constructed in this study can be applied at two levels of vocational education: secondary vocational education and higher vocational education. Next, figures (www.bveraad.nl) illustrate the importance of the vocational education route in the Netherlands. In 2003 about 625 000 students aged 12 to about 18 participated in secondary vocational education and 375 000 students aged 18 to 22 participated in higher vocational education. In the secondary education sector, vocational education has the most students.

## Theoretical framework

Competency-based education is a concept that has existed for several decades and has its origin in the US. In the 1960s it was labelled performance-based teacher education (Olesen, 1979). During these years competency-based education was characterised by its detailed analyses of behavioural aspects of professional tasks. Competency is defined as an underlying characteristic of an individual, which is causally related to effective or superior performance in a job (Boyatzis, 1982). Tasks of professionals were described in detailed lists of fragments and assessable elements. Barnett (1994) says that competencies described in this more behaviouristic way cannot provide guidelines for an educational curriculum because of the detailed level of description. The concept Grant et al. (1979) studied in the 1960s and 1970s is different from the current leading approach to competence in Europe. In Europe a more holistic approach of competence is being used (Eraut, 1994; Biemans et al., 2004). In this approach competence is defined as follows: 'competence is the integrated performance-oriented capability of a person or an organisation to reach specific achievements' (Mulder, 2001, p. 76). Competency focuses on an aspect of behaviour, competence focuses on the integrated capability of a person and leads to an authorisation to do certain tasks. Competent means that a person has a certain proficiency. When a person has developed all the competen-

cies necessary for a certain job, he or she gets a qualification. In this description of competence the focus is on the main and leading approaches. This description does not suggest there is no room for other approaches. In both the US and in Europe holistic behavioural approaches can be recognised.

In the holistic approach to competence, learning is seen from a social constructivist perspective. The basic assumption for this originally social psychological approach is that humans construct their (social) reality by interacting with others (Simons, 2000). Constructivism arose from dissatisfaction with the theories of knowledge in the tradition of Western philosophy. The central assumption in constructivism is that knowledge and skills are not products that can be transferred from one person to another. Knowledge and skills are results of learning activities of learners (Glaser, 1991). Constructivism knows different approaches; from a radical individualistic approach to a more social constructivist approach. The social constructivist approach in particular influences thoughts about competence-based learning. In a more (social) constructivist view of learning individuals construct their own truth and knowledge. Knowledge construction mostly takes place in a social setting; so a group of persons construct their own truth or social reality. Therefore learning should no longer be seen as a stimulus-response phenomenon. Learning requires self-regulation and the building of conceptual structures through reflection and abstraction (Von Glasersfeld, 1995).

The holistic and social constructivist view of learning has been of major influence on the approach to competence-based learning used in this study. Besides these major influences, other theoretical insights contributed to defining the concept of competence-based learning. The most important theoretical concepts are described briefly in a first set of 10 principles for competence-based learning (Mulder, 2004), which was the starting point for the focus group meeting and the Delphi study.

Based on experiences in the US, where competence-based education did not become a success because of its detailed character, there was increasing demand to use larger and useful units as starting points for developing curricula in the Netherlands. This resulted in more interest in vocational core problems, job competence profiles and job pictures which brought about principle 1: 'Verify in which jobs and roles students end up after completing their studies and determine which vocational core problems are critical in those jobs and roles'.

The fragmentation in education mentioned before has a distinct influence on curricula. It leads to demand for curriculum integration (Tanner and Tanner, 1995) and fewer pure disciplinary approaches. It was believed that theory and practice should be more aligned with each other and that parts of professional practice should be used as the focus in curriculum planning. This brought about principle 2: 'Identify vocational core problems which lead to curriculum development'.

Already in the 1970s, McClelland (1998) argued that recognition of de-

velopment should be organised by transparent and criterion-based assessments. Competence development should be measured before, during and after the learning trajectory. These developments resulted in two principles: principle 3 'rewarding competence developments should be done through assessment by different assessors'. Principle 4 concentrates on the following: 'before the learning trajectory the competencies already developed have to be assessed'.

An essential characteristic of competence is integrating knowledge, skills, and attitudes. In learning trajectories this integration has to be realised to ensure a practical assignment can be carried out successfully. It is important students are able to make representations of practice (Eraut, 1994). It is also important for students to situate their (learning) experiences in practice, so they understand which learning activities contribute to their successful performance. Critical reflection on the diversity of tasks and problem situations a student meets in practice (Schön, 1983) is essential for competence development. Critical reflection causes an expansion and deepening of learning experiences and these processes are responsible for competence-development. These theories resulted in three more principles. Principle 5 states learning has to be situated in recognisable and meaningful contexts. Principle 6 states connecting theory and practice is necessary. Let students acquire experience and let them reflect on these experiences. Principle 7 states knowledge, skills and attitudes should be integrated into learning trajectories.

During the design of learning trajectories for competence development it is important to support the learning process of students and, depending on their progress, to increase their autonomy (Van Merriënboer, 1997). To give students full opportunity to develop, motivating and inspiring learning environments in which all their developmental possibilities can be stimulated are necessary. This led to principle 8: 'Make it possible for students to be both increasingly responsible for their own learning processes and steering them.'

In a learning environment based on competencies, the student is part of a community of practice (Wenger, 1998). Students are seen as junior colleagues instead of students or trainees. Teachers are coaches and experts taking part in the knowledge construction of students through respectful dialogue. These theories led to principle 9: 'Teachers have to be stimulated to fulfil their role as coaches'.

Competence-development can be realised for each individual through personal development plans and portfolios in which competence-development can be recorded. According to Onstenk (1997) it is important to pay attention not just to competencies important for performing a job; competencies in communication, learning or designing are also important for surviving in current society. Competence-based curricula have to prepare students for lifelong learning. This concept led to the final principle, principle 10: 'in a curriculum a basis must be formed to develop competencies for the future career, with specific attention on learning to learn competencies'.

The theories mentioned above pay attention to separate aspects of (developing) education. However, developing competence-based education requires all aspects of education be reconsidered. The different theories mentioned individually above are not exclusive for competence-based learning, but all principles together comprise a unique framework for developing competence-based learning. As yet there is no consensus on a set of principles. It remains a collection of different theories. In the following part of this article, a process is described on how to reach consensus on the set of principles for competence-based education.

## Method

The starting point is the list of 10 principles for competence-based learning (Mulder, 2004). Researchers transposed these principles into a model. The European Foundation of Quality Management (EFQM) model provides the basis for this model. EFQM is a business improvement model which consists of nine items which are applied in phases. The basis for the model of this study are the principles. Each principle is applied by means of variables and these variables are the basis for describing four phases. The four phases can be characterised as follows: not competence-based, starting to be competence-based, partially competence-based and completely competence-based. Not competence-based education can be defined as traditional education. Knowledge transfer is a central issue in this phase. The second phase can also mainly be defined as knowledge transfer, although this transfer is accompanied by examples or case studies from practice. The third phase, partial competence-based, means that to some extent the disciplinary approach to education is replaced by an approach in which practice plays an important role. In the fourth and final phase, education is completely designed based on competencies and vocational core problems.

This model was the starting point for a mixed method study. Both a focus group session and a Delphi study were conducted. A focus group session is one in which participants discuss a specific topic, aiming at reaching common understanding and a shared picture of it in a relatively short period of time. A Delphi study seeks to get an accurate shared result through a set of sequential questionnaires interspersed with summarised information and feedback from opinions derived from earlier responses (Delbecq et al., 1975). This study opted for both a focus group and a Delphi study.

Some 30 experts were asked if they were able and willing to participate in the focus groups and subsequently the Delphi study. They were selected according to their (research) expertise in competence-based learning and articles published. A group of 15 experts reacted positively. Almost all of the other 15 reacted positively and emphasised the need for this re-

search, but were unable to attend, mainly because of time restrictions. The 15 that agreed to take part came from eight different (research) institutes in the Netherlands.

The study consisted of three rounds. The first round was a focus group session, during which the first set of 10 principles were discussed and the results processed in the framework. Then the Delphi study took place. Participants were asked to complete two questionnaires, marking to what extent they agreed with the changed principles, variables and phases. They could score from 1 'I fully agree' to 5 'I don't agree at all' and they also could include comments. In the first questionnaire, participants could respond to each aspect of the principles, both with scores and comments. In the second, while it was decided to still give respondents the opportunity to respond with a mark for each aspect, they could only comment on the principle as a whole. This choice was made to get a better idea of the principles as a whole, because in the first questionnaire some respondents' comments were inconsistent. Participants' scores and comments were processed. The scores were mainly used to see the overall opinion on a principle and its application. When a principle had a mean score between '1' and '2' hardly any changes were considered. For mean scores between '2' and '3' a change was thoroughly considered. For scores higher than '3' changes were almost always made. The comments were used to change the principles. For the final decision on changes, three researchers always had to agree on the proposed changes. The Delphi study was finished when the overall score of each principle was satisfactory (mean score between '1' and '2') and participants had no further proposals.

All 15 participants joined the first focus group session and in the first round of the Delphi study 9 of 15 participants returned the questionnaire. In the second round of the Delphi study, 7 of the 15 participants returned the questionnaire. A Delphi study requires commitment from its participants for a longer period of time. Unfortunately, not all participants were committed to the end.

## Results

Table 1 summarises the mean scores, standard deviations and number of respondents on the different aspects from the conceptual framework from the first and the second rounds of the Delphi study. The final principles and accompanying applications are used in the table.

The results in Table 1 show in the first round 11 of the 21 items (three items per principle) scored between '2' ('I agree to a large extent') and '3' ('I do not have an opinion'). These items have been changed. The 10 items that scored lower than '2' had hardly any changes made. In the second round of the Delphi study only two items scored '2' or higher. This means that participants 'fully agree' or 'agree to a large extent' with almost all these

items in the framework. Except for the items in principle 7, all items scored higher than 2. Based on comments some changes were made. The second round scores were generally lower than in the first round. Table 1 also shows that for some items not all respondents reacted because they did not consider themselves experts in that particular field.

A Delphi study is concluded when a predefined percentage of participants agree with the subject of study. In this study 75 % of participants had to 'fully agree' or 'agree to a large extent'. In the second and last round of the Delphi study for each aspect, five or six of the seven respondents 'fully agreed' or 'agreed to a large extent' with the items of the frame-

**Table 1**: Scores from the first and second round of the Delphi study with means and SDs.

1 = 'I fully agree', 2 = 'I agree to a large extent', 3 = 'I do not have an opinion', 4 = 'I do not agree', 5 = 'I do not agree at all'

| Principle | Results round 1 | | | Results round 2 | | |
|---|---|---|---|---|---|---|
| | Mean | St. dev. | N | Mean | St. dev | N |
| 1. The competencies that are the basis for the study programme are defined. | 1.56 | 0.527 | 9 | 1.43 | 0.535 | 7 |
| Content of variables | 1.78 | 0.441 | 9 | 1.86 | 0.690 | 7 |
| Division and content of phases 1 to 4 | 2.00 | 1.00 | 9 | 1.86 | 0.690 | 7 |
| 2. Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment). | 1.67 | 0.500 | 9 | 1.29 | 0.488 | 7 |
| Content of variables | 1.83 | 0.612 | 9 | 1.71 | 0.756 | 7 |
| Division and content of phases 1 to 4 | 2.11 | 0.601 | 9 | 1.71 | 0.756 | 7 |
| 3. Competence-development of students is assessed before, during and after the learning process. | 2.56 | 1.130 | 9 | 1.00 | 0.00 | 6 |
| Content of variables | 2.22 | 0.972 | 9 | 1.67 | 0.816 | 6 |
| Division and content of phases 1 to 4 | 2.78 | 1.202 | 9 | 1.86 | 0.690 | 7 |
| 4. Learning activities take place in different authentic situations. | 1.67 | 1.00 | 9 | 1.29 | 0.488 | 7 |
| Content of variables | 1.89 | 1.054 | 9 | 1.43 | 0.535 | 7 |
| Division and content of phases 1 to 4 | 2.22 | 1.394 | 9 | 1.86 | 0.900 | 7 |
| 5. In learning and assessment processes, knowledge, skills and attitudes are integrated*. | | | | 1.14 | 0.378 | 7 |
| Content of variables | | | | 1.29 | 0.488 | 7 |
| Division and content of phases 1 to 4 | | | | 1.86 | 0.690 | 7 |
| 6. Self-responsibility and (self)-reflection of students are stimulated. | 1.87 | 0.354 | 8 | 1.29 | 0.488 | 7 |
| Content of variables | 2.33 | 0.866 | 9 | 1.57 | 0.535 | 7 |
| Division and content of phases 1 to 4 | 2.13 | 0.835 | 8 | 1.86 | 0.690 | 7 |
| 7. Teachers both in school and practice fulfil their role as coach and expert in balance. | 1.89 | 0.601 | 9 | 1.71 | 0.951 | 7 |
| Content of variables | 2.38 | 1.061 | 8 | 2.29 | 0.951 | 7 |
| Division and content of phases 1 to 4 | 2.63 | 1.061 | 8 | 2.00 | 1.00 | 7 |
| 8. A basis is realised for a lifelong learning attitude for students. | 1.61 | 0.601 | 9 | 1.14 | 0.378 | 7 |
| Content of variables | 2.14 | 1.069 | 7 | 1.43 | 0.787 | 7 |
| Division and content of phases 1 to 4 | 1.40 | 0.548 | 5 | 1.43 | 0.787 | 7 |

* Principle 5 is added after the second round of the Delphi study.

**Box 1**: Model for competence-based learning in VET

|  | Principle | Variables | Not competence-based | Starting to be competence-based | Partially competence-based | Completely competence-based |
|---|---|---|---|---|---|---|
| 1 | The competencies that are the basis for the study programme are defined. | Putting together a job competence profile. Using a job competence profile. Interaction between education and vocational practice. | There is no job competence profile put together. | There is a job competence profile without participation of the vocational practice. This (vocational) competence profile has been used during the (re)design of the curriculum. | There is a job competence profile with participation of the vocational practice and this profile is fixed for a longer period of time. This job competence profile has been used during the (re)design of the curriculum. | There is a job competence profile with participation of the vocational practice and this profile is tuned frequently with the regional and local vocational practice including the major trends. This job competence profile has been used during the (re)design of the curriculum. |
| 2 | Vocational core problems are the organising unit for (re)designing the curriculum (learning and assessment). | The extent to which the vocational core problems determine the curriculum. | There are no vocational core problems specified. | There are vocational core problems specified, which are used as examples in the (re)designing of the curriculum. | There are vocational core problems specified. These core problems are the basis for the (re)design of some parts of the curriculum. | There are vocational core problems specified and these lead to the (re)design of the whole curriculum. |
| 3 | Competence-development of students is assessed before, during and after the learning process. | Recognising earlier developed competencies. Formal assessment. Formulating feedback. Flexibility in format and timing of assessment. | Assessment is the final stage of a learning process and takes place at a fixed moment. | Assessment takes place at several moments. Assessment is used for formal assessment and does not play a role in the learning process of students. | Assessment takes place before, during and after the learning process. Assessment is used for both formal assessment and competence development of students. | Assessment takes place before, during and after the learning process. Assessment is used both for formal assessment and competence development of students. Students determine the moment and format of assessment themselves. |
| 4 | Learning activities take place in different authentic situations. | Authenticity. Diversity. Relation with learning at school and learning in practice. | Learning in practice is of subordinate importance and there is no relation with learning at school. | Learning at school is in the lead. Sometimes, In some cases a relation is set up with learning in practice or experiences from practice. | Learning activities to a large extent take place in authentic settings, but the relation with learning at school is insufficient. | Learning activities to a large extent take place in diverse authentic settings and learning activities are clearly related to the learning activities in practice. |

| | Principle | Variables | Not competence-based | Starting to be competence-based | Partially competence-based | Completely competence-based |
|---|---|---|---|---|---|---|
| 5 | In learning and assessment processes, knowledge, skills and attitudes are integrated. | Integration of knowledge, skills and attitudes. | Knowledge, skills and attitudes are separately developed and acknowledged. | Knowledge, skills and attitudes are sometimes integrated in the learning process. Knowledge, skills and attitudes are assessed separately. | Knowledge, skills and attitudes are integrated in the learning process or in the assessment procedure, not in both processes at the same time. | Integration of knowledge, skills and attitudes is for both learning and assessment processes the starting point and therefore applied. |
| 6 | Self-responsibility and (self-) reflection of students are stimulated. | Self-responsibility. Self-reflection. Reflection on functioning in the vocational setting. Learning needs of the student. | Learning activities are characterised by external steering: students carry out assignments by means of elaborated instructions. There is no (self-) reflection. | In a limited part of the learning activities, students determined the way of learning themselves. There is hardly any reflection on the learning process and functioning in vocational settings. | Students themselves determined the way of learning, and time and place of learning, based on reflection on the learning process and functioning in vocational settings. | Students are after all responsible for their own learning processes based on their learning needs. |
| 7 | Teachers both at school and practice fulfil their roles as coaches and experts in balance. | Way of supporting the learning process. Support in the knowledge acquisition process. | There is no question of support. Knowledge transfer is central to the learning process. | To a limited extent responsibility for the learning processes is handed to students. Teachers support through guidance. | Students enjoy a certain level of autonomy in determining their own ways of learning. Teachers observe when students need support and offer it. | Teachers stimulate students to formulate learning needs and based on self-reflection determine their own learning process. |
| 8 | A basis is established for a lifelong learning attitude for students. | (Labour) identity development. Development of learning competencies. Focus on future career. | There is no attention paid to competencies that are related to learning or (labour) identity development. | In the curriculum there is attention paid to competencies that are related to learning and (labour) identity, but these competencies are not integrated in the learning process. | During learning trajectories competencies related to learning and (labour) identity development are clearly related to vocational core problems and attention is paid to those competencies to a large extent. | During learning trajectories competencies related to learning and (labour) identity development are integrated and reflection on the future careers of students has taken place. |

work. Consequently, one can conclude that respondents came to a consensus on the model. Box 1 shows the final results.

The result of the Delphi study is a model for competence-based learning. The study started with a list of 10 principles; the renewed list consists of eight principles. Some major changes have been made to the first set of 10 principles. First, in the former set of principles 'assessment' and 'accreditation of earlier developed competencies' were separate principles. Because these principles are both closely related to assessment,

they are combined as one principle in the renewed set of principles. Second, the role of students has changed. In the former set of principles self-steering of students was mentioned. In the renewed set, self-steering is changed to (self)-reflection, because (self)-reflection indicates better the (complex) role of the student. To develop competencies it is necessary for students to gain experience and practice the competencies in several authentic situations. In the former set of principles nothing was mentioned about practising in several authentic contexts. So, this was added. Next, in the first set of principles the role of the teacher was described as only being a coach. During this study it appeared that the teacher is not only a coach, but also an expert. Besides in the former set of principles only the role of the teacher (in the institution) is mentioned. In the new set of principles the teacher or coach in practice is also included, because of the increasing importance of this role. Finally, in the first set of principles no attention was paid to developing the (professional) identity of students. However, in this study the importance of developing (professional) identity is emphasised; identity development for individuals in today's society as well as for individual employees is included in the last principle.

## Conclusion

Although discussion continues on the added value of competence-based learning, and the pitfalls mentioned in the introduction of this article are still valid, competence-based learning is a popular development in the Netherlands. However, as there still lacks a model for developing competence-based learning, this study was conducted. Its main objective was to reach consensus on a model for competence-based VET. All participants who returned the second questionnaire (fully) supported the current model, so the study finished with a viable consensus on it. Although this is a satisfying result, some final remarks are necessary.

A group of experts reached consensus on the model. It was now important to see whether VET institutions were really able to work with this model. A first attempt to measure the applicability of the model in practice was conducted. The model was tested in three VET institutions. The three institutions for secondary vocational education and higher vocational education developed and implemented competence-based learning separately from one another. Results were analysed and in a final consultation with a representative group of persons (three to five) from each institution, each case, based on the model was analysed and discussed. The following preliminary results of all three cases can be given. First, the representatives recognised their situations in the analyses and determined in which phase implementation of competence-based learning was situated. Second, the representatives could identify which aspects of the current situation should be improved. Finally, the model made it possible to formu-

late a concrete plan for future developments. Although preliminary, the conclusion can be drawn that this model can support VET institutions in their development towards competence-based learning. Further research with these and other programme teams of VET institutions needs to explain the exact added value of the model.

The model concerns the educational processes in a VET institution. It describes principles and items that can be applied at curriculum level. The model does not apply to the organisational level of a VET institution. However, if realising competence-based learning, the whole organisation has to change. Further research has to make clear what implementing competence-based learning means for the organisation of an institution. Mulder (2003) has already indicated that although competence-based learning is a promising development, it is rather complex and needs all developers' collective intelligence to make it a success.

This study only concentrated on agricultural institutions of VET, because the study was commissioned by the Dutch Ministry of Agriculture, Nature and Food Quality. But in other segments of education (teacher education, scientific education) competencies are increasingly the starting points for (re)designing the curriculum. Further research needs to make clear to what extent the model described in this study can be useful in other segments of education. Finally, it is interesting to compare the Dutch view on competence-based learning with developments at European level. In other countries competence-based learning is also an item on innovation agendas (Bjørnåvold, 2000; Descy and Tessaring, 2001).

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# Practical knowledge and occupational competence

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SUMMARY

**The work-oriented change in the didactics of vocational education (VET) identifies 'significant' vocational work situations and the associated work process knowledge as the pivotal factor in the design of vocational curricula and processes. What is dramatic about this change of perspective is not merely the departure from academic, discipline-based teaching methods, but also the formulation of vocational teaching methods for VET practice and VET design that are predicated on development theory. As concerns the structurally oriented method of imparting VET, which underwent this change early on, it is necessary to differentiate the category of knowledge, above all with respect to practical knowledge and practical concepts, and also as a basis for domain-specific VET research.**

## Competence development in vocational curricula and work situations

Germany's tradition of discipline-based vocational school curricula is to be replaced by a system which prioritises the work and business processes characteristic of an occupation as the focus for curricula structured around learning fields (KMK, 1996). The processes formulated as objective requirements here nevertheless lend a subject-related quality to the curriculum at the same time. This is what is significant about the above-mentioned change of perspective. The 'learning field' concept is geared not to a systematic sequence of factual material, but to the idea of a meaningful set of relevant vocational work situations which trainees must learn to master increasingly well. Vocationally competent behaviour therefore becomes the subject of learning.

By emphasising learning as a subjective process of construction, recent discussion of teaching methodology and teaching/learning re-

search have highlighted more clearly than ever before the fundamental difference between knowledge-centred instruction and knowledge as acquired learning (cf. Wittrock, 1990).

The pedagogical trends implicitly pursued by the KMK (German Standing Conference of Education Ministers) via the learning field concept correspond to theories based on the development of competencies. Vocational curricula can be systematised not only technically but also as a developmental process from beginner (novice) to reflective mastery (expert) (cf. Dreyfus; Dreyfus, 1987; Rauner, 1999). From a development theory point of view, the objective side - i.e. the one presenting the learning requirements to the subject - still remains. This reflects the idea of someone being confronted by developmental tasks (Havighurst, 1972; Gruschka, 1985 ([1])) but not yet having solved them: what a person cannot yet do - for want of the requisite competence - he learns to do by confronting the task, which fosters in him the development of competence. On account of this developmental/methodological basic model, the concept of developmental tasks lends itself particularly well to the structuring of vocational learning processes. We ([2]) refer to 'paradigmatic' work tasks typical of vocational work (Benner, 1997) whenever the work contexts characteristic and typical of an occupation at the same time promote the development of occupational competence. The identification of such tasks presupposes an analysis of the objective circumstances constituting a given occupation: the artefacts, tools, methods and organisational forms of vocational work, as well as the (competing) demands made by vocational work. The most successful way of reconstructing the most important work tasks for the development of occupational competence is on the basis of 'expert workers' workshops' (cf. Norton, 1997; Bremer; Röben, 2001; Kleiner, 2005).

The expert workers' accounts of their work, training and projections are arranged in such a way as to match increasing stages of occupational competence development and the formation of occupational identity. Two difficulties which can only be overcome by qualification researchers with a degree of experience should be pointed out in this connection:

1) The identification of work tasks can rapidly stray to the level of abstract abilities which reveal very little about vocational expertise and the competencies it incorporates.

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([1]) Developmental task theory was first taken up in Germany in the college project on course evaluation. Blankertz refers in his introductory contribution to the symposium 'Didactics and identity formation in young people' (8th DGfE Congress in Regensburg, 1982) to the breadth of this approach: 'what I find interesting about the recourse made to Rousseau and Spranger is simply the high value being attached by a subject theory to teaching methods that are appropriate to systematic education at a young age. [...] Indeed, syllabuses, textbooks, curricular materials and classroom teachers at secondary II level often refer by way of illustration to individual disciplines and industrial technologies, without systematically taking into account the developmental tasks faced by pupils (Blankertz, 1983, p. 141).

([2]) 'We' means a fairly large group of academics who have addressed ourselves in the past few years to the concepts and theories of task orientation in qualification and curriculum research (cf. ITB, 2002).

2) Work tasks which operate with the same artefacts and tools, and more-over superficially appear very similar, often prove to be extremely diverse in terms of the requisite occupational competence (cf. Stratmann, 1975).

Both of these difficulties can be overcome by means of vocationally oriented studies directed at analysing vocational work processes and tasks in situ (Lave; Wenger, 1991, p. 33; Röben, 2005). Interpreting and re-evaluating industrial work processes and tasks therefore means taking into account the interpretation model emerging in the context of communities of practice. Theo Wehner has coined the term 'local interpretation models' here. These are on the one hand imbued with social significance, but on the other hand they develop only in places where communities of practice operate (Wehner et al., 1996, p. 79). More specifically, what this means for qualification research is that the researcher must decode the work processes in situ as an interplay of work artefacts, tools and methods, and must decode the work organisation in its functionality, in its genesis and structurability as a technological and social process.

**Figure 1**: Vocational competence development 'from beginner to expert'
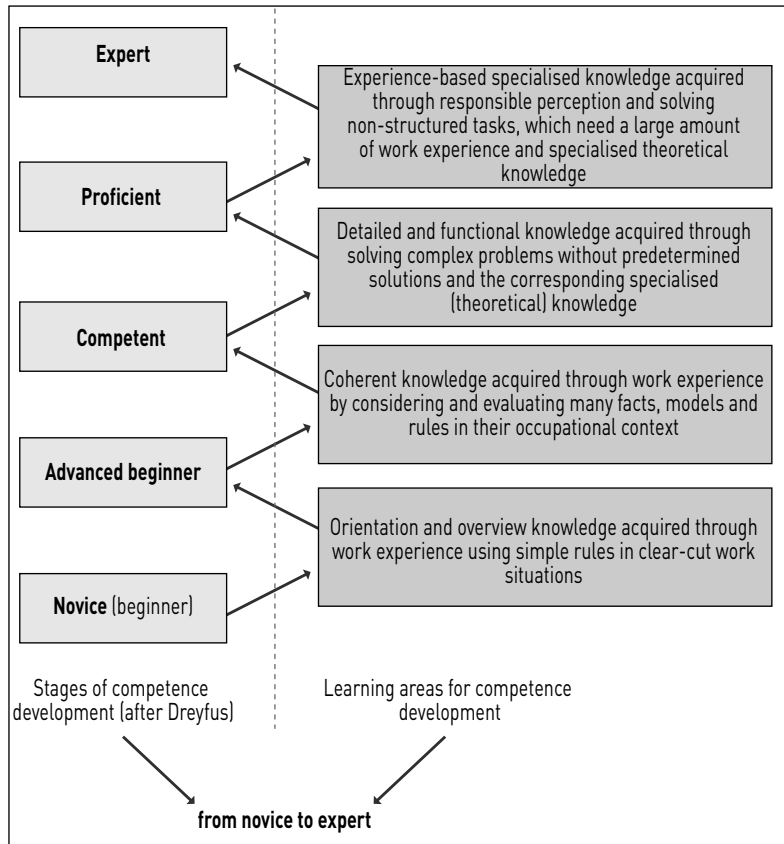
Bremer (2001) refers to the consequences of this for a work-oriented didactics of vocational education. For a trainee at the beginning of his vocational education, the new tasks and situations mark the start of a developmental process necessitates three elements: (1) vocational learning, (2) vocational work and (3) cooperation at work.

Developmental tasks have two didactic functions. First, they are used as an evaluation instrument to demonstrate the formation of occupational competence and identity at the (as yet unidentified) critical thresholds of occupational competence development (Bremer; Haasler, 2004). Second, developmental tasks are at the same time a didactic tool for establishing and designing vocational curricula as well as learning and working tasks for structurally oriented VET (vocational education and training) (cf. Howe et al., 2001).

The five stages of competence development identified by Hubert L. Dreyfus and Stuart E. Dreyfus, and the four corresponding developmental learning areas (Figure 1), have a hypothetical function for the identification of thresholds and stages in the development of occupational competence and identity; they also have a didactic function in the development of work-related and structurally oriented vocational courses (Rauner, 2002).

Expertise research also attaches crucial importance to developmental tasks, or their functional equivalents, for competence development. Regarding the development of occupational competence in nurses, for instance, Patricia Benner notes the paradigmatic significance of work situations in the step-by-step achievement of occupational competence in accordance with Dreyfus and Dreyfus' developmental model. Benner relates these developmental tasks to 'paradigmatic work situations' in the sense of cases which promote the competence of nursing staff (Benner, 1997).

Benner and Gruschka favour a change in the empirical access to real learning paths. Blankertz regards this change as dramatic not only owing to the departure from the discipline-based structuring of vocational curricula, but also in that competence development is governed by structures of meaning which demand a change of perspective in the trainee: 'he must anticipate his specific occupational role and identify with it - otherwise no competence development would be feasible' (Blankertz, 1983, p. 139).

Along with the subject of learning, i.e. the person whose skills are being developed from the level of deficient to competent, the analytical focus is also directed at learning processes beyond the pedagogical and organisational continuum of systematic instruction. The subject learns in situations whose quality becomes crucial to the learning outcomes. In a much more general pedagogical context, Lave and Wenger point out that learning as a path from inability to ability is accomplished as a process of integration into the community of practice of those who already demonstrate expertise (Lave; Wenger, 1991).

It has taken almost two decades in Germany to translate into didactic concepts the impetus generated by the attempt to explain competence development in VET in terms of development theory (cf. Bremer; Jagla, 2000; Rauner, 2004).

## Dimensions of practical knowledge

In the context of the change in VET didactics concerning work and work processes, work process knowledge is regarded as a central category of knowledge: it is knowledge which arises from reflective work experience and is incorporated in practical work. Work process knowledge is a form of knowledge that guides practical work and, as contextualised knowledge, goes far beyond non-contextual theoretical knowledge (cf. Eraut et al., 1998).

Picking up on the discussion about work process knowledge initiated by Wilfried Kruse (Kruse, 1986), this key category has been identified and explored in numerous research projects as a form of knowledge fundamental to vocational learning (cf. Boreham et al., 2002; Fischer; Rauner, 2002).

Work process knowledge can be characterised in an initial approximation as a combination of practical and theoretical knowledge (Figure 2). The European 'Work Process Knowledge' research network bases its investigations into the subject on a working definition whereby work process knowledge is 'knowledge which

• is directly necessary in the work process (as opposed for example to discipline-based knowledge;

**Figure 2**: Work process knowledge as a combination of practical and theoretical knowledge and of subjective and objective knowledge
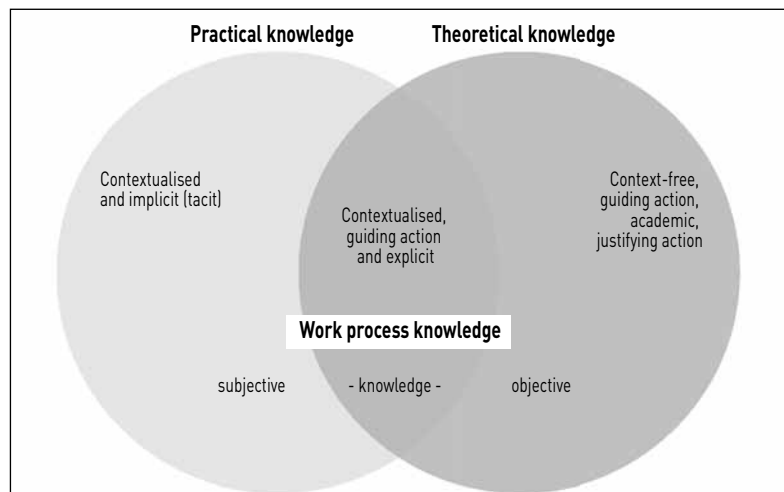
- is acquired in the work process itself, e.g. through experiential learning, but does not exclude the application of theoretical knowledge;
- encompasses a complete work process, in the sense of designing, planning, performing and assessing one's own work in the context of workplace processes' (Fischer, 2000, p. 36).

The category of practical knowledge will now be examined in more detail. This is especially crucial for VET, since what is directly at issue here is the relationship between work experience, knowledge and ability. We should refer at this juncture to the current discussion about the founding of a theory of social practice, as put forward for example by Andreas Reckwitz from a sociological perspective. From the point of view of VET research and pedagogy, it is interesting to note Reckwitz's reference to the implicit logic of practice, as expressed for instance in the artefacts of the working world and in the knowledge, interests and functions they represent.

According to Reckwitz's theory of practice, practical knowledge comprises:

1. 'knowledge in the sense of interpretive understanding, i.e. a routine assignment of meaning to objects, persons etc.;
2. methodical knowledge of 'script'-based procedures, or how to perform a series of actions competently;
3. motivational/emotional knowledge: an implicit sense of what one actually wants, what is at stake and what would not be feasible' (Reckwitz, 2003, p. 292).

This definition omits a dimension of practical knowledge which is relevant to VET research and pedagogy. The materiality of practice, as identified by Reckwitz, for example reduces technical artefacts to the dimension of the technical as a social process, in the theory of practice just as in established technical-sociological research. Curriculum theory requires a broader concept of the technical, encompassing the technical dimension of knowledge itself.

In examining paradigmatic work situations and tasks for nurses, Patricia Benner attaches constitutive importance to practical knowledge for occupational competence and takes up the cognitive theory positions substantiated by Schön in his 'epistemology of practice' (Schön, 1983). The six dimensions of practical knowledge identified by Benner (Benner, 1997) have gained currency in qualification and curriculum research. In qualification research, Bernd Haasler inter alia bases himself on this category-based framework for practical knowledge and confirms its usability in an empirical analysis of the extent to which manual work can be objectivised (Haasler, 2004).

*(1) Sensitivity to fine qualitative differences (sensitivity)*

A distinctive feature of practical vocational work is that, with increasing occupational experience, trained professionals develop ever greater sensitivity to fine and extremely fine situative differences in the percep-

tion and mastery of work situations. For example, a competent tool-maker, when removing the protruding parts of steel surfaces that have to be particularly flat, must possess exceptional technical sensitivity going beyond both the theoretical description of the requisite knowledge and expertise and the analysis of flat surface measurements and the machining algorithm to be derived therefrom. Experienced tool-makers are able, without lengthy reflection, to select correctly from thousands of tiny points on the steel surface they are shaving down which ones need to be removed, and can do so without being able to articulate the algorithm or rules they apply (Gerds, 2002).

*(2) Shared understanding (contextuality)*

Another aspect of practical vocational work is that, with increasing work experience beginning at the VET stage, members of occupational communities of practice possess an increasing body of similar and shared experiences. Their vocational work tasks are largely identical or similar. The language, stress, social norms and embedding of the specific vocational work in the process of social work constitute occupational traditions which lead to the emergence of comparable patterns of behaviour and appraisals. This ultimately results in an intuitive understanding that goes beyond verbal communication, enabling those concerned to work side by side even in very complex work situations without the need for many words (cf. Wehner et al., 1996).

*(3) Assumptions, expectations and attitudes (situativity)*

Practical knowledge comprises assumptions and expectations about typical work situations and work procedures. The interplay of experiential assumptions, attitudes and expectations, which leads to perceptual awareness (Holzkamp, 1985), on the one hand, and situative behaviour on the other constitutes an extremely fine differentiation of plans for action, going far beyond theory-driven activity. The narration and description of typical work situations initiated in technical discussions serves two purposes here: a contextualised account of work activity as an expression of situative assumptions, expectations and attitudes, and the decoding of their genesis. Furthermore, this contextualised access to practical knowledge ultimately makes it possible to differentiate more clearly between explicit and implicit work process knowledge.

*(4) Paradigmatic work tasks (paradigmaticity)*

Benner and Wrubel (1982) introduced the term 'paradigmatic cases' for the purposes of their vocationally oriented qualification research in the field of the nursing professions. Paradigmatic work tasks only include ones which are subjectively experienced as especially challenging and objectively afford new or additional work experience, but which are at the same time mastered on the basis of previous experience and previous knowledge in such a way that prior knowledge makes it possible to create prom-

ising plans for action. Paradigmatic developmental tasks have an objective side, inasmuch as vocationally oriented qualification research has shown which work tasks are typical of each developmental stage in the occupational progression from beginner to reflective mastery (expert) and whose accomplishment demands or promotes superior and more differentiated knowledge. One pre-requisite for curriculum development founded on development theory is the identification and analysis of vocational work tasks which have the quality of paradigmatic or developmental tasks.

### (5) Communication in the community of practice (communicativity)

Experts develop highly economic forms of comprehension in a broad spectrum of verbal and non-verbal communication within their community of practice. The subjective significance of information communicated within a community of practice is largely coherent. The degree of technical understanding lies well above that of communication outside the enterprise. In vocational work processes it is necessary on the one hand to be extremely precise when using defined concepts, codes, norms and rules, which allow no - or virtually no - scope for subjective interpretation. On the other hand, practical knowledge and occupational competence are reflected in contextualised language and communication whose full significance is apparent only to members of the community of practice. Access to the practical knowledge of a community of practice presupposes that one understands its language (Becker, 2005).

### (6) Unpredictable tasks and meta-competence (perspectivity)

Practical vocational activity takes place in work situations and contexts whose predictability varies from one occupation to another. New individual and collective practical knowledge arises constantly in such work situations, even though it is not possible to solve the fundamental problem of work situations that are in principle unpredictable. Related to this is a specific form of work-related stress, resulting from what can systematically be described as a knowledge gap (Drescher, 1996, p. 284). Thus work process knowledge is always incomplete knowledge, which is experienced subjectively in the case of unpredictable work tasks and constantly has to be bridged and completed in a given situation. In highly complex networked automated systems there is an additional unknown factor related to conditions and causes of faults. Faults of uncertain origin and temporary breakdowns make complex networked work systems even less transparent. Mastery of unpredictable work tasks - fundamentally incomplete knowledge (knowledge gap) in relation to non-transparent, non-deterministic work situations - is characteristic of practical work process knowledge. Wherever this is a feature of vocational work, meta-competence can be created, namely the ability to cope with the knowledge gap when solving unpredictable tasks and problems in vocational work.

The differentiation of the practical knowledge category as a dimension of the work process facilitates research into domain-specific knowledge,

which sheds more light on work process knowledge and in turn also promises to reveal more about the imparting of work process knowledge in or for vocational work processes. However, it provides only a partial answer to the overriding question of whether the loss of actuality of work process knowledge caused by accelerating change in the working world fundamentally devalues this knowledge as a point of reference for the development of occupational competence. A widely held popular thesis maintains that technical competence is devalued by the loss of actuality of vocational knowledge. Thus the technical dimension is in a sense shifted to a meta-level, where all that matters is to have appropriate access to technical knowledge documented in comfortable media, databases and knowledge management systems. Accessing the 'knowledge' required for specific work tasks - knowledge management - would be sufficient. Technical competence would vanish as a form of domain-specific method competence. Yet this thesis has been rejected by comprehensive studies on the transformation of skilled work and on skill requirements, above all in the field of diagnostic work. Some pertinent vocationally oriented studies, and expertise research too, have confirmed the opposite thesis, namely that the vocational work process knowledge underpinning technical occupational competence has in fact gained in significance (cf. Drescher, 1996; Becker, 2003; Rauner; Spöttl, 2002; Gerstenmaier, 2004).

VET practice, expertise research and vocationally oriented qualification research in the field of personal services and industrial work have unanimously concluded that domain-specific (technical) competence is the cornerstone of occupational competence (3). (To the extent that it is possible to put empirical curriculum research back on a firmer footing thanks to domain-specific qualification research, the diffuse formula of key qualifications takes a back seat.) Expertise and qualification research at the same time supports the concept of vocational learning in the context of meaningful work situations and hence the key programmatic idea of a curriculum structured around learning fields. The orientation of vocational learning according to (occupational) work and business processes - from a structurally oriented perspective - implies that work activity has a rationality of its own beyond the one-dimensional scientific rationality typical of the discipline-based curriculum. This finding has unleashed another controversial discussion in VET pedagogy about the connection between discipline-based and casuistic learning (cf. Fischer; Röben, 2004).

A widespread pedagogical belief in the specialised nature of vocational knowledge ties in with the German Educational Council's requirement that all training must be academically oriented, and assumes that specialist academic knowledge is the highest form of systematic knowledge, in which social knowledge is stored. Tade Tramm for instance does not in-

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(3) Cf. on this point the proceedings of the HGTB and GTW conferences (Pahl; Rauner; Spöttl, 2000; Eicker; Petersen, 2001; Petersen; Rauner; Stuber, 2001), Gerstenmaier, 2003 from an expertise research perspective, and Gardner in his substantiation of multiple intelligence theory (2002).

terpret the KMK's reference to work and business process orientation in its hand-out on the development of learning fields (KMK, 1996) as a programmatic reference to an extended notion of competence, but links it to the discussion about inductive forms of learning, which in VET are ultimately always directed at 'opening up access to systematic knowledge and conceptual awareness, and hence moving from the pragmatic context to economic insights [in the field of business and administration, F. R.] and interpretations' (Tramm, 2002, p. 58).

This assumption, widespread in VET pedagogy, that discipline-based knowledge represents a kind of shadow occupational activity that - in procedural terms - guides occupational expertise, derives from a fundamental mistaking of categories, as is demonstrated inter alia by Neuweg (2000) and Fischer (2002) (cf. on this point also Heritage, 1984, p. 298 ff).

Our interim conclusion would therefore be that the development of occupational competence occurs in a process of reflective practical experience. According to Schön, the development of occupational competence is based on an extension of the repertoire of individual cases with which the learner is confronted in the developmental process. Schön, however, underestimates here the contribution made by school-centred VET, if it is successful in turning work process knowledge and its communication in activity-oriented forms of learning into the cornerstone of curriculum development and course design. That then means systematising teaching and learning content along developmental lines, since occupational competence can only be developed in that way - and not along discipline lines.

The notions of practical knowledge and 'reflection on and in action' correspond to Klaus Holzkamp's notion of practical concepts (Holzkamp, 1985, p. 226 ff.). He maintains that the concepts which people use subjectively are basically practical, in that their elements, scope and fields of meaning (i.e. the sum of their elements of meaning and their context) are affected by the individual developmental processes. Scientifically defined concepts, however, represent only a fraction of the elements of meaning of practical concepts and hence determine (occupational) competence to only a very limited extent.

Members of different communities of practice have their own domain-specific practical concepts, in which the domain-specific connotations of objects form specific semantic fields (Wehner; Dick, 2001). The semantic fields of practical concepts become blurred at the edges, change their scope with every new experience, are in themselves quite contradictory, and their elements of meaning are often associated with other practical concepts. The significance of individual elements of meaning can only be clarified (in a domain-specific fashion) by taking into account the skill profile of an occupation. Subjective interpretations of elements of meaning are exposed to a continual process of change, embedded in the processes of competence development. It is therefore necessary to investigate in more detail whether and how the semantic fields for the same concept overlap in different occupations, how the elements of meaning correspond

to one another and in what way they are linked to other semantic fields. Practical concepts not only regulate ongoing work activity at a given time; they also underpin communication within and between communities of practice by symbolically representing contextualised circumstances. These processes of forming practical concepts that guide action and facilitate communication in communities of practice take place above all as situated learning. It is the task of technical and vocational didactic research to investigate beginners' prior understanding - or their subjective semantic fields for technical concepts - and experts' occupational semantic fields for key technical concepts. Only then will it be possible to devise teaching and learning strategies which enable the semantic fields and structures of everyday concepts and theories gradually to be transformed into occupational semantic fields.

## Conclusions

The traditional comparison made in pedagogical discussion between discipline-based and casuistic learning is misleading. The didactic concept of activity-led acquisition of discipline-based knowledge is predicated on a scientistic misconception of the relationship between knowledge and competence. The importance of specialised technical curriculum content for the process of developing occupational competence is greatly overestimated. In the area of industrial and technical VET, some elements of the work-related semantic fields are denoted with definitional knowledge, even if it is acquired through inductive teaching and learning methods. By contrast, the domain-specific practical concepts (Holzkamp, 1985, p. 266 ff.) acquired in the process of occupational competence development and the related subjective theories, as well as the understanding of the work process context, serve to guide action. This process cannot be dissociated from that of integrating into the community of practice.

Empirical VET research must therefore investigate in a domain-specific fashion, for each profession or occupation, what prior understanding and what experiences impact on the relevant vocational concepts and subjective theories of learners. Moving on from there, the steps and stages in the developmental communication of work process knowledge must be explored didactically. To this extent, the developmental systematisation of working and learning situations, e.g. in the form of case-work and projects, is an appropriate form of systematic VET where there is an opportunity to acquire extensive, meaningful and action-guiding concepts and theories, as well as behavioural strategies, embedded in and supported by the process of vocational identity-building. The topicality of this discussion arises out of the European project on the introduction of modular certification systems for vocational education as well as the opposite trend internationally towards the re-establishment of dual training models (e.g. in Malaysia, Oman, Italy, Holland and Scotland).

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# Competences and vocational higher education: Now and in future

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SUMMARY

**In this article the popularity of the concept of competence in higher vocational education is explained and the most important issues in this field are discussed. In particular, the vagueness of the term and the problems in defining job and training profiles are explained. Then the design of competence-based education is discussed. The paper ends by mentioning some subjects that are relevant to the future of competence-based education.**

**Competence-based education is a catch-all word concealing many different forms of education. It is mostly used for individual courses and much less for curricula although, seen from the point of view of competence, this could be the most interesting level. Research into the effectiveness – and content – of competence-based education is sparse and it is important to subject the claims of competence-based advocates to further investigation.**

## 1. Background to the popularity of the term competence

Competence is a term that has caused a furore within a relatively short time. Many recent books and articles on educational theory devote attention to competences, core competences and competence-based education, incidentally often without making it clear what the term means precisely (Biemans et al., 2004, Mulder, 2000, Descy and Tessaring, 2001).

This paper goes into the use of the concept of competence in the context of Dutch vocational higher education and discusses a number of central problems, although it should be noted that the problems presented here are not unique to higher vocational education, but are also relevant to secondary vocational education. Furthermore, the problems presented here can be seen in other countries of the European Union.

It is noteworthy that thinking in terms of competences is often presented as a new philosophy of teaching and training, whereas the term competence was already particularly popular in the 1970s. At that time, experiments were launched in the United States with competence-based curricula. Teacher training in particular, under the name Competence-Based Teacher Training (CBTT), but also legal and nursing vocational training, was also reorganised on a competence-based model (Grant, 1979). These experiments must be seen in the light of the problem of articulation observed between education and professional practice. The idea behind the experiments was that more stress had to be put on the acquisition of essential knowledge and skills under the slogan 'Back to basics'. Specific to CBTT was the emphasis on the acquisition of the behaviour exhibited by outstanding teachers by the study of part-skills, using heavily behaviouristically slanted instruction methods such as micro-teaching.

The initial optimism over CBTT ebbed very quickly (see Eraut, 1994). The copying of the behaviour of outstanding teachers by studying skills or part-skills did not result in the broad competence intended. Students encountered problems in integrating the part-skills learned, an ability that is required to function properly as a teacher. Although the American experiments attracted some notice, the CBTT approach attracted only a small following.

Not until the early 1990s did competence thinking attract widescale interest. Mulder (2000) assumes that interest in this concept was generated by publications on core competences by Prahalad and Hamel (1990). The concept first became popular in labour organisations and vocational education. Not until the end of the 1990s did higher education begin to show a serious interest in competence thinking. Interest in the concept of competence cannot be ascribed to any one development; rather it was a cluster of developments that led higher educational institutions to embrace the concept of competence. A few of these developments are described briefly below.

A feature of contemporary work is the increasing unpredictability of the future and the accompanying uncertainty over the skills that, both qualitatively and quantitatively, are important. More flexible work is the answer given by labour organisations to overcome this uncertainty. Traditional careers, in which employees work for prolonged periods for the same employer, building a vertical career, are on the decline; employees more often face, whether willingly or not, changes of employment so a horizontal career pattern is becoming ever more common. The ability to manage one's own career, even if it is much more often a more horizontal career,

is a skill that contributes to whether an employee is a successful 'knowledge worker' in the lowest segments of the labour market (Kuijpers, 2003). A knowledge worker is someone who acts efficiently, anticipates and learns and who uses knowledge for improvement and renewal. The development and application of knowledge in products and services - and, furthermore, at a faster rate than competitors - is vitally important to labour organisations for them to survive in the 21st century (Kessels, 2004). Possession of the ability and motivation to keep learning is crucial for a labour organisation to continue to be attractive.

It should be obvious that these changes in work have repercussions for higher education. Besides professional skills, graduates are expected to have learning, social and career competences in order to guarantee wide employability, including in the longer term. These competences are an essential part of the skills of employees in a post-industrial society and must therefore be given adequate consideration in syllabuses of higher education.

It would not be doing justice to reality simply to pay lip service to the concept of competence by pointing out external developments, such as the labour market situation or government policy. In higher educational institutions, too, one can see trends that form a breeding ground for thinking in terms of competences. The idea that reality is becoming more complex and dynamic has increased understanding in higher education that the acquisition of predominantly technical knowledge is not enough to manage the increasing complexity. A switch is taking place from knowledge to learning. In addition, the results of experiments in educational psychology in the 1980s show that the transfer of knowledge and skills does not take place automatically (see e.g. Salomon and Perkins 1989), and subjects such as 'Learning to learn', 'Project education', 'Problem-centred education' and 'Contextualisation and decontextualisation' score higher on the innovation agenda of higher education.

The move from knowledge to learning, in combination with the problem of transfer, creates a seed bed for the concept of competence. Whereas problem-centred or project education emphasises teaching methods for the collective learning of how to solve problems, competence-based education stresses the nature of the problems which must be included in such forms of education, namely the key content of professional practice. Key content means the problems and tasks that belong to the durable core of the profession and which are fairly stable over time.

## 2. Consideration of competences in higher education

The fact that competence thinking is extremely popular does not mean that it means the same thing in every context. Different views are possible and each view gives a slightly different facet of the term competence. A num-

ber of these views are dealt with by Van der Klink and Boon (2003), and these are briefly described in Table 1. Competence is an international term but its meaning is different in different countries. Table 1 shows how the concept of competence is defined in the three countries where the term is frequently used. A second view of the concept of competence is the educational theoretical perspective. In the table a distinction is drawn between the cognitive theory of learning and the constructivist theory of learning that has been in vogue particularly over the past 10 years. Lastly the table describes the view from the area of application since the purpose for which the concept of competence is used determines the nuances of the definition. For instance, in educational settings definitions are used in which competences are regard-

**Table 1**: Views of the concept of competence

| View | Location | Emphases in the definition |
|---|---|---|
| Geographical area | United States | Competence [American: competency] refers to behavioural and personality characteristics underlying possibly excellent performance. |
| | United Kingdom | Competence refers to the ability to perform to standards specified in advance. |
| | Germany | Competence refers to the broad capacity to act that enables an individual to do a job. Aspects such as interpretation and professional identity are also part of this capacity. |
| Teaching theory | Constructivism | Emphasises the importance of convictions, motivation and ambition as major aspects of the term competence, more stress on involvement of participants in developing teaching practices based on competence. |
| | Cognitive teaching theory | Stronger accent on teachable aspects of competence, more emphasis on top-down approach to the development of teaching practices based on competences. |
| Practice | Acquisition and selection | Competences consist of a combination of partly developable potentials and partly non- or hardly changeable personal characteristics for a range of jobs. |
| | Teaching and training | Competences are regarded as something to be learned or to be developed further. |
| | Job evaluation | Competences are defined in terms of specific actions within one job. |
| | Performance pay | Competences are defined in terms of the desired output of a job. Competence is regarded as the predictor of performance. |

ed as developable skills, whereas in selection practice competences are much more often regarded as hard or unvarying personal characteristics.

There is no good overview of the extent to which the concept of competence has been embraced in higher education but it is a fact that much attention is devoted in higher educational institutions to the competences of their graduates. The particular feature of this development is the fact that the attention comes above all from the institutions themselves, in contrast to the 1970s, when the concern came from employers regarding the connection between education and the labour market. Various developments support the interest that training institutions have in the professional abilities or competence of graduates. One of these is the accreditation system, in which the aptitude of graduates for the labour market is used as an explicit quality criterion both for higher vocational and higher education graduates. Another development supporting competence thinking is certainly the interest that educational institutions have in a good reputation in this field since, as resources become more scarce and competition increases in the higher education market, reputation and recognition are extremely important assets.

Despite this attention there is also a considerable lack of clarity about the precise definition of relevant competences. Which competences must graduates have? What is the relative importance of various types of knowledge, skills and attitudes? Does this relative importance change in the course of a career? Which labour market perspective must education prepare for? And which time perspective is important? Which are more important, competences needed at the time of the first entry to the labour market or competences that are important at the later stages of a career?

The eagerness of educational institutions to offer competence-based training, in combination with the lack of clarity about the precise content of the concept 'competence-based' has led to the multiplicity of different meanings and forms of implementation that we find in higher education.

In higher education the term 'competence-based education' is often used without it always being clear what it means exactly. Van der Klink and Boon (2003) observe that four variants are actually used. In the first variant it is above all a matter of window dressing; the term is used by education providers to create a distinct profile on the market without anything actually changing in the education. It could be called 'old wine in new bottles'. Here it is often a case of a different name for an existing education in skills where the extra ingredient is on the surface.

In the second variant the term 'competence-based education' can be used if there is an innovation in the teaching methods, moving towards integration of knowledge and skills, often by the use of authentic problems, projects or cases. The authentic problems discussed in training are not chosen for their representativeness or relevance to the practice of the profession but from the pedagogic perspective of identifiability. In practice the emphasis here is often on vocational skills.

Third, competence-based education can aim at strengthening the re-

lationship with the possibly regional labour market, for instance by setting up consultative committees with representatives from the professional field, staff training, or by drawing up job or training profiles in consultation with the professional field. This variant occurs particularly in training courses to prepare for a profession with a recognisable profile and a well-organised professional field.

The fourth and last variant uses competence-based education as a label for an integrated approach, in which attention is devoted both to pedagogic innovation and optimisation of the relationship with the labour market (see also Buskermolen and Slotman, 1999). This approach is discussed further in paragraph 4.3.

The four variants described above are meant as a structural framework for educational practices and are definitely not intended to make judgments in the form of more/less, better/worse. Furthermore, the variants do not in principle rule each other out. For instance, window dressing can act as a prelude to making real innovations in education.

# 3. The arrangement of competence-based higher education

Institutions that begin introducing competence-based education encounter a number of problems:

1) There is little agreement on the definition of competence so that a shared vision on how to introduce competence-based education is often missing.

2) A fundamental condition for introducing competence-based education is the possession of a job and training profile so that the demands made on graduates match the competences demanded on the labour market.

3) There is a considerable lack of clarity in the way in which and the methods by which competence-based education has to be designed and arranged.

The following paragraphs discuss these three problem areas in detail.

### 3.1 Definition of competences

Van der Klink and Boon (2003) argue that the lack of clarity over the term competence itself contributes to its popularity. On the basis of interviews with experts, the authors observe that competences include at least knowledge, skills and attitudes, and that the mix of these can vary with each competence. In their opinion, conceptual harmonisation is a necessary precondition. They also advocate limiting the term competence-based education by applying the following two criteria:

1) Competences dealt with in training must be geared to the requirements (key problems) in the profession/cluster of jobs for which the training is a qualification.

2) The teaching (and testing) methods must prepare the student to handle these key problems.

The number of definitions of the term competence is probably incalculable. On the basis of a literature study, Stoof, Martens and Van Merriënboer (2000) observe that competence is a term that belongs to the 'wicked words' category. A characteristic of wicked words is that their limits are difficult to determine. Complete agreement on the content of a term like this is virtually impossible.

- A study was conducted by Van Merriënboer, Van der Klink and Hendriks (2002) on behalf of the Advisory Council for Education into the possibility of a conceptual harmonisation of the concept of competence.

The authors observe that there is a considerable overlap between the concept of competence and concepts such as 'expertise' and 'key qualification', but the concept of competence is not entirely covered by the other concepts. The authors come to the conclusion that conceptual harmonisation of the concept of competence is possible using six dimensions, three of which are considered necessary and three relevant. The idea of dimensions suggests that several positions can be held on one dimension (e.g. low, neutral, high). In view of the limited length of this text, only the necessary dimensions are dealt with here:

- Integrativity: a competence is a coherent assembly of elements needed for problem-solving;
- Sustainability: one characteristic of a competence is that it is fairly stable (over time) but that the content (e.g. the knowledge and skills) of the competence varies over time;
- Specificity: competences differ in the degree to which they are context-bound. Some, such as learning competences, are widely applicable whereas others are more bound to specific contexts, including vocational.

Finally the authors point out that conceptual harmonisation is perhaps important but only if it is regarded as a necessary step towards educational innovation. A correct balance must be struck between conceptual harmonisation, on the one hand, and actually working at educational innovation by the parties concerned, on the other.

## 3.2 Job and training profiles

One of the pillars of a competence-based approach to education is the match between the content and the skills demanded by business. It is clear that a mix of specific professional competences must be sought which ensure usability in the short term, and broader competences that guarantee employability in the longer term (Borghans and de Grip, 1999). There are various methods for harmonising professional demands with educational curricula.

In broad outline a distinction must be drawn between methods that attempt to make a direct link between professional practice and education-

al curricula and methods intended to distil the elements of professional practice that can enrich the curriculum.

In the first variant there is a strong emphasis on the analysis of knowledge and skills needed to do a job and then on translation of this knowledge and these skills into educational terms. Normally it is almost always the job of experts to reflect on essential competences belonging to a specific job or task. Their ideas are then used as input for a curriculum. The best-known method is conventional task and job analysis, in which tasks, sub-tasks and goals are identified by the use of observation and interviews. Variants of the task and job analysis are the critical path and critical incident analysis (Fletcher, 1997), which both aim at a very specific description of tasks, based on interviews with professionals. A second variant is more focused on designing a curriculum that meets the demands of a job or profession; the focus here is on enrichment of the curriculum. The goal is not to make a direct match with the job requirements but to distil the realistic and representative characteristics, requirements or situations from professional practice that make it possible to integrate competences into the training. These competences must be relevant to professional practice but must at the same time make it possible to innovate the professional practice. A number of methods used in this connection are: research into the professional experiences of alumni of a particular training programme and then specifically to question the degree to which the training offers a good preparation for the profession concerned. Other methods are based on group surveys of experts at a working conference. One example is the Dacum method (developing a curriculum), which provides an analysis of tasks, knowledge and skills needed to practise a profession. The analysis is then made according to a specific procedure by a panel of practitioners of that profession. The most important assumptions are that expert practitioners are better at describing a profession than anyone else; that each profession can be broken down into jobs and tasks and, lastly, that all tasks have implications for the knowledge and skills required. Possibly the Dacum method can be further explored in subsequent stages such as the AMOD method (a model), in which a step is taken towards curriculum and evaluation, or the SCID (Systematic Curricular Instructional Development), in which a detailed analysis of tasks is made with a view to curriculum development.

Other methods are surveys of core competences or key qualifications where quantitative and qualitative information is sought by using interviews, questionnaires and a seminar, with the object of describing those competences that demand flexibility from practitioners (Van Zolingen, 1995; Onstenk, 1997). The important point here is consideration for the complexity of relationships between the expected output, the organisational setting and the social context in which the work is being done. Another qualitative method for drawing up job profiles in both the short and long term was tested by van der Klink and Boon (2002). Using semi-structured interviews with recent graduates and their direct supervisors, they investigated what com-

petences are needed for today's professional practice and for careers within these practices.

In practice, the choice of method is dictated by a multiplicity of factors in which not only the nature of the training or course is important, but also considerations of cost and time play a part. If cost is a burden and time limited, less labour-intensive methods are chosen more often, and an analysis of existing information, for instance based on alumni surveys supplemented by desk-top research, will be chosen. The scope of the problem also plays a major role. If a specific part of a course is concerned, it may be possible to make do with a job analysis. If there are questions about the future development of a profession and its effect on a curriculum, an investigation into the development of key qualifications is more likely.

In contrast to curricula designed in business and in primary and secondary vocational education, curricula in higher education are often designed without any systematic investigation beforehand into the job profile on which the training is focused and information is used that is obtained from surveys of the opinions of alumni on the match between training and job requirements. On the other hand, particularly in higher education, ideas from the target profession on the relationship between the curriculum and job requirements are becoming more and more important, including as part of accreditation procedures.

## 3.3 The design of competence-based curricula

*Characteristics of competence-based curricula*
This paragraph refers to the fourth variant of competence-based education (see para. 2). A competence-based curriculum gives consideration both to the optimisation of the relationship with the labour market and to pedagogic innovation. A competence-based curriculum is not only geared to the competences of the job and training profile, but generally shows a number of the following pedagogic characteristics (Schlusmans et al 1999, Keun, 2002, Mulder, 2004):
- focus on problems from professional practice;
- integration of the acquisition and application of knowledge and skills;
- the student's self-responsibility;
- co-operative learning;
- new forms of testing;
- use of ICT.

These characteristics are explained briefly below.

Throughout the entire curriculum attention is focused on problems from professional practice. This may take various forms, ranging from cases and descriptions of problem situations introduced into the school environment to virtual businesses (Bitter-Rijpkema et al, 2003) and to genuine professional situations in practice (job placements, graduate assignments). Here,

the creation of the most authentic possible contexts is considered extremely important (Gulikers et al, 2002).

The acquisition of knowledge, skills and attitudes and their application is integrated. So students do not first learn a miscellany of knowledge and skills separately and then apply them to a practical situation but the acquisition of knowledge and skills is stimulated by applying them. Students are constantly being made more responsible for their own learning and competence development. A competence-based curriculum teaches the student to control his own development, with instruments such as portfolios, personal development plans and study contracts being of crucial importance (Elshout-Mohr et al, 2003). Syllabuses are increasingly personalised and geared to the students' initial situation and learning needs.

Co-operative learning also plays an important role in competence-based curricula. For instance learning in groups via project or problem-guided forms of education is often an essential part of the curriculum (Baert, Beunens en Dekeyser, 2001, Kreijns, Kirschnner and Jochems, 2002).

Lastly, testing is integrated into the learning process and, in a competence-based curriculum, not only the acquired knowledge and skills but also competence is tested. Here, an important factor is the introduction of new forms of testing such as performance assessment, authentic testing and peer assessment (Tillema et al, 2000). Competence-based testing appears to be the Achilles heel of competence-based education. If students are only judged on the knowledge they have acquired while skills and attitudes are ignored in the assessment, students will only bother to acquire the knowledge needed for the test. Competence-based testing presupposes the integrated testing of knowledge, skills and attitudes, not only by a recapitulative test at the end of the learning process but also by a formative test to give students interim information on their progress and encourage reflection on their own performance. Traditional forms of testing, such as multiple-choice questions, open questions or essays are regarded as inadequate to say anything about competences because the focus is only too often on knowledge. New forms, such as simulations, skills labs, or appraisals in the work situation, will have to be added to the test repertoire to be able to assess adequately whether students have acquired the entire competence.

A major issue in competence-based education is the validation of non-formal and informal learning (Colardyn and Bjørnåvold, 2004). In competence-based curricula the recognition of previously acquired competences is becoming ever more widespread for the purpose of granting exemptions. An inventory of the procedures already adopted in practice in higher vocational education for the accreditation of prior learning (APL) shows that countries such as Finland and the UK have developed national systems for this purpose equipped with the necessary statutory frameworks (van Rens, 2004). In contrast, higher education in the Netherlands is still at the experimental stage; local initiatives are being developed but they are

particularly focused on determining the candidate's knowledge, in particular the knowledge expressed in formal certificates and diplomas.

A separate issue in drafting competence-based curricula is the use of ICT. ICT is often seen as a major precondition for the creation of a competence-based curriculum. This means in particular the automation of the learning process in an electronic learning environment, in which the supply of a large quantity of supporting information, the creation of virtual contexts, the offer of communication options and the flexibilisation of syllabuses is central (Klarus and Kral, 2004)

### 3.3.1 Design methods

The design of cogent, competence-based curricula demands precise gearing of learning activities, instruction and testing (Biggs, 1996), in which first the tests of skills are determined before learning activities and instruction are designed. This is at odds with the usual approach in education, where the tests are only designed as the last component of instruction.

In the design of competence-based curricula, traditional instruction-design models, based on learning simple knowledge or skills, are no use. However, there are few reliable guidelines or approaches available to design or redesign a competence-based curriculum (Petegem and Valcke, 2002). Nor do descriptions or presentations of good practice offer satisfactory methods because they often relate to things such as job placements or practical training or the use of portfolios and do not extend to the level of the overall design of the training.

There are two methods of design that appear to offer a satisfactory basis for designing competence-based curricula: the cognitive apprenticeship model and the 4C/ID-model.

The Cognitive Apprenticeship Model (Collins, Brown and Newman, 1989) is based on cognitive ideas about learning. The instruction model is modelled on the earlier master-journeyman relationship, in which newcomers learn as much as possible on the job from the master himself. Three characteristics are central to this model: modelling, coaching and fading. In constructing a curriculum, this model gives a number of instructions:
- make authentic tasks the focus;
- introduce increasing complexity into tasks so that they always contain; more skills and concepts that reflect expert behaviour;
- provide sufficient variation in the execution of tasks;
- first present tasks as a whole before concentrating on the separate parts;
- ensure close monitoring of the student so that the degree of support can be adjusted to the student's specific needs.

Although the Cognitive Apprenticeship Model clearly shows the effective methods of acquiring competences, it gives designers virtually no clue as to how they should design competence-based teaching practices.

This contrasts with the 4C/ID-Model, which shows in great detail how designers should go about their task (Van Merriënboer, 1997).

The 4C/ID-model is based on the modern principles of Instructional Design (ID) (see also Merill, 2002). One feature of this model is that it starts with an extensive analysis of the way in which experts carry out professional tasks in practice. Complex skills or competences are analysed down to their constituent skills. Specific to the 4C/ID approach is the principle that constituent skills and accompanying knowledge must be coordinated and integrated. The model gives some clues for the design of a learning environment that focuses on the stimulation of complex learning, the integration of learning and working and the offer of built-in support. The model distinguishes between four components (4C) that together form the instructional blueprint: learning tasks, supporting information, just-in-time information and task segmentation. An integrated learning environment can be created with these four components. The most important component is authentic learning tasks based on situations from professional practice. Each learning task contains the entire professional task and is conducted in a realistic professional situation. Learning tasks form the 'backbone' of education. The other components are developed in relation to the learning tasks. Learning tasks are divided into classes arranged in order from simple to complex, depending on the degree of support. There must be enough variation between the learning tasks in one task class. A learning task from the highest task class, in which the task is carried out independently, can be used as a test (Hoogveld et al, 2002; van Merriënboer et al, 2002; van Merriënboer, 1997).

## 4. An agenda for educational practice

This article explains the background of the concept of competence in higher vocational education and then discusses questions arising in the development of competence-based education. In brief, it can be stated that competence-based education is in fact a catch-all term concealing many different forms of education. The competence-based concept is also discussed at various levels, ranging from a single course to total training. Looked at relatively, a number of interesting examples can be found at course level. Otherwise it is found at the level of 'inter-course' training aspects and at the level of total training design, which is probably where there is the greatest need from the point of view of educational practice.

In conclusion we can say that the concept of competence has found acceptance but that a number of subjects are still neglected. To conclude this paper we would like to touch on a number of issues that in our opinion are essential to the further development of competence-based education.

1) Because competence-based education is a catch-all word, it is important to clarify what options are available to create competence-based education. Does 'competence-based' mean that all parts of education

are competence-based? Or must integration classes be added to the curriculum? Does 'competence-based' education mean the end of formal lectures and theory lessons? It is important clearly to identify the various options, including their consequences.

2) The development of competence-based job and training profiles is a matter of concern. Competence-based profiles differ from conventional profiles by having more stress laid on the integration of knowledge, skills and attitudes into meaningful wholes. There are no approaches or procedures for this. There is also a lack of knowledge on how the profile can fulfil a guiding role in the continuation of the process of educational development. In competence-based education it is important that the cohesion between knowledge, skills and attitude is retained. That is often still the case in the training profile, but there is a real risk that the connection is being moved to the background in the further development of education. There are still no integrated design methods suitable for competence-based education.

3) Besides the above points that focus on the design and execution of competence-based education, it is important that the implicit claims of competence-based training be investigated further. 'Competence-centeredness' is associated with broad usability, with a greater accent on 'being able' instead of mere knowledge acquisition. Research into the position of graduates on the labour market and changes in their position over a lengthy period (longitudinal career research) should indicate whether these claims are actually being realised.

4) Competence-based education demands a huge amount of investment both in monitoring and in testing, and the question is whether this is economically feasible. Researchers will have to seek out smart, economically sound educational solutions, probably with the help of ICT, to make the offer of competence-based education affordable on a large scale.

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# Training in socio-emotional skills through on-site training (¹)

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SUMMARY

**Socio-emotional skills are highly prized on the labour market these days; many writers say that competencies of this type help to increase individuals' employability, but educational institutions consistently forget their responsibility for providing training in them.**

**Most jobs call not only for knowledge and specific technical competencies, but also for a certain level of social and emotional skills enabling workers, for example, to work in teams, to motivate themselves when confronting problems, to solve interpersonal disputes, and to tolerate high levels of stress.**

**The best way of developing socio-emotional skills is through experience, appropriate training and practice. For this reason, we argue that the time spent undergoing on-site training is a perfect opportunity for tutors to help students and recent graduates to develop their socio-emotional skills.**

**Key words**

Social skill,
apprenticeship,
vocational training,
work-based training,
personal development,
vocational guidance,
mentoring

## Introduction

Hand in hand with the recent technological revolution and economic globalisation of the 20th century, the concept, structure and work dynamics of organisations the world over have been re-defined; at the same time, changes have occurred in kinds of work, in organisational and intangible technologies and, logically, in the skills profiles required of young people and workers.

Our society needs more and more professionals endowed with a wide range of skills, and in particular with those skills that are not restricted to the technical content of their jobs, but which are also related to the way of working, to attitudes towards work and others, to the quality of relationships, and to flexibility and the capacity to adapt. It is not simply a question of knowing how to do something (know-how), but also of wanting to do it and knowing how to be. Education must meet this demand, and guidance in particular may be seen as an appropriate educational tool for addressing the demand.

The importance of skills training has been highlighted by various leading international institutions such as the Organisation for Economic Cooperation and Development (OECD), the International Labour Organization (ILO), and the European Union itself. In short, an interest has been clearly expressed in what has been called the 'skills focus' at an international level (García, 2003; Irigoin and Vargas, 2002).

The emphasis in the European Union today is on the need to give skills training to young people and workers, irrespective of whether they work by preference with things, ideas, data or people. On the one hand, the need to have both standards of professional qualification and standards of higher (university) education has been established in the European context. Specifically, in Spain, Organic Law 5/2002 of 19 June on Qualifications and Vocational Training (*Ley Orgánica 5/2002, de 19 de junio, de las Cualificaciones y de la Formación Profesional*) states that the policies to be developed must ensure that the competences, knowledge and attitudes (crucial for national and European competitiveness) of all segments of the population are strengthened.

On the other hand, the Tuning Educational Structures in Europe project on the implementation of the 1999 Bologna Declaration at university level is also based on the skills focus; one of the project's key objectives is to help develop European university qualifications that are easily comparable and comprehensible, and based on the design of occupational profiles, learning outcomes, and skills that are desirable in terms of generic and specific skills relating to each area of study or occupational sector (González and Wagenaar, 2003, p. 28-33).

## The skills focus

Research into the role of non-cognitive and personality variables in the performance of employment duties got under way in the 1970s when the skills focus was beginning to gain in importance (McClelland, 1973). Indeed, this focus has received a new lease of life in the last few decades (Boyatzis, 1982; Fletcher, 1991; Wolf, 1995; Levy-Leboyer, 1997; Tejada, 1999; Pereda and Berrocal, 1999, 2001; García, 2000, 2003), finally being applied by European education and vocational training policies (Blas, 1999). Although the skills focus has attracted serious criticism (Barret and Depinet, 1991; Barnett, 1994) - for example, it is frequently referred to as a 'fad' (Del Pino, 1997) - its usefulness, as many writers have pointed out, is becoming increasingly self-evident and incontrovertible: *la gestión por competencias es una moda del management, pero es una moda que 'sirve' para apoyar e instrumentar la nueva organización de la empresa y la nueva realidad de la gestión de personas en la organización laboral* [management by skills is a style of management, but one that 'serves' to support and structure the enterprise's new organisation and the new reality of person management in workforce organisation] (Jiménez, 1997, p. 347).

Although a large number of definitions may be found in the literature on the concept of 'skill', most emphasise that all skills are learned, or are capable of being learned and developed, and necessarily involve the appropriate (and observable) performance of particular types of activity and task. According to some writers, for example, skills are *los comportamientos que se llevan a cabo cuando se ponen en práctica los conocimientos, aptitudes y rasgos de personalidad* [behaviours that are carried out when knowledge, aptitudes and personality traits are put into practice] (Pereda and Berrocal, 1999, p. 75); others say that they constitute the *conjunto de conocimientos, procedimientos, destrezas, aptitudes y actitudes necesarias para realizar actividades diversas (ejercer una profesión, resolver problemas) con un cierto nivel de calidad y eficacia, y de forma autónoma y flexible* [corpus of knowledge, procedures, competences, aptitudes and attitudes that are needed to carry out various activities (e.g. doing a job or solving problems) to a certain degree of quality and effectiveness, and in an independent and flexible manner] (Bisquerra, 2002, p. 7). Repetto, Ballesteros and Malik (2000, p. 60) take the view that the word 'skill' mainly refers to the integration of the three levels of human functioning usually referred to by the acronym KSA (knowledge, skills and attitudes), and originally described by Bloom et al. as the 'cognitive, psychomotor and affective' fields (Bloom, Engelhart, Furst, Hill, and Krathwohl, 1956; Krathwohl, Bloom, and Masia, 1964; Dave, 1970; Simpson, 1972; Harrow, 1972):

- knowledge, the outcomes of perceptive and conceptual processes such as attention, selection, symbolisation, codification/decodification, reflection and evaluation;

- execution of competences, the outcomes of the psychomotor process that enables individuals to give clear responses, and possibly to offer a tangible product that may be observed and assessed by another person;
- attitudes, the products of emotional responses to events and other specific objects.

In this context, Roe (2002, 2003) proposes a comprehensive skills model whereby the skills (and sub-skills) that develop through practice in the workplace flow from an expression of knowledge, skills and attitudes, and from a combination of capacities, personality traits and other personal characteristics like motivation, energy state and level of vitality. However, we believe that it is also important to stress that skills are not stable characteristics (traits), but rather the demonstration of an appropriate performance in particular contextual/situational conditions, despite the fact that this performance is only carried out thanks to the prior existence and combination of personal and contextual resources. With regard to skills, therefore, it is important to bear in mind that their acquisition, development and expression (or inhibition) depend at all times both on personal characteristics, such as contextual or situational characteristics, and on the dynamic interaction between both fields (personal and situational).

To put it in another way, and in line with the proposal put forward by Pereda and Berrocal (1999, 2001), it is important to point out that for a person to demonstrate skill in a job, function or role, s/he not only needs to master a series of conceptual (knowing), procedural (knowing how to do something (know-how)) and attitudinal (knowing how to be) knowledge, but must also, firstly, be motivated to act (wanting to do something) and secondly, be endowed with personal characteristics (cognitive skills, emotional intelligence and personality traits) and with contextual characteristics minimally appropriate and favourable to the performance to be carried out (able to do something). In this way, experience and practice in different (real and simulated) situations allow a person to be trained to link all these resources with a view to facilitating on each occasion the transfer of his/her skills to new, albeit similar, situations and demands.

With regard to theoretical approximations of the study of skills, the authors have concluded, following a review of the literature, that there are three main theoretical perspectives or models (see Vargas, Casanova and Montanaro, 2001; Jiménez, 1997; Del Pino, 1997; Royo and Del Cerro, 2005):

a) the conductist, analytical or molecular model, originally from the United States, in which the emphasis is laid on the molecular elements of skills. According to this model, skills are seen as a coherent corpus of 'observable' behaviours which allow a particular activity to be appropriately carried out. This is the perspective that gave rise to the skills focus itself, and as a reaction to the 'focus on traits' in psychology (McClelland, 1973; Pereda and Berrocal, 1999). In this model, the accent is placed both on behavioural observation and on interviews

concerning critical events, with a view to determining the behaviour pro-
files of successful workers and high fliers. From this perspective, *se con-
cibe el desempeño competente como aquel que se ajusta a un traba-
jo descrito a partir de una lista de tareas claramente especificadas* [per-
formance is deemed to be competent when it adjusts to a job described
on the basis of a list of clearly specified tasks] (Vargas et al., 2001,
p. 24), and these tasks are described as very concrete and meaningful
actions (e.g. 'recognising and altering an incorrect accounting entry' for
somebody working in bookkeeping, and 'smiling at customers and call-
ing them by their name' for people dealing directly with the public;

b) the personal qualities and attributes model, originally from Great Britain,
and described as 'functionalist' by Royo and del Cerro (2005). Under
this model, skill is seen as a combination of attributes (traits) which un-
derlie successful work, and are usually defined more broadly and gener-
ically in such a way that they may be applied in different contexts. Ex-
amples of these attributes are leadership, initiative and team-work-
ing;

c) the holistic, or integrated, model, which has its roots in France, but is
also applied widely in Australia and England. This approximation of the
skills focus embraces skills such as the skill to integrate both tasks car-
ried out (behaviours) and the person's attributes, and simultaneously
takes the setting into account. In short, this model sees skills as the
outcome of dynamic interaction between separate masses of knowl-
edge, abilities, attitudes, and aptitudes and personality traits mobilised
according to the characteristics of the context and the work that the in-
dividual is engaged on (Vargas et al., 2001, p. 28).

Our theoretical approach to socio-emotional skills is structured by the
holistic, or integrated, skills model. We agree with Le Boterf (2001), for ex-
ample, when he says that skill is a construction: the outcome of a combi-
nation and dual mobilisation of incorporated and personal resources
(e.g. knowledge, know-how, personal qualities and experience) and con-
textual resources (e.g. documentary networks, databanks and tools).

As for the typology of skills, a distinction is drawn, depending on
their level of applicability, between generic skills and specific skills (Lévy-
Leboyer, 1997), this being terminology that is shared by institutions such
as the OECD and the European Union under the Tuning project. Given
their possible transferability to various contexts and situations, generic skills
are those used in any occupational activity; specific or technical skills are
those whose content is linked to a specific area of work and to a sub-
stantive activity, even though they are not easily transferable and are nor-
mally acquired through occupational specialisation.

However, the afore-mentioned generic skills, which are transferable to
a wide range of jobs, include particular social skills and emotional skills, or
'socio-emotional skills if they are being referred to as a whole (Repetto and
Pérez, 2003). In the Tuning project, for example, some of these socio-emo-

tional skills are contained in the group of interpersonal skills (e.g. team-working and interpersonal skills) and in that of systemic skills (e.g. leadership, initiative and motivation to succeed).

Many writers and institutions also use the phrase 'key competencies'. This mainly refers to those generic skills that warrant special recognition for their outstanding importance and applicability to the various areas of human life (educational and occupational, personal and social). Indeed, the words 'generic' and 'key' are sometimes used synonymously. In one of its papers, the Information Network on Education in Europe, Eurydice, outlines its position as follows: 'Despite their differing conceptualisation and interpretation of the term in question, the majority of experts seem to agree that for a competence to deserve attributes such as "key", "core", "essential" or "basic", it must be necessary and beneficial to any individual and to society as a whole' (Eurydice, 2002, p. 15). However, we think it is important to make clear that 'basic skills' are not the same as 'key competencies'. Most experts usually talk about 'basic' skills when referring to the sub-group of generic or key competencies that are instrumentally essential in a given culture for every person and job, and particularly as we use 'basic' skills to communicate with one another and continue learning. Classic examples of basic skills are 'carrying out basic arithmetical calculations (adding, subtracting, multiplying and dividing)' and 'reading and writing in one's mother tongue'. Since the 1990s, at least two more basic skills, the outcomes of both economic globalisation and accelerated technical progress, have come to the fore: 'speaking English' and 'using electronic office tools'.

In our view, a large number of socio-emotional skills (e.g. perception of the emotions of others, regulation of one's own emotions, empathy and self-motivation) are also 'key' competencies.

Lastly, we must mention another term used in the field of skills that is less orthodox, but which is nonetheless sometimes used: meta-competences. According to some writers (Fleming, 1991), this refers to higher-level competencies that make it possible to call on a corpus of other competencies of narrower scope. Others (Cardona, 2003) say that the word refers to a person's traits that precede the acquisition, development and performance of any kind of competency (namely decision-making skills, integrity and emotional intelligence).

## Socio-emotional competences

### Types of socio-emotional competences

With regard to the classification of socio-emotional comptencies, it is important to bear in mind that it varies from one writer to another, and from one theoretical approximation to another. Increasing interest in Emotional Intelligence (EI) since the mid-1990s has also contributed to the rediscov-

ery of emotional skills in particular and, by extension, to that of socio-emotional skills. We set out below a summary of the main theoretical models of socio-emotional skills to be found in the specialist literature.

As for a typology of emotional skills, the evolutive psychologist Carolyn Saarni (1999) says there are a total of eight: awareness of one's own emotions; the ability to discern and understand others' emotions; the ability to use the vocabulary of emotion and expression; capacity for empathetic involvement; the ability to differentiate internal subjective emotional experience from external emotional expression; capacity for adaptive coping with aversive emotions and distressing circumstances; awareness of emotional communication within relationships; capacity for emotional self-sufficiency.

From the perspective of educational interventions aimed at developing socio-emotional skills, the Collaborative for Academic, Social and Emotional Learning (CASEL; www.casel.org ), a research body of international standing in school programmes on 'socio-emotional education', has drawn up a list of socio-emotional skills and competencies that fall under four headings: knowing oneself and other people (an example of this is the skill to recognise and label one's own feelings), taking responsible decisions (for which it will be necessary to have, for example, appropriate emotional regulation), caring for other people (in which empathy is a key factor) and knowing how to behave (a group including verbal and non-verbal communication, the management of interpersonal relationships, and negotiating).

The cognitive psychologists Mayer and Salovey (1997) do not speak about skills in the real sense of the word, but of four large 'emotional' competences, or branches of EI: a) the perception, assessment and expression of emotions; b) the emotional facilitation of thinking; c) an understanding of emotions and emotional knowledge; and d) the reflexive regulation of emotions.

As for skills more accurately referred to as 'social', Bunk (1994) says that examples include the capacity for social adaptation, a disposition for cooperation, and team spirit. As Caballo (1993) describes, social competence (or social skills) mainly incorporates a corpus of behaviours carried out by an individual in an interpersonal setting; these behaviours express the individual's feelings, attitudes, desires, opinions and rights, in a manner appropriate to the situation (e.g. a context involving the family, education or work), while at the same time respecting the same behaviours in others, and generally resolve problems that can immediately arise in the interaction, thereby minimising the possibility of problems occurring in the future.

Using their international experience of working for international human resource consultants and earlier research conducted for the Hay Group consultancy (Boyatzis, 1982; Bethell-Fox, 1997) as a basis, Boyatzis, Goleman and Rhee (2000), all leading disciples of the school of David McClelland, have concluded that the main socio-emotional skills required

**Table 1**: Classification of socio-emotional skills under the Goleman
(2001, p. 28) model

|  | Personal skill | Social skill |
|---|---|---|
| Awareness | Emotional self-awareness<br>Self-assessment<br>Self-confidence | Empathy<br>Orientation towards the client<br>Organisational awareness |
| Management | Emotional self-control<br>Formality<br>Responsibility<br>Adaptability<br>Motivation for success<br>Initiative | Development of others<br>Influence<br>Communication<br>Conflict management<br>Leadership<br>Catalyzing change<br>Building alliances<br>Team-working |

for success at work may be summarised in a series of 20 skills, which in turn fall into four general blocks: emotional self-awareness, self-management or self-government (self-control), social awareness (empathy), and management of social relations and skills. This is one of the most frequently employed models in human resources in organisations, despite the fact that insufficient empirical research has been carried out with a view to supporting its validity.

Following an analysis of the content of the main models of emotional intelligence trait (EI trait) in the literature (Salovey and Mayer, 1990; Goleman, 1995; Bar-On, 1997), Petrides and Furnham (2001) have recently drawn up a list of the 15 most important socio-emotional dimensions for this construct: adaptability, assertiveness, emotional assessment of oneself and of others, emotional expression, the emotional management of others, emotional regulation, low impulsiveness, the skills required to form relationships, self-esteem, self-motivation, social skill, stress management, empathy, happiness and optimism.

*Socio-emotional skills, performance at work and employability*
The importance of socio-emotional skills to the growth of socio-economic benefits is well established in other western societies: 'American industry currently spends around USD 50 billion every year on training, and much of this training focuses on social and emotional skills' (Cherniss, 2000, p. 434). Spain has no tradition of conducting research in these skills, but in the last ten years, important, well-researched studies on the subject have been written in Anglo-Saxon countries, with the United States in particular taking the lead. A leading player in these initiatives is CASEL, under whose aegis dozens of socio-emotional training courses have been

developed; the institute is currently focusing particular attention on research into the assessment of these programmes (Zins, Travis and Freppon, 1997; Zins, Weissberg, Wang and Walberg, 2004; Zeidner, Roberts and Matthews, 2002).

A number of studies (Pérez, 2003) refer to the involvement of emotional intelligence and socio-emotional skills in leading a satisfactory life, mental health, career development, doing one's job, effective leadership, dealing with work-related stress, and the reduction in the level of aggressiveness in organisations. Scientific contributions to this field have so far found evidence of important relationships between socio-emotional skills, personal development, performance of duties at the workplace and effective leadership in organisations (Wong and Law, 2002). It is also worth pointing out that the ongoing development of tools for evaluating emotional intelligence is making a major contribution to the expansion of this field of research (Pérez and Repetto, 2004; Pérez, Petrides and Furnham, 2005).

Generally speaking, socio-emotional skills are felt to be critical to the effective performance of most jobs (Cherniss, 2000). Accordingly, it is reasonable to conclude that personal development, the quality of life at work, and the development of leadership of members of an organisation may be facilitated by training courses aimed at developing socio-emotional skills.

Although cognitive skills in the world of work are clearly very important, especially at a time when work is becoming more complex and requiring decisions to be taken continually (Gottfredson, 2003), it is believed that, to achieve and maintain good relations at work and obtain high levels of performance, professional development and organisational learning as well, there is also a need for other social and emotional skills. The development of such socio-emotional skills plays an important part in boosting an individual's success in an organisational context. The need for skills of these types covers a wide range of tasks including the management of groups, team-working, tolerance of work-related stress, negotiations, conflict resolution, planning one's own professional career, motivation for one's own work, the motivation of others, and dealing with critical situations.

In most organisations these days, there is an inescapable need for team-working and cooperation with, and coordination of, others - in short, the implementation of socio-emotional skills that will facilitate and optimise both work and the quality of relationships.

It is clear, then, that socio-emotional skills are important for professional development, and probably for vocational integration and employability as well (Palací and Topa, 2002; Palací and Moriano, 2003). For an initial approximation, we may define 'employability' as la capacidad de un candidato para conseguir y mantener un empleo o sucesivos empleos a lo largo de toda la vida profesional [an applicant's ability to find and keep a job and subsequent jobs throughout his/her professional lifetime] (Sánchez, 2003, p. 274). Although there is no absolute consensus on the subject, the

essential characteristics of employability may be summarised under three headings:

1) a predisposition towards mobility;
2) the knowledge, skills and competences applicable to various employment contexts;
3) updated knowledge of the labour market.

However, it is important to bear in mind that employability does not depend solely on the individual: after all is said and done, what makes a person employable is his/her ability to match the variable demands of the labour market. On the other hand, the fact that a person possesses the skills most widely in demand on the labour market gives him/her a huge advantage and the flexibility to find and keep a job. As has been noted above, socio-emotional skills are deemed to be both generic skills and key competencies, and therefore to be useful in a wide range of jobs and professions. However, the field of vocational training is notable for at least seven occupational families in which socio-emotional skills probably play a major role as they are normally used in situations of team-working and work involving direct and/or personal contact with customers. These seven families are: a) administration; b) commerce and marketing; c) communications, audio-visual; d) hotels and tourism; e) personal image; f) health; and g) socio-cultural services and the community.

In all of these, the promotion of guidance and training in socio-emotional skills is recommended during the period of on-site training.

## Skills training

As Pereda and Berrocal (1999, 2001) and García (2003) show, skills training is based on the use of active, participative methodologies. The most important skills training techniques include 'real-life work experience' or, in their absence, 'simulations' (e.g. role-playing, business games and outdoor training), which promote experiential learning and modelling (observing more experienced work colleagues, or watching videos), which in turn foster learning by observation and social learning. The context of on-site work is ideal for developing skills as it provides a real work setting in which the skills required by a given job must be put into practice.

Skills training is based on practice and 'action', and on-site work experience therefore offers a unique opportunity to develop skills as students are enabled to 'experiment', 'try out', 'apply', 'test', 'acquire' and/or 'extinguish' skills (behaviours) in a real work setting.

### Workplace training

On-site training played no systematic part in vocational training [Formación Profesional] (FP II) in Spain until the 1980s. This was when an emphasis began to be placed on vocational training, and an atmosphere of closer and more active collaboration between entrepreneurs and educa-

tional institutions first emerged (Martínez, 2002, p. 46). In substantive terms, the establishment of on-site training (*Formación en Centros de Trabajo*, FCT) arose out of Article 34.2 of the Organic Act 1/1990 of 3 October on the General Organisation of the Education System (*Ley Orgánica 1/1990 de 3 de octubre, de Ordenación General del Sistema Educativo*, LOGSE), which sought to promote learning in the workplace and in the classroom. Today, this system of alternating classroom and workplace training has fortunately become widespread in vocational training in Spain. It may be partly because of this that vocational training qualifications, which were once much less highly regarded, have gained greater social acceptance in Spain in the last few decades.

Moreover, according to figures from the Ministry of Education and the Eurydice report for 2005, the last few years have seen an increase in the number of Spanish students studying vocational training, although many fewer than those opting for the *Bachillerato* and going to university (approximately 38 % as compared with 62 %). However, *la formación profesional tiene un mayor potencial de inserción laboral que la universitaria* (vocational training has greater potential than a university education for enabling people to enter the labour market) (Informe Infoempleo, 2005, p. 24).

Like Sobrado and Romero (2002), we believe that practical work and on-site training are both key elements of vocational integration guidance and an excellent opportunity for developing personal and key competencies. When students and recent graduates of vocational training and higher education take part in on-site training, they have a chance to learn from experience, although it has to be remembered that experience in itself involves no learning nor is it educational. For the experience of on-site training to become a genuine learning process, it must boast at least three characteristics (Álvarez Rojo et al., 2000):

a) integrating well planned and coherent experiences with skills to be developed;
b) promoting reflection over experience;
c) facilitating the integration of experience through self-assessment, the analysis of consequences, and the promotion of transference to other situations.

Initial Specialised Vocational Training (*Formación Profesional Inicial Específica*) in Spain aims to fulfil these three requirements by promoting on-site training through FCT modules. Spanish legislation on the subject currently differentiates between four separate blocks of training, or 'Professional Modules' (*Modelos Profesionales*) (MECD, 2003b, p. 5):

a) professional modules linked to a unit of skill, and consisting of specific, professional skills training designed to enable students to acquire the professional behaviours set out in the unit of skill;
b) a basic, or transversal, module consisting of knowledge of a particular technical field, and on which a number of course's specific modules are based;
c) a Training and Vocational Integration Module (*Módulo de Formación y*

*Orientación Laboral*, FOL), a training package aimed at providing students with more comprehensive preparation for entering the labour market and developing appropriately in the world of work;

d) an On-site Training Module (*Módulo de Formación en Centros de Trabajo*, FCT), which seeks to consolidate and complement students' professional skills acquired in the educational establishment through the performance of productive activities at the workplace.

Training in the workplace (FCT) corresponds to the on-site training module in Initial/Regulated Specialist Vocational Training (*Formación Profesional Inicial/Reglada Específica*); it lasts between 10 and 20 weeks, approximately 25% of the total workload for each qualification. *La característica más relevante de esta formación es que se desarrolla en un ámbito productivo real (la empresa), donde los alumnos podrán desempeñar las actividades y funciones propias de los distintos puestos de trabajo de una profesión, conocer la organización de los procesos productivos o de servicios y de las relaciones laborales, siempre orientados y asesorados por los Tutores del Centro Educativo y del Centro de Trabajo* [The key feature of this training is that it takes place in a genuine productive setting (the enterprise) where students may perform the real activities and functions of the jobs in a profession, and learn about the organisation of the productive processes or services and of employment relations, with constant guidance and advice from tutors in the educational establishment and the workplace] (MECD, 2003b, p. 6; MEC, 1994).

The aim of workplace training is to promote the vocational training of students in three areas (MECD, 2004): theoretical-cognitive (knowledge), practical (technical skill) and attitudinal (social attitudes and skills). Under this system, the development of socio-emotional skills only appears to be represented by the third area, where some attitudes are inter-mingled with certain socio-emotional skills. As we know, there is already a reference to affective and social factors in the official approach taken by workplace training (FCT), but it is far too restricted, not to say reductionist and simplistic, as is clear, for example, from the summary assessment form provided by the Ministry for workplace tutors to use when assessing students on workplace training (see Table 2).

*The key role of the tutor*

The learning process during on-site training calls for a form of tutoring that embraces features including coaching and mentoring. As Repetto and Pérez (2003, p. 104) explain, *en el coaching, el supervisor propone a su tutorizado, y acuerda con él, planes de acción concretos encaminados a mejorar su formación en determinadas competencias* [in coaching, the supervisor offers students, and reaches agreements with them about substantive action plans designed to improve their training in particular skills]. The broader process of mentoring may be defined as *el proceso continuo mediante el cual un supervisor, denominado mentor, informa y orienta a un compañero de trabajo, nuevo o de menor experiencia, en su proceso*

**Table 2**: Elements of current assessment of attitudes and social skills
in workplace training. Extracted from MECD (2004: p. 26)

| INDICATOR | ASSESSMENT | | | | |
|---|---|---|---|---|---|
| | 10 | 8 | 6 | 4 | 2 or 0 |
| Initiative | Takes a large number of productive initiatives | Takes frequent, successful initiatives | Only sometimes takes initiatives | Very rarely takes initiatives | Rarely or never takes initiatives |
| Spirit of collaboration and team work | Great willingness and success | High level of willingness and success in most cases | Moderate level of willingness and relatively successful | Little willingness | Very little, or no, willingness |
| Attendance and punctuality | No incidences | 1 or 2 minor incidences a month | 3 or 4 minor incidences a month | 1 or 2 major incidences a month | 3 or more major incidences a month |
| Sense of responsibility and interest in the work | Very high | High | Acceptable | Low | Very low or none at all |

*de adaptación a su puesto de trabajo y a la organización* [an ongoing process whereby the supervisor, who is known as the 'mentor', instructs and guides new or inexperienced work colleagues in their process of adapting to their job and to the organisation] (op. cit., p. 105). Lastly, the person carrying out the tutoring/guidance role in one way or another is known as the 'tutor'. This approach is typically used as a strategy for intervening in workers' continuing vocational training (García et al., 2003).

Moreover, tutors - that is to say both those who work in vocational training schools (teachers, tutors and advisors in Departments of Guidance) and in university-based Guidance, Information and Employment Centres (*Centros de Orientación, Información y Empleo*, COIEs) and workplace-based tutors - are deemed to be decisive factors in promoting the training of students and recent graduates in socio-emotional skills; to achieve this, they have to employ well designed and empirically validated programmes and courses in work-based guidance and training.

Tutors play a key role with students undergoing on-site training, offering them direction, guidance, assistance and support during their period of occupational training. This work carried out by the tutors needs to be offered to small groups of students and those who have recently completed their on-site training, although the tutors also give each student personal attention.

On-site tutors are key players in workplace training: *se responsabiliza de organizar el puesto formativo con los medios técnicos disponibles, y*

*con los fines propuestos en el programa formativo. Se encarga asimismo del seguimiento de las actividades del alumno* [they are responsible for organising the training, using the technical resources available and complying with the objectives set out in the training programme. They also have the task of monitoring their students' activities] (MECD, 2003a). All of the foregoing means that the tutor has to carry out a number of functions (see Table 3).

## Final thoughts

As both Vélaz de Medrano (2002) and Palací and Topa (2002) make clear, socio-emotional skills play an important role in vocational integration, remaining in employment, employability and professional development, and also in enabling workers to achieve adaptation and social inclusion as participative citizens of the system.

However, research including that of Echeverría (2002) shows that key competencies frequently required in a range of jobs are team-work and self-control, both of them socio-emotional skills. Echeverria also provides data relating to the discrepancy between academic, especially university-level, education and the demands of the labour market. Similarly, the work of Cajide, Porto and Abeal (2002), which is based on information supplied by a large number of enterprises, also highlights the imbalance between academic education and employers' requirements in relation to 'social skills', 'personal development skills' and 'employment skills'.

On-site training and initial work experiences constitute a unique context for the development of skills, and particularly of socio-emotional skills (see Ballesteros, Guillamón, Manzano, Moriano and Palací, 2001; Palací and Peiró, 1995), while guidance and tutoring activities are key elements in promoting the person's training and in encouraging his/her entry into the labour market or transition from an academic environment to the labour market.

**Table 3**: Functions of the on-site tutor in workplace training.
Adapted from MECD (2003a).

| Functions | |
|---|---|
| Exclusive | Leading the training activities |
| | Giving guidance to students |
| | Assessing students' progress |
| Shared | Planning training activities |
| | Determining how many students can be supported at any one time |
| | Resolving technical and personal problems |
| | Completing monitoring and assessment forms |

Guidance and tutorial processes have been clearly highlighted in numerous studies as significant factors in enabling people in employment and social contexts (Repetto, 1991; Rodríguez Diéguez, 2002). Accordingly, the roles of the practical skills tutor and on-site trainer are of vital importance in helping students and recent graduates to seize opportunities to learn socio-emotional skills (Slipais, 1993; Repetto, Ballesteros and Malik, 2000).

As for the importance of contextual variables in the development of socio-emotional skills and vocational integration, earlier studies have highlighted the importance of family variables among others (Osca, Palací and Hontangas, 1994). This is one of the reasons why a guidance intervention plan on citizens' socio-emotional skills for vocational integration and the professional development of young people should also take a look at contextual variables, and, as far as possible, give thought to coordination of the work of various institutions (the educational establishment, workplaces and employment activities, the family, and local bodies like the local authority and not-for-profit associations).

Workers' training and their likely employability depend these days on the development both of their technical skills and of their socio-emotional skills, especially when the performance of their duties frequently involves teamwork, cooperation with other workers, and/or dealing with, or having direct contact with, customers. Moreover, as a number of studies have pointed out (Bachman, Stein, Campbell and Sitarenios, 2000; Wong and Law, 2002), jobs characterised by 'emotional labor' (for a review of this, see Glomb and Tews, 2004; Martínez, 2001), such as managers, sales assistants, nurses, teachers, psychologists and debt-collectors call for a high level of socio-emotional skills generally, and of emotional skills in particular, to enable them both to control their own emotions and those of others appropriately in relation to the demands of the job, and to save them from emotional exhaustion and deteriorating health.

Given that the context of on-site training offers important opportunities for promoting the development of socio-emotional skills, we think it is appropriate and necessary to argue for the inclusion of guidance plans and socio-emotional skills training in vocational workplace courses, as long as they are supervised by a tutor/advisor/mentor, and flexibly linked to the rest of the planning of these modules. Similarly, on-site training for students and university graduates should include the same plans for guidance and training in socio-emotional skills.

However, given that skills of this type can, and should, be developed throughout a person's life from childhood to the third age, as has been seen at other times, what would be really desirable and useful for our present and future society would be for socio-emotional skills training to have begun earlier in schools at all levels (Repetto, 2003; Bisquerra, 2005).

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# The production and destruction of individual competence: the role of vocational experience

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SUMMARY

This article presents the results of research into the impact on individual skill levels of the variables traditionally represented by human capital. The discussion is centred around the way in which education and vocational experience contribute to the process of producing useful skills in the job market or, conversely, of making them obsolete.

The data comes from a survey of five banks in which we asked supervisors to assess the skills of 600 employees (counter staff and customer managers). It is a hetero-assessment based on a list of skills and behaviours.

The central theme of this article is to draw attention to the process of the invalidation of acquired knowledge which individuals can be faced with and the role which banks accord to the two sources of human capital. The complementarity or substitution of sources of skills acquisition is thus proposed on a case-by-case basis.

## Introduction

In economics, the theme of skills is quite widely addressed by the theory of human capital, especially where it seeks to explain stylised facts of the labour market such as better salaries for the better educated. The notion of the 'productive value' of education, inspired by Becker (1975)

(¹) and developed by the human capital model, indicates that education contributes to the acquisition of productive capacity. For his part, Mincer (1993) (²) puts the emphasis on post-school investment, supposing that individuals acquire productive capacity after their formal education, with vocational experience an important source of acquiring skills.

It still needs to be understood how education and vocational experience contribute to the process of producing useful skills or, conversely, to making them obsolete. We wish to discuss which are the skills produced by the school and/or by businesses through experience and highlight the process whereby the acquired knowledge of the oldest individuals is 'invalidated' as a result of economic and technological development.

Using empirical research data into the production and valorisation of skills in the banking sector, we study the impact of human capital variables on individual skill levels. The data comes from a survey of five banks in which we asked supervisors to assess the skills of 600 employees (³) (counter staff and customer managers). It is a assessment based on a list of 30 skills and behaviours.

Our approach is structured into three parts. Firstly we have to take into account the propositions of human capital theory in order to understand the role of vocational experience in the employment market. Secondly, we look synthetically at the transformation of jobs and skills in the banking sector. Thirdly, we present some of the results which enable us to discuss this process of the construction/destruction of individual skills and subsequently, the search by banks for young, graduate staff. Can we talk in terms of the destruction or rather about the non-use of acquired skills? The reply to this question depends on the analytical reference framework chosen, an economy of conventions or an economy of education.

# 1. The theory of human capital and the production of skills

In this section, we present the theoretical contributions, together with the limititations of the neo-classical approach to human capital, in order to discuss the productive value of vocational experience.

## 1.1 Vocational experience and the human capital model

When it first appeared, the notion of human capital related to various individual investments (Schultz, 1961). The pioneering research of Becker and Mincer sought to examine individual investment in education and

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(¹)  Second edition
(²)  This is a reprint of the 1974 edition
(³)  The survey was conducted during 2001 on a sample of 1100 employees in 120 branches, situated in various locations - Lisbon, Porto, Viseu, Évora and Faro, and coming under the three biggest financial groups in Portugal. The final sample obtained was 600 employees.

vocational experience to explain the differences in salaries observed in the employment market.

Without doubt, the notion of human capital does not merely represent a break with the previously held neo-classical view of the homogeneity of work, but also represents a new way of looking at the factor of labour. In 1998, the OECD recognised the potential of the concept of human capital, which 'forcefully' highlights the importance of the human factor in an economy based on knowledge and skills (OECD, 1998).

Indeed, human capital theorists stressed the influence of initial training and vocational experience on the growth in individual productivity which results from the productive capacity acquired from these two sources of skills.

In a word, Becker and Mincer theorised the idea that workers are heterogeneous by virtue of differences in their useful productive capacity on the labour market.

In Human Capital, human capital refers in particular to education. Education is an investment, be it for the individual or for society, because it enables skills to be acquired which make individuals more productive. For Mincer, Becker's schooling model constitutes a primitive configuration of the salary function in human capital theory. He introduces the idea of post-school investment, notably investment in vocational training

It is through this approach in terms of investment that Mincer admits that individuals acquire productive capacity after formal education, vocational experience being an important source of skills acquisition. Nevertheless, in his opinion, these investments are not directly observable. What can be observed and quantified are the salary profiles. These illustrate the variation in salaries by age and their configuration suggests that investment is greater at the start of a salary career and less intense later on.

## 1.2 Criticisms of Mincer's operational concept

For Mincer, the operational concept of vocational experience is a potential experience and this contribution makes him somewhat open to criticism, especially as Mincerian vocational experience is a homogenous experience measured by years of vocational life. During the nineties, economists and sociologists went back to studying vocational experience and sought to capture the heterogeneity of the paths and of the productive capacity acquired. They also sought to highlight the obsolescence of the skills acquired from vocational experience.

On the basis of the hypothesis that 'enterprises seek to minimise the cost of adapting', Cart and Toutain propose studying the role of vocational experience in the individual's ability to adapt (Cart and Toutin, 1998, p. 137). For the authors, vocational experience enables individuals to acquire skills, the latter being determined by the variability and elasticity of the jobs. Thus, the variation in vocational activity presents an essential role in the process of constructing skills (Cart and Toutin, 1998).

Alongside this line of research, Ballot and Piatecki (1996) ask about the

lasting validity of acquired vocational experience. In their discussion on the hedging which enterprises do between promotion and external recruitment to fill the more senior hierarchical positions, Ballot and Piatecki reject the idea that vocational experience is an indicator of the quality of labour. The authors put forward two arguments: firstly, that changes in vocational activity help to devalue experience; secondly, that in a context of technological development, training and experience become progressively obsolete. In this context, recently trained generations acquire new advantages (Ballot and Piatecki, 1996).

It is important to stress that the contributions of Cart and Toutin (1998) and Ballot and Piatecki (1996) related, above all, to heterogeneity and the complexity of vocational experience as a source of acquiring skills. However, they did not describe the skills which experience produces or makes obsolete. We are, therefore, a long way from the problem of the current role of vocational experience in the production or obsolescence of skills. What exactly are the skills whose production is determined by vocational experience? This description of the sources of producing skills is the subject of an empirical analysis which we will develop later. Let us consider for the moment the job trends in the banking sector in order to understand the transformation of skills requirements on the part of the banks in the sample.

## 2. The Portuguese banking sector and the transformation of its jobs

The major changes which banks have undergone comprise a multitude of transformations and constitute an interesting case study for understanding changes in skills requirements. This is why this article is dedicated to examining the principal changes which have taken place in the Portuguese banking sector and how they impact on the composition of labour.

Technological development and market trends have transformed jobs and skills in the banking sector. Without wishing to go into a detailed analysis of these changes, it should be remembered that they have been far reaching (Almeida, 2001) in terms of the increase in the number of jobs and their vocational configuration, as well as in the increase in the number of branches (Costa Pereira (coord.), 1998).

1985 and 1992 are the most important dates in the development of the Portuguese banking sector. The first signals the start of the process of re-privatisation of the sector, with the creation of a private bank. This process was consolidated by 1992, with the expansion of private banks to the detriment of state-owned banks. This development was linked to the renewal of the economic, technological, organisational and management strategies of the Portuguese banks. In more recent years, the strategy of bank mergers has become stronger, resulting in a concentration on major financial groups.

As regards the composition of labour, it should be stressed that the banks have started a process of reclassifying staff, based on their level of education. Furthermore, for some time, the banking sector has proven to be a sector with high educational qualifications. Thus the Collective Labour Agreement of 1982 specified a minimum of 9 years' education at the time of recruitment and the 1990 Agreement specified secondary level schooling - 11 years' education - as a criterion, even though compulsory schooling in Portugal is currently 9 years.

Some macroeconomic data ([4]) can be useful in helping to describe this movement of qualitative change in labour. Between 1985 and 1992, the proportion of graduate staff responsible for commercial activities increased considerably: the proportion of graduates rose from 4.5 % in 1985 to 8.2 % in 1992 and to 16.5 % in 1998.

In focusing on the recruitment policy ([5]) of banks in Portugal, we find that they favoured applicants with a university qualification, and secondly those with a secondary education qualification. The annual average growth rate (AAGR) of university graduates recruited between 1985 and 1992 is 42 %; it is 36 % in the case of those with a certificate of secondary education. By contrast, during this same period, the AAGR of employees who had completed the period of compulsory education (9 years) is the lowest - 19 %. The importance of university education persists between 1992 and 1998, with an AAGR of its graduate staff of 14 %. Recruitment at other levels goes down, with an AAGR of -3 % in the case of those with secondary school education and -17 % in the case of those who have completed the period of compulsory education.

This desire to reclassify is also proven by the recruitment practices of certain banks in our sample, which are now moving away from the rules set out by the Agreement revised in 1990 and demanding a university qualification for access to banking jobs, rather than a secondary education certificate. Banks also seem to favour training in management and economics as these enable staff to acquire the specific skills more easily. In a word, banks are pursuing a strategy of acquiring general and vocational skills which are partially or wholly produced by education.

The strategy of change is finally being deployed on banking activities which were traditionally structured according to a bureaucratic system and a rigid division between administrative and commercial activities. In a context of internationalisation, development of financial markets and the computerisation of most vocational activities, some jobs have disappeared, others have been transformed and, finally, new jobs have appeared.

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([4]) The proportions are calculated on the basis of data from an administrative survey conducted by the Ministry for Employment, which covers all enterprises. It is an exhaustive source of information, entitled '*Quadros de Pessoal*', which contains information about enterprises and workers, presented in a symmetrical fashion.

([5]) The indicators used for examining the recruitment policy were calculated on the basis of staff with less than one year's service.

The most far-reaching transformation relates to the weakening of the rigid dichotomy between administrative and commercial jobs, i.e. between the 'back-office' and 'front-office'. In fact, the priority given to commercial activities, multitasking and team work has resulted in this dichotomy becoming obsolete, requiring bank employees to have skills which encompass both these types of activity.

Over and above these organisational changes, we must take into account the reconfiguration of the skills of bank staff who are responsible for commercial activities. The main development is asking staff to change from a passive attitude of waiting for the customer to express his needs, to a proactive one of spontaneously approaching customers (Conseil, 1998).

In the same vein, the specialisation of 'commercial' matters is reinforced. It is becoming more frequent for there to be separation between those responsible for specific customers, such as major companies, small and medium-sized companies, public organisations, private individuals. In some banks, staff responsible for commercial activities specialise in a particular business sector, such as property.

In order to meet the challenges presented by these changes, banks seek human resources which have the most appropriate skills. The education system is therefore becoming a crucial source of acquiring the skills which facilitate the ability to learn and to adapt to permanent change.

In their comparative work on European banks, Annadale-Massa and Bertrand (1990) stress the role of the education system in preparing human resources to cope with change.

# 3. Empirical analysis and discussion of the productive value of vocational experience

In this final part, we concentrate our study on the impact of education and vocational training on the individual skill level. Firstly, we need to present our methodological options and the instrument we have used for gathering information. We will then discuss the empirical results and the discrepancies compared to the contributions of human capital theory.

## 3.1 The data

In this section, we will present the methodological research options and the main results of the debate on the valorisation of vocational experience or the valorisation of acquired knowledge. In order to relate to this debate, we will test the human capital hypotheses, according to which education and vocational experience contribute to skills production. The 'productive value' of education and vocational experience thus relates to the economic - salary value of the skills acquired. We should also point out that our context is sources of skills production and the valorisation of those sources.

Our analysis is centred on the hetero-assessment of skills. Unlike the methodological options of Green (1998) and Paul (2005), who use the self-

assessment of skills by the employees themselves, our work consisted of asking supervisors to use a skills grid to assess the skills of staff (figure 1).

The methodological option of assessment should be seen in the context of most banks, which have introduced systems for assessing their staff. Normally, supervisors are responsible for assessing the performance and/or skills of their subordinates and this assessment serves as a basis for decisions on matters of salary, profit sharing, promotions, training courses, etc.

Compared to self-assessment, assessment has the advantage that it enables subjectivity to be reduced since the assessor will be in a position to use comparisons between individuals or comparisons with the level of skills expected in any given job.

We should stress that we are seeking to 'reduce' subjectivity and we are aware of the limitations of this. We must bear in mind two limitations here: the stakes of the assessment which the supervisors face (Baraldi et al, 2002); and the availability of the assessors, who must obtain general information and spend a large amount of time assessing skills.

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**Box 1**

**The survey and the skills grid**

Our empirical analysis is based on a survey which sought to assess the skills of staff in the banking sector responsible for commercial activities.

We confined the analysis to a sample of counter employees, customer managers and administrative clerks. It does not relate to branch supervisors who are responsible for bank branches and have managerial responsibilities.

We constructed a skills grid using research into employees in the banking sector. In other words, we did not analyse the jobs but instead made use of national and European research into the banking sector, and also used grids specific to each of the banks.

This grid was then validated by interlocutors from the sample banks, and in particular by the human resource managers and branch managers.

The questionnaire relates to each member of staff at a bank branch and refers to the assessment by the supervisor based on the skills grid. For 51.7 % of the employees assessed, the questionnaires were completed by the supervisors, in our presence; for 23.3 % the supervisors completed the questionnaires without our being present and after presentation of the survey; and 25 % were completed without any presentation, and in our absence.

The survey was conducted in the course of 2001 on a sample of 1100 staff at 120 points of sale, situated in various locations - Lisbon, Porto, Viseu, Évora and Faro - and coming under the three biggest financial groups in Portugal. In the end, the sample obtained included 600 staff.

We also examined the sector and the sample banks using the qualitative and quantitative information available. Thus we analysed the banks' internal documents, such as their assessment tools and job and skills studies. We interviewed the human resource managers and several branch managers in order to obtain information about policies on recruitment, training, pay, reductions in staff numbers, promotion, etc.

As it is a subjective measure of the individual skill level which could also be confused with individual performance (Eustache, 1996), we can assume that the assessment can be biased by certain characteristics of the assessors, without being able to specify this bias. However, this subjectivity is not really invalidating in as much as it forms the basis of the assessment of the performances of staff and their use by the hierarchy.

Once this assessment had been carried out, we were able to analyse the various skills levels of the staff from the sample banks, through their genesis and their valorisation ([6]).

### 3.2 Education and skills

Our proposal is to test whether the education system and the production system are alternative or complementary sources in the process of producing skills. In order to do this, we use a regression model which, for each pre-defined skill, enables us to identify the principal sources, linked to the job offer. The model, inspired by Heijke and Ramaekers (1998), follows the following structure:

$$c_{ai} = b_0 + \sum_{j=1}^{n} b_j f_{ji} + ei$$

where the skill level (a) of the individual (i) is a linear function of individual characteristics, such as education, vocational experience, years' service with the bank and sex. Education and vocational experience are analysed according to the propositions of the human capital theorists: the number of years' education and the number of years' experience. Vocational experience is equal to age less the years' education less age upon starting education.

In the table below, we only show the skills for which education has a positive effect and/or vocational experience a negative influence([7]).

The results presented in table 1 indicate the positive or negative impact of human capital variables on the individual skill levels of bank staff. Thus, the positive signal associated with education leads to the conclusion that it enables skills to be acquired which are recognised by supervisors. The assessment made by the supervisors shows that, during their vocational activities, staff call upon skills which they have acquired, partially or entirely, within the education system.

Education makes a highly diversified contribution to the production of skills. It has a positive and strong influence over theoretical knowledge, as might be expected, but cannot be enough in a knowledge-based society

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[6] As regards the analysis of the econometric model of acquisition and valorisation with the variables of the supply and demand of skills, see Suleman, 2004, on the IREDU site, www.u-bourgogne.fr/IREDU, where we also looked at the certain banks which present higher skills levels. The open question is as follows: do banks facilitate or prevent the impact of the variables of demand, notably the job occupied and the bank.

[7] For regression results see appendix 1.

**Table 1**: The impact of human capital variables on the individual
skill level

| Type of skills | Skills used in the survey | Education | Experience |
|---|---|:---:|:---:|
| Theoretical knowledge | General technical knowledge | + | |
| | Specific technical knowledge | + | |
| | Knowledge of foreign languages | + | - |
| Strategic/specific skills | Negotiating skills | | - |
| | Skills of persuasion | | - |
| | Perseverance and goal-orientation | | - |
| | Customer-orientation | | - |
| | Understanding the bank's strategy | + | - |
| Organisational skills | Ability to work independently | + | |
| | Ability to take responsibility | + | |
| | Receptiveness to learning | | - |
| | Effort in learning | | - |
| | Adaptability | | - |
| | Ability to innovate | | - |
| Technical ability | Planning and organising work | | - |
| | Using computer systems | | - |
| Cognitive skills | Analytical skills | + | - |
| | Selecting and processing information | + | - |
| | Problem-solving skills | | - |
| | Ability to learn | + | - |
| | Transferring, transposing knowledge and experience | + | - |
| | Understanding the specifics of banking | | - |

Source: Survey 'Valorising skills in the employment market', 2001, in Suleman, 2004

where education has to be geared towards innovation and not just towards
the use and reproduction of old knowledge.

The most surprising results are connected with other skills, directly op-
erational in the job, which are influenced by education (table 1).

Education exerts a positive influence over cognitive skills levels, no-
tably the ability to analyse, select and process information, where the es-
timated coefficients are positive and significant.

**Table 2**: Average level of behaviour and abilities in terms of developing new skills, by age

| Age range | Receptivity to learning | Effort in learning | Ability to learn |
|---|---|---|---|
| Age > 30 | 3.51 | 3.37 | 3.54 |
| Age ≤ 30 | 4.02 | 3.90 | 4.06 |

Source: Survey 'Valorising skills in the employment market', 2001

**Table 3**: Average level of behaviour and abilities in terms of developing new skills, by educational level

| Age range | Receptivity to learning | Effort in learning | Ability to learn |
|---|---|---|---|
| Compulsory schooling | 3.21 | 3.16 | 3.26 |
| Secondary education not completed | 3.36 | 3.21 | 3.40 |
| Secondary education | 3.76 | 3.55 | 3.73 |
| Tertiary education | 4.01 | 3.94 | 4.06 |

Source: Survey 'Valorising skills in the employment market', 2001

Thus we can envisage education as a system which helps to generate infrastructural skills, what Stankiewicz (2002) called 'metaknowledge'. These subsequently help in the learning of more vocational and operational knowledge/abilities. We are thus approaching the relationships of complementarity as suggested by Thurow (1976).

The idea of the 'paradox of the accumulation of human capital' suggested by De Palma and Tchibozo (2004) is corroborated by our results. The paradox illustrates that individuals with higher education levels are the ones who participate most in training measures. In order to test this hypothesis, we continued our analysis by making a distinction between the youngest staff (age ≤ 30) and older staff (age > 30). [8]

The young employees are the most educated; almost 50 % have a university degree. The tables below show differences in the behaviour and abilities of two groups of staff in terms of developing new skills.

It should therefore be stressed that the better level of education among young people enables them to develop what we can call the learning triptych: ability to learn, receptivity to learning and effort in learning. More pre-

[8] One might ask, why the 30 age limit? In fact, after numerous tests we have found that age 30 is the boundary after which vocational experience becomes negative in the skills acquisition model.

cisely, more educated people learn more easily but are also more disposed to learning and exhibit proactive behaviour when it comes to seeking training.

The positive signs of education for the ability to work independently and take responsibility show that education contributes to a reduction in supervisory problems and to the development of leadership skills in individuals.

Finally, education favours the acquisition of strategic skills which are specific to banks. It should be added that some of the latter thus acquire strategic/specific skills on the employment market, by profiting from the investment made by the individuals in education. A clear example is the ability to understand banking strategy. Education thus appears to provide tools which facilitate an understanding the new challenges facing banks.

Through this analysis, we can propose explanations for the renewal of labour in the banking sector: the acquisition of key skills which the banks have not yet produced.

We shall examine below the role of vocational experience in the individual skills levels.

## 3.3 Vocational experience and skills

The negative signs shown in table 1 demonstrate that vocational experience has a negative impact on individual skills levels. These results are surprising and require discussion. In fact, it appears that vocational experience no longer contributes to the acquisition of the productive capacity which is supposed to determine salary. The question now is to ask why experience continues to be valued in the banking sector.

### 3.3.1 Some details of the remuneration system in the banking sector

The Collective Labour Agreement (CLA) governs, inter alia, the management of jobs, qualifications, salaries and vocational development. Application of the rules relating to remuneration is an aspect of importance for our analysis.

Firstly, the basic salary is determined using salary levels defined in the Agreement. Secondly, these levels include increases in salary as a result of years' service, which means that salary is affected by specific vocational experience. The graph below shows the trend in basic salaries as a function of years of vocational experience.

Following the same line of argument, we can show that the oldest employees are the best paid. By using the previous grouping of employees by age, we were able to confirm that most of the employees aged less than 30 are concentrated in the lowest salary levels (table 4). In our analysis, level 1 corresponds to the aggregation of the lowest levels and level 3 to the highest levels for employees responsible for commercial activities.

By analysing the salary levels set out in the Collective Agreement, we can see that these levels, as highlighted by Reynaud (2001), also repre-

**Graph 1**



basic salary

Source: Survey 'Valorising skills in the employment market', 2001
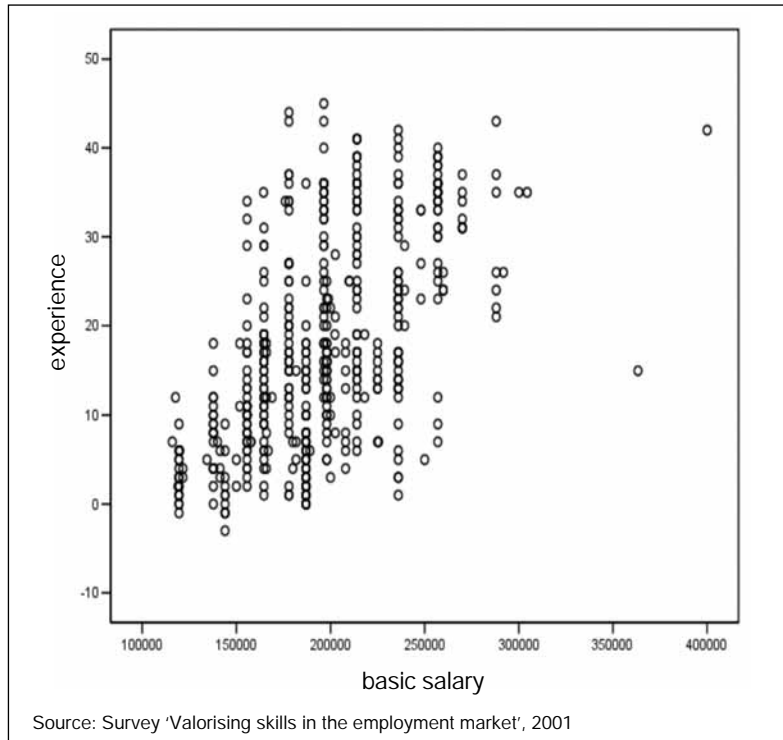
sent a status system in which age, vocational experience, years' service, etc. are all represented.

In short, the salary rules established by the Collective Agreement correspond to the amount of the basic salary, to certain additional salary elements and to growth in salary as a result of either length of service or merit ([9]). The level of remuneration established by the basic salary thus incorporates the influence of vocational experience and length of service which contribute to disconnecting salary, to a large extent, from the acquisition or use of skills. This is why it would appear relevant to use the ob-

**Table 4**: Proportion of employees by basic salary level

| CLA salary level | Age | |
|---|---|---|
| | Age > 30 | Age ≤ 30 |
| 1 | 37.8 % | 62.2 % |
| 2 | 87.7 % | 12.3 % |
| 3 | 98.0 % | 2.0 % |

Source: Survey 'Valorising skills in the employment market', 2001

servations of J.D. Reynaud who highlights that recognition through salary of 'skills is probably... much more modest than is hoped...' by researchers (Reynaud, 2001, p. 23).

However, skills are more important for determining other components of individual remuneration, and for the chances of promotion (Suleman, 2004). Profit sharing and chances of promotion are governed by very different logics. Here, the logic of assessed skills is much more marked. Vocational experience constitutes an obstacle to vocational development and does not involve any increase in flexible remuneration. Banks establish new relationships with their employees, asking them for commitments which will be recognised by other salary rules. As Gavini (1998) has pointed out, we are talking here of an enterprise which is an autonomous source of normative production.

### 3.3.2 The skills most sensitive to vocational experience

Let us note above all the negative impact of vocational experience on cognitive skills. We find that the oldest employees show lower levels of cognitive skills which we have classified as infra-structural. This makes the learning of other skills, such as strategic/specific skills, difficult. Stankiewicz considers that 'the ability to learn basic technical knowledge is reduced when metaknowledge is lacking' (Stankiewicz, 2002, p. 9).

We can therefore deduce that relationships of complementarity between skills contribute to a vicious circle and can, irreparably, lead older employees to vocational exclusion.

Compared to the ability to adapt, education favours and vocational experience prevents the acquisition/development of this skill ([10]). Having constructed their skills in a model of stable organisation, document processing (physical) and application of the pre-established rules and procedures, bank employees today need other skills. We would recall the contributions of Cart and Toutin (1998) who highlighted the influence of the variability and the elasticity of activities on the ability to adapt.

To take another aspect: work on codes and symbols requires abstract abilities which are of a very different nature. It is not surprising, therefore, that the older employees show a poor level of ability to use computer systems.

Finally, capacity for and behaviour in respect of training conform to the precepts of the theory of human capital, according to which investment in training goes down with age. Older employees are less available for training and also learn less easily (see table 2).

By referring to several studies by ergonomists into the relationship between age and the ability to learn, Legrand draws attention to the influence

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([9]) The Collective Agreement specifies a percentage of employees whose salary must be increased on merit.

([10]) Workers aged less than 30 show higher average levels than older workers (average ability to adapt 3.91 compared to 3.45)

of old work habits which 'bring about restrictive mental and physical changes. The result of this is to make it less easy to learn any new tasks in a different organisation' (Legrand, 1998, p. 108).

The result is a cumulative process of obsolescence of certain abilities and obstacles to the acquisition/development of other skills. Vocational experience enabled the acquisition of skills which are no longer useful. We can assume that the experience of such skills becoming obsolete contributes to the destruction of skills.

Does this mean that older employees are not competent? Or, can we infer from this that relationships of complementarity between skills contribute to a vicious circle which, irreparably, leads older employees to vocational exclusion? Will the skills acquired throughout the vocational journey thus be destroyed?

We should stress that competence is a prisoner of the notion of competence used by the enterprise. In other words, it is limited by what the players define and determine as being competence and what the most valid skills are. We must point out, therefore, that the skills grid which represents the central tool in the skills model, is not itself neutral. It incorporates the skills which the enterprises (banks) consider to be the most important in a given context.

We should note that this idea of destruction of skills comes under the definition of skills as a convention, i.e. as a result of a judgement on what competence is (Eymard-Duvernay and Marchal, 1997). Thus the stock of human capital/acquired skills is no longer relevant in certain vocational contexts. The enterprise does not recognise a stock of skills such as this, taking an unfavourable view of such skills. In the analytical context of the economy of conventions, we can admit that this judgement is based on irreversible characteristics, such as age, yet such age, which is linked to vocational experience, contributes to the destruction of skills. However, in the logic of human capital, it is more about a dephasing or discrepancy of skills acquired previously.

These results to some extent contradict those of the human capital theorists (Becker, 1975 and Mincer 1993), of work as a quasi-fixed factor (Oi, 1962) and of internal labour markets (Doeringer and Piore, 1971). All these authors have highlighted the advantage of a durable work relationship, i.e. of experience/length of service, in order to get a return on investments in specific human capital made by the enterprise.

### 3.3.3 The production and valorisation of vocational experience

These results indicate divergences of interpretation compared to those obtained from Mincer's proposals. Both he and other researchers have highlighted the importance of experience to explain salary differences. We are therefore faced with a paradox: vocational experience is not recognised as a source of producing skills, but it is valorised (Suleman, 2004). This paradox goes back to the salary rules set up by the Collective Agreement which sets the amount of the basic salary, certain additional

salary elements and growth in salary according to either length of service or merit ([11]).

We must take up this idea and discuss the reasons which justify this production and this valorisation of experience. The systematically negative relationship between vocational experience and almost all other skills can, in fact, highlight four phenomena:

- an obsolescence of the skills of the older employees, these skills having been produced in traditional models of work organisation when the separation between administrative and commercial functions was very marked;
- a generation effect which seems to differentiate between generations of employees in the banking sector: one where there is a preponderance of administrative logic and one dominated by commercial logic and the anticipation of customer needs;
- a competence convention suggesting social and sectorial prejudices as regards older people. In fact, in our observations, interlocutors at banks often highlight the difficulties of older employees in the face of changes, especially technical changes;
- an effect of selection which translates as a lack of vocational development on the part of employees with poor skills levels in low-level jobs - the ports of entry as defined by Doeringer and Piore (1971).

Where the skills required are new, it should be noted that banks look for them outside, notably amongst young graduates. This undoubtedly means that the young generation is better educated than the previous generation. All that leads to a 'time effect' which manifests itself, on the one hand, by the valorisation of education and, on the other, by the refusal to recognise vocational experience as an essential source of acquiring skills.

Does this support the predictions of Mincer? We now need to consider the links between vocational experience and the salary of the individual.

Our empirical results show that vocational experience is worthwhile, i.e. each additional year's experience leads to an increase of 4 % in monthly remuneration (Suleman, 2004). By comparing the results of acquisition/production models with those of models of the valorisation of human capital, there appear to be divergences of interpretation compared to those obtained from Mincer's proposals.

As we have said, whether it is Mincer or most of the researchers propounding the theory of human capital, all highlight the importance of vocational experience to explain salary differences. These result from the role of experience in the acquisition of productive capacity. It would appear, therefore, that the valorisation of experience does not represent a retribution of its role in the production of skills.

Our analysis of the valorisation of skills has also revealed that vocational experience is not crucial for other elements of individual remunera-

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([11]) The Collective Agreement specifies a percentage of employees whose salary must be increased on merit.

tion. For example, it is no longer significant for profit sharing, or for the chances of promotion (Suleman, 2004).

Having identified this 'apparent paradox', we can remember the theoretical contribution of Fragnières (1992) who presents three central notions of the problem of certifying skills:

- certification or formal validation of knowledge or qualifications;
- assessment which depends on judgement and the monitoring of training and the results of training;
- and valorisation which relates to social recognition, by highlighting the economic, social and/or mercantile value of the qualification acquired.

Here, valorisation of the qualification acquired by vocational experience does not lead to validation of the experience acquired/skills. As the judgement is unfavourable, the value of experience would appear to be more social than economic. Economic value is restricted to salary-remuneration, suggesting that it is more a social rule. In other components of individual remuneration (such as profit sharing), experience does not benefit the older bank employees. In this case, the internal normative production of banks becomes more decisive and the logic of competence then represents the will of banks to establish different employment relationships.

On the basis of this analysis, we can ask about the role of vocational experience on the construction as well as on the destruction of individual competence. It is necessary, therefore, to take a brief look at what the economy of the enterprise has contributed, and especially at the theoretical framework of contemporary institutionalism (Eymard-Duvernay, 2004).

In their work on Ways to recruit, Eymard-Duvernay and Marchal (1997) highlighted, as we have already stated, that competence is the result of a judgement as to what competence is. Where it is the result of a judgement, competence is a social construct which enables the creation of a hierarchy of people.

According to this concept of competence, we admit that banks define the way in which their employees are assessed - the skills criteria - and construct a classification of these same employees. However, these criteria change and, according to the reasoning of Eymard-Duvernay, 'people see their classification evolve, for good or bad' (Eymard-Duvernay, 2004, p. 73).

It must also be remembered that the formalisation of skills is, therefore, never completely in tune with the level of competence held by the individual. This incorporates a subjective dimension which arises out of the judgement and criteria, possibly even discriminatory, which is only identifiable with major research costs. The question as to whether the various skills levels which result from the assessment are due to actual differences in skills or are the result of the particular judgement by supervisors, remains unanswered.

Another argument would also appear relevant: the relationship of substitution or complementarity between education and experience. For

Stankiewicz, 'initial training and on-the-job experience are very poor substitutes for producing adaptability' (Stankiewicz, 2002, p. 11). For the author, initial training and 'heavy duty' further training contribute to the production of theoretical-methodological knowledge, whereas experience and 'lightweight' further training contribute to the production of practical knowledge.

For us, this debate must also draw attention to the organisational model, whether qualifying or not, as well as to the renewal of job requirements. However, what we believe to be more important is the way in which banks - institutions - assess the role of education and vocational experience in the production of skills.

# 4. Conclusion

In this analysis, we have highlighted that economic, technical and organisational changes have resulted in undermining the skills acquired by vocational experience.

In the banking sector, the increasing dilution of functions between administrative and commercial workers or, to use the terminology of the sector, between 'back-office' and 'front-office', with a set of technical and economic changes, have brought about a radical transformation in skills. One of the main consequences of this phenomenon is that, on the one hand, the older workers have seen and are still seeing their skills invalidated and their degree of employability reduced. Vocational experience is no longer synonymous with competence from the point of view of the direct hierarchies of the banks. Perhaps the hypothesis of the obsolescence of skills should not be abandoned, when most workers only have a poor level of skills which are strategic.

However, one can also find reasons for the alternative hypothesis of discriminatory judgement.

Furthermore, vocational experience has a deep-seated effect on the dispersion of basic salary. We must therefore ask ourselves whether there really is any validation and valorisation of acquired knowledge and of skills, or to what extent the valorisation of vocational experience in salary represents more of a constraint for the salary policy of banks than a recognition of the productive value of vocational experience.

There is absolutely no doubt that vocational experience has enabled the construction of skills which have been useful in a technical and organisational context, but it also contributes to the destruction of these very skills, in a new context. This could explain why banks use the educational system to obtain the skills they need. Based on the progression of educational qualifications, banks seek new skills which they have not - yet? - been able to produce themselves.

However, the relationship of complementarity, substitution or even interaction between education and the enterprise, as an entity which permits

the acquisition of experience and, therefore, the construction of skills, is still to be clarified.

It has to be borne in mind that the idea of destroying skills is the result of a theoretical option which refers the definition of competence back to a convention on what competence is. Thus, in the context of the economy of conventions, it would appear relevant to highlight this idea of destruction, as the enterprise judges individual competence favourably or unfavourably. It is a social/organisational construct.

However, in the logic of the economy and education, in particular the theory of human capital, it is more a matter of the dephasing or discrepancy of the skills acquired previously. The role of education, training and the enterprise is therefore taken up in a different way.

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**Appendix 1**: The skills acquisition model

| Skills | R²A | Constant | Schooling | Experience | Length of service | Sex |
|---|---|---|---|---|---|---|
| General technical knowledge | 0.263 | 1.577*** | 0.134*** 0.443 | -0.010 -0.133 | 0.004 0.039 | 0.066 0.036 |
| Specific technical knowledge | 0.072 | 2.367*** | 0.072*** 0.241 | -0.107 -0.214 | 0.021** 0.206 | 0.101 0.057 |
| Knowledge of foreign languages | 0.258 | 2.254*** | 0.089*** 0.293 | -0.021** -0.264 | 0.001 0.010 | 0.025 0.014 |
| Negotiating skills | 0.056 | 3.725*** | -0.002 -0.007 | -0.024** -0.326 | 0.007 0.072 | 0.034 0.020 |
| Skills of persuasion | 0.064 | 3.742*** | -0.008 -0.028 | -0.025** -0.341 | 0.007 0.074 | -0.078 -0.046 |
| Perseverance and goal-orientation | 0.042 | 3.833*** | 0.000 -0.002 | -0.026** -0.343 | 0.016 0.166 | -0.095 -0.054 |
| Customer-orientation | 0.075 | 3.858*** | 0.009 0.033 | -0.024** -0.319 | 0.007 0.075 | -0.040 -0.024 |
| Understanding bank strategy | 0.094 | 3.201*** | 0.041** 0.158 | -0.020** -0.293 | 0.012 0.140 | -0.017 -0.011 |
| Ability to work independently | 0.019 | 2.870*** | 0.044** 0.156 | -0.008 -0.104 | 0.016 0.167 | -0.060 -0.035 |
| Ability to take responsibility | 0.023 | 3.060*** | 0.046** 0.168 | -0.004 -0.060 | 0.008 0.083 | -0.058 -0.035 |
| Receptiveness to learning | 0.163 | 4.038*** | 0.012 0.044 | -0.029*** -0.399 | 0.003 0.031 | -0.037 -0.022 |
| Effort in learning | 0.143 | 3.700*** | 0.023 0.080 | -0.030*** -0.402 | 0.009 0.096 | -0.019 -0.011 |
| Adaptability | 0.163 | 3.703*** | 0.026 0.097 | -0.033*** -0.474 | 0.015* 0.169 | -0.008 -0.005 |
| Ability to innovate | 0.112 | 3.340*** | 0.017 0.060 | -0.024** -0.331 | 0.004 0.044 | -0.030 -0.018 |
| Planning and organising work | 0.046 | 3.526*** | 0.007 0.027 | -0.023** -0.315 | 0.014 0.151 | -0.097 -0.057 |
| Using computer systems | 0.204 | 4.052*** | 0.009 0.031 | -0.048*** -0.661 | 0.024** 0.252 | 0.111 0.065 |
| Analytical skills | 0.069 | 2.929*** | 0.043** 0.160 | -0.023** -0.331 | 0.025** 0.274 | -0.045 -0.028 |
| Selecting and processing information | 0.090 | 2.969*** | 0.045** 0.170 | -0.023** -0.332 | 0.019** 0.212 | 0.012 0.007 |
| Problem-solving skills | 0.054 | 3.207*** | 0.031 0.112 | -0.019** -0.261 | 0.014 0.148 | -0.053 -0.688 |
| Ability to learn | 0.174 | 3.585*** | 0.038** 0.147 | -0.028*** -0.416 | 0.012 0.136 | -0.007 -0.005 |
| Transferring, transposing knowledge and experience | 0.079 | 3.068*** | 0.042** 0.167 | -0.017** -0.261 | 0.012 0.145 | -0.010 -0.006 |
| Understanding the specifics of banking | 0.073 | 3.468*** | 0.024 0.097 | -0.023*** -0.354 | 0.016* 0.191 | -0.024 -0.016 |
| N | 443 | | | | | |

Source: Survey 'Valorising skills in the employment market', 2001

# Towards a framework for assessing teacher competence

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SUMMARY

**Developing instruments to assess teacher competence requires a model of competent performance which can guide both the collection and appraisal of evidence in task situations. Following Kane (1992), the validation of statements about teachers' competence is regarded as the evaluation of interpretive argumentation.**

**Based on contemporary insights into teaching and learning, an interpretive model of competent performance is described which, rather than being prescriptive in nature, offers scope for various forms of responsible professional performance. Consequences of professional performance for students/class/organisation are the basis of the model. Acceptable interventions and underlying decision-making processes as well as the associated parts of a professional knowledge base are derived from the consequences. The consequences of these insights for developing domains of competence and collecting evidence are discussed.**

## 1. Introduction

Internationally, there is growing interest in assessing teacher competence prompted by demand for quality assurance and for greater recognition of the teaching profession (Verloop, 1999). The United States has a long tradition in teacher assessment, reflected in both the volume of research articles and books published, and the instruments developed. In the United States, the principle of accountability to taxpayers was a major incentive for directing attention at teacher assessment. Various instruments have been developed to assess teachers at various stages in their

professional careers in the context of selection, certification, and professional development (Dwyer, 1998). Much information in the present article was drawn from this body of literature. This does not, however, mean there is no teacher assessment tradition in countries beyond the United States. Pelkmans (1998), for instance, described teacher assessment practices in England, Wales, Germany, Australia, and the Netherlands. These countries do, however, have less experience than the United States.

In the Netherlands, as well as in other countries (Pelkmans 1998), teacher assessment is receiving greater attention because of the increased scope for policy-making by schools, one of the consequences of which is to make differentiation of position and pay possible (Verloop, 1999; Straetmans and Sanders, 2001). Growing emphasis on competence-based training is also increasing demand for assessing teacher competence. In addition, a law adopted in the Netherlands provides that professionals in education must satisfy competence requirements. The Dutch foundation for professional teaching competence (SBL, 2003) formulated requirements for seven domains of competence that are considered crucial for beginning teachers. In Section 3.2.1.1 these domains are further discussed.

The requirements must be met by teacher training colleges and school organisations. Finally, the option of allowing faster transfer into education from other occupations has been opened up to counteract the threat of teacher shortages in the Netherlands (Klarus, Schuler and Ter Wee, 2000; Tillema, 2001).

The developments described above call for a coherent approach to assessing teacher competence. This article presents some fundamentals for a framework for assessing teacher competence. We start by constructing an interpretive model for assessing competent (teacher) performance, based on different theoretical notions of good teaching. We go on to discuss various instruments for assessing teacher competence by using the requirements that follow from the concept of construct validity as expounded by Messick (1996). Lastly, we discuss some issues for future study.

## 2. An interpretive model of teacher competence

There is no generally accepted definition of the concept of competence. Recently several authors (e.g. Bos, 1998; Mulder, 2001; Van Merrienboer, Van der Klink and Jansen, 2002) have reviewed the literature and come up with comprehensive definitions. A first and important distinction can be made between 'competence' and 'competency'. According to Mulder, competence is a comprehensive concept for abilities or capabilities of people or organisations, while a specific competency forms a part of competence. Competency (plural competencies) is a narrower, more atomistic concept used to label particular abilities (see also McConnell, 2001). Based

on a study of dozens of definitions of competence (e.g. Bunk, 1994; Spencer and Spencer, 1993; Parry, 1996), Mulder (2001) derived a definition that captures most of the important authors: 'competence is the ability of a person or organisation to achieve particular levels of performance' (p. 76). Citing different authors he adds that the competencies of individuals consist of:

- integrated action proficiencies
- which are made up of clusters of knowledge structures,
- cognitive, interactive, emotional, and where necessary psychomotor skills
- and attitudes and values which are necessary for:
- performing tasks,
- solving problems,
- and more generally the ability to function in a particular:
- occupation,
- organisation,
- position,
- role.

When measuring dimensions of competence, it must be noted that they are not directly observable, but are manifested in performance in a specific situation (Spencer and Spencer, 1993). In addition, competence can be developed to a particular level, for example beginner, advanced, and expert. Mulder (2001) emphasises that competence may be present in individuals (personal competence) and systems (system or team competence). Finally, aspects of competence are to some extent transferable from one situation to another (Thijssen, 1998, 2001).

Various questions can be asked when gauging the competence of individuals. How are statements about competence derived? What assumptions and theoretical notions underlie measurements of competence? In answering questions of this type, it is important to use an adequately descriptive and explanatory interpretive model (Shepard, 1993).

There is no sound and broad-based scientific framework for what constitutes competent teaching from which inferences can be drawn to assess teacher competence (Haertel, 1991). There are various frameworks, the contents of which are largely dependent on the underlying vision of professional performance (Dwyer, 1994, 1998) and on the theoretical approaches adopted (see Reynolds, 1992).

Developers of teacher assessment instruments mostly work towards a shared view of competent teaching, obtained through interaction between developers and representatives of the profession. The resultant view of this interaction can vary widely: it may be a hybrid of all kinds of views of teaching, but also a fairly specific view, for example, 'programme-oriented' or 'development-oriented learning' in the context of early and pre-school education. The first approach is a logical one to adopt in the formulation of frameworks of competent performance which must apply to large groups of teachers, for example, national proficiency requirements. The second approach

is more appropriate for organisations that work according to a specific mission.

Besides the view of teaching, the theoretical angle on professional performance also determines what form an interpretive model takes. In the literature, different elements of teacher competence have been emphasised throughout the history of evaluating teachers. In reviewing the literature, different opinions of good teachers and good teaching can be distinguished (Creemers, 1991; Verloop, 1999):

(a) differentiating personality traits which help to make a successful teacher (Getzels and Jackson, 1963; Creemers (1991);

(b) describing knowledge elements involving subject matter content, ways teachers think within a discipline (Bruner, 1963; Tom and Valli, 1990);

(c) describing forms of teacher behaviour which contribute to learning performance (Brophy and Good, 1986; Simon and Boyer, 1974);

(d) describing teachers' cognition and decision-making processes (Kagan, 1990; Verloop, 1988);

(e) describing teachers' practical knowledge which they apply to specific situations in which they find themselves (their class, their subject domain) and the way they form theories about these situations (Beijaard and Verloop, 1996).

For each of these conceptions of good teaching, specific assessment techniques were used. To assess personality traits, questionnaires and psychological tests were used to identify certain desirable or undesirable traits. Within this conception of teaching the focus was not so much aimed at good teaching itself but rather at characteristics of a good citizen. A still dominant conception is that good teachers have a lot of knowledge. In earlier times, this involved knowledge of discrete facts and elements; later, emphasis was laid on the structure of a discipline (such as maths or physics), and still later on how professionals act and think within a certain discipline. Knowledge also relates to pedagogical knowledge, for instance about methods of delivering instruction, building curriculum, and grouping students. These knowledge elements are increasingly derived from educational research (Bellon, Bellon and Blank, 1990). A frequently used method of assessing knowledge is taking standardised knowledge tests (e.g. Latham, Gitomer and Ziomek, 1999).

As a reaction to both emphasis on stable teacher characteristics and a one-sided emphasis on knowledge, teaching is also seen as displaying effective behaviour. This conception considers what a teacher shows in the classroom. Numerous observational instruments have been developed to concentrate on (small) units of behaviour, thought to be connected with successful learning outcomes (Stodolsky, 1990). However, this approach pays little attention to what goes on in the mind of teachers. What do they think or decide, and why do they decide the way they do? Different assessment instruments have been used to uncover teacher thinking, including thinking aloud protocols while solving a teaching problem and stim-

ulated recall interviews. During such interviews, teachers look back at their videotaped performance and answer questions on what they were thinking at a particular moment. The concept of teaching as displaying a rich base of practical knowledge involves assessment methods that concentrate on specific situations confronted by teachers. The instruments used do not differ principally from those used in revealing thought processes. However, the focus is more on the specific work context (e.g. the specific subject in a specific grade) in which teachers carry out their activities (Meijer, Verloop and Beijaard, 1999).

With the recent revolution in thinking about learning, summed up in the term 'new learning', there is an additional conception of teaching: promoting powerful learning activities among learners. In this conception, good teaching assumes that teachers do not so much need to demonstrate a clear-cut repertoire of 'correct' behaviour but rather show that they contribute to successful learning of their students (Simons, 1999; Vermunt and Verschaffel, 2000).

Although all the separate conceptions of teaching cover some aspects of teacher competence, none of them fully describe or explain what competent teaching is. Looking back at the definition of competencies described above, there is a need for a unified comprehensive concept of teaching competence that considers all the different elements of teacher competence, that is, teacher traits, teacher knowledge, teacher behaviour, teacher thinking, situation-specific decision-making, and resulting learning activities. Roelofs and Sanders (2003) have developed a model of competent performance for assessing teacher competence which does justice to the aspects of competent performance described above. The model follows the general definition of competencies described by Mulder (2001).

The starting point in this model, represented in Figure 1, is that teacher competence is reflected in the consequences of teachers' actions, the most important being students' learning activities. Other examples of consequences are: a (smooth or disruptive) classroom climate, a feeling of well-being among students, good relationships with parents and colleagues. Starting from the consequences, the remaining elements of the model can be mapped backwards. First, the component 'actions' refers to professional activities, e.g. delivering instruction, providing feedback to students, and creating a cooperative classroom atmosphere. Second, any teacher activity takes place within a specific context in which a teacher has to make many decisions, on a long-term basis (planning ahead) or immediately within a classroom situation (see Doyle, 1983). For instance, teachers will have to plan their instruction and adapt it depending on differing circumstances (e.g. different student learning styles, different organisational conditions). Third, when making decisions and performing activities, teachers will have to draw from a professional knowledge base and from some personal characteristics.

Evaluating different domains of teacher competence, for example, instruction and classroom management, means that interpretive infer-

**Figure 1**: Interpretive model of competent performance
(based on Roelofs and Sanders, 2003)
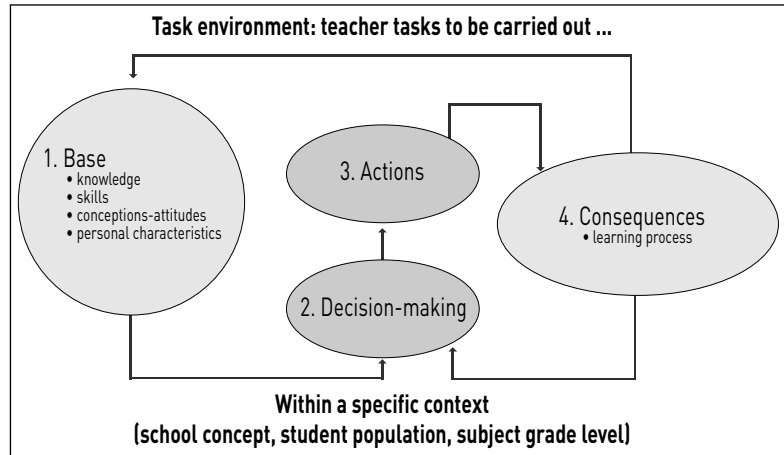


ences are made about teachers (see Kane, 1992). When combining different aspects of teaching into one comprehensive model of competent performance, the chances for valid inferences are better than when using reductionistic models which concentrate on separate parts of the teaching process.

# 3. Assessment of teacher competence

Before describing our general model's implications for collecting evidence of teacher competence, we briefly comment on the importance of construct validity as a unifying concept for determining assessment quality. Many specific quality requirements can be derived from this framework of construct validity.

## 3.1. Criteria for construct validity of competence instruments

The requirements of competence instruments vary depending on the purpose of the assessment. Because of the consequences for the candidate, stricter requirements are set for 'high-stake' instruments (selection, certification) than for instruments used for professional development (Pelkmans, 1998).

The most extensive framework for determining the quality of instruments has been developed by Messick (1996). Messick indicates that for each form of assessment it is necessary to consider six aspects of construct validity:

(a) content,

(b) theory and process models,

(c) structure,

(d) generalisability,

(e) external aspects,

(f)  consequences.

The 'content' aspect is about the relevance and representativeness of the assessment. The question is: within what limits can conclusions be drawn from the assessment? The 'theory and process models' aspect is about the extent to which the selected tasks call for the relevant action on the part of a candidate and whether the influence of construct-irrelevant factors is minimised. The 'structural aspect' relates to whether the performance criteria correctly reflect the criteria that experts use and the accuracy and consistency with which performance is scored and assessed.

'Generalisability' is the extent to which assessments can be generalised to a universe of, for example, tasks and settings.

The external aspects of validity are the extent to which the measurement results converge with, and diverge from, other measurements and constructs. 'Consequences' or consequential validity, examines the extent to which the instrument has positive or negative effects and side effects on the student's learning and the teacher's teaching.

## 3.2. Collecting evidence of competence

Using our comprehensive model of teacher competence as an interpretive framework for assessment, and considering criteria for construct validity, consequences for the construction of a content domain and procedures for collecting evidence of competence can be described. Of the Messick aspects three deserve closer attention: content, theory and process models, and generalisability.

### 3.2.1. Developing a domain of competence

Following Messick's 'content' aspect, the assessment content should be relevant and representative for the teaching profession. Content reviews are used to set the boundaries within which inferences about teachers' competence are made. Various complementary procedures are usually adopted in establishing a domain of competence: empirical analyses of how teachers function, consultation of excellent teachers, empirical research on variables which contribute to higher learning performance, and consultation of committees of practising professionals (see Verloop, Beijaard and Van Driel, 1998). The mix of scientific and practical perspectives contributes to the acceptance and practical usability of instruments (Beijaard and Verloop, 1996; Duke and Stiggins, 1990; Uhlenbeck, 2002).

The basis of any assessment must contain an overview of aspects of competence, the situations in which they must be demonstrated, and the desired degree of mastery. Three questions need to be answered:

(a) What is the crucial content of competence?

(b) How are performance criteria defined?

(c)  In what way can levels of competence be assessed?

### 3.2.1.1. Selection of content

To demarcate domains of competence, selecting what is characteristic of adequate professional functioning and what is critical to functioning is necessary. Starting from our model of competence, the important questions are:

- what are teachers expected to demonstrate and in which task situations?
- what degree of difficulty of task situations must teachers be able to cope with?
- what student results ('consequences') can be expected from teacher activities?
- through which actions and decision-making processes might teachers be able to contribute to students' results?

Various domain descriptions for teacher competence have been developed both in the US and the Netherlands. Danielson and McGreal (2000) distinguished four broad, relevant professional task areas: planning and preparation; instruction; classroom environment; professional responsibilities. Referring to the classroom environment, they state: '[...] such activities and tasks establish a comfortable and respectful classroom environment, which cultivates a culture for learning and creates a safe place for risk taking' (op. cit., p. 31). On instruction, they write: '[...] Teachers who excel in domain 3 [instruction] create an atmosphere of excitement about the importance of learning and the significance of the content' (op. cit., p. 32). These statements illustrate focus on the consequences of the actions, rather than on the actions themselves.

The description given by Danielson and McGreal was also the basis for a set of assessment instruments, Praxis III, as part of the so-called Praxis series, developed by Educational Testing Service, measuring, among other things, teachers' in-class practice in each of the four areas mentioned. In the Praxis-III assessment, classroom observations of teacher and student behaviour are combined with pre- and post-observation interviews (Dwyer, 1998), the latter addressing the decision-making process of teachers.

The American National Board for Professional Teaching Standards reduces the multiplicity of tasks in the assessment for certifying  (advanced) teachers to dimensions of teaching expertise, such as improvisation, degree of challenge, passion for teaching and learning (Bond et al., 2000).

In the Netherlands, the Dutch Foundation for Professional Teaching Competence (SBL), recently developed a set of initial proficiency requirements for teachers in primary and secondary education for the Ministry of Education based on seven broad domains of competence. In the description of requirements, SBL starts with how classes and individual students of competent teachers function, illustrating a coherent approach to teaching. The following domains have been developed:

(a) interpersonal competence, the ability to create a friendly, cooperative climate and open communication;

(b) pedagogic competence, the ability to create a psychologically safe learn-
ing environment for students, contributing to their wellbeing;

(c) subject matter and didactic competence, the ability to guide students
in acquiring the basics of school subjects and the way this knowledge
can be used in daily and working life;

(d) organisational competence, the ability to create an orderly on-task cli-
mate in their classes;

(e) competence in cooperating with colleagues, the ability to gear one's
own work to the work of colleagues and to contribute to the school or-
ganisation in general;

(f) competence in cooperating with the school environment, the ability to
contribute to cooperation with people (parents) and organisations with-
in the school context;

(g) competence in reflection and development, the ability to reflect on one's
own competence and to keep up with changing demands and devel-
opments within the profession.

This set of requirements will be the basis for many assessment instru-
ments at teacher colleges.

### 3.2.1.2. Performance criteria

Having described the domains of competence, an important question
is how to formulate criteria against which to judge teacher performance.
Following our model, a comprehensive approach in formulating criteria is
desirable to prevent overreliance on isolated teacher activities, separate
knowledge aspects, or on students' results. Instead, these elements of
competent performance should be combined within verbal descriptors of
criteria. Examples of one-sided, sometimes tautological criteria can easi-
ly be found:

'the teacher indicates clearly', 'chooses material in the correct way'.
Following our model of competence (see Figure 1) performance criteria
start with desirable learning activities and outcomes among students, from
which acceptable teacher actions and decisions can be derived. The ac-
ceptability of teacher decisions has to do with the quality of the profession-
al knowledge base with respect to specific teaching situations. Frederik-
sen et al. (1998) speak of 'functional criteria'. An example of a functional
criterion, taken from the instructional competence of kindergarten teach-
ers aimed at concept acquisition of young children, is presented by Roelofs
and Van den Berg (2005): 'by means of instructional activities (ques-
tions, explanations, performance tasks, discussions) the teacher succeeds
when children perform activities which contribute to a deeper understand-
ing of a chosen set of concepts (e.g. autumn)'.

### 3.2.1.3. Levels of performance

Where criteria can be considered statements of competent perform-
ance within task situations, standards look at the quality of the actions and
their results. For our purposes, a discussion on developing performance

standards is beyond the scope of this article. Instead we emphasise the importance of having an interpretive model which can describe and explain differences in levels of performance. A model that accounts for differences between novices and experts within a profession can add to the construct validity of teacher assessment. The work of Berliner (2001) in the domain of expertise development is particularly significant. Berliner summarises how expert professionals differ from novices. Experts:

(a) excel in their own specialist domain and in specific contexts;
(b) develop automation of actions which occur often;
(c) are more opportunistic and flexible;
(d) are more sensitive to task requirements and situations when they solve problems;
(e) represent problems in qualitatively different (richer) ways;
(f) recognise patterns in work situations more quickly and more accurately;
(g) observe more significant patterns in the domain in which they are experienced;
(h) take a longer period of preparation for solving problems and use richer and more personal sources of information.

The Berliner features of expert teachers were used recently model to investigate the construct validity of the NBTPS certification system for advanced teachers (Bond et al., 2000). Results showed that in most dimensions certified teachers outperformed non-certified teachers.

### 3.2.2. Sources of evidence of competence

In developing instruments, focus is on obtaining the best possible evidence of competence in a candidate. Considering validity requirements related to content representation, underlying theory and process models, and generalisability, 'best possible' refers to the representativeness of tasks and task situations and the degree to which the assumed processes and effects of competent performance are adequately represented in the assessment.

The first choice in collecting evidence of competence relates to the nature of the evidence. Basic forms of evidence are: lesson documentation, lesson observation (live or recorded, focus on teacher actions or student activities), teacher logs (focus on actions), reflective interview (focus on decision-making processes), reflective report (focus on decision-making processes), student tests (focus on results), written teacher test (focus on knowledge base or decision-making processes), multimedia teacher test (focus on knowledge base or decision-making processes).

Following our model of competence, all the evidence of competence should be registered and interpreted within specific teaching situations. Competence instruments differ sharply in this respect.

Lesson observations range, for example, from context-free assessments based on visits to lessons ('teacher explains clearly') to narrative reports of lesson episodes or unfiltered video sequences. This also applies to gathering lesson documentation, which may, for example, concern ma-

terials from complete series of lessons or extracts from what teachers regard as their best work. The contents of documentation can also vary sharply. They may relate to teachers' lesson plans, to (examples of) teacher feedback to students, or to (examples of) what the students pick up from feedback from teachers. In all this, it must be determined who is in the best position to supply the necessary evidence of competence: teachers themselves, colleagues, students, parents, managers, external experts, or others. Following our model of competence, every participant in the assessment should be in a position to give representative and convincing pieces of evidence of competence related to consequences, teacher actions and decision-making processes. Peterson (2002) describes for different data sources the advantages and disadvantages of involving each of these participants.

The second choice in collecting evidence of competence includes selecting a set of tasks and task situations which can be considered as representative, both quantitatively and qualitatively for the domain of competence under study. The following questions need to be answered:

(a) Is the chosen situation or set of situations representative of actions in the professional situation?

(b) Is the chosen task or set of tasks and task situation or set of task situations relevant or critical for demonstrating competence?

(c) How difficult/complex is the task or task situation?

(d) Does the candidate have the opportunity to supply necessary evidence of competence?

(e) Does the chosen set of tasks and task situations cover the universe of tasks and task situations?

(f) Can statements on the situations being measured be extrapolated to the work situation?

Tasks and task situations differ in their degree of authenticity: real, simplified real, simulated and symbolised assessment situations. Assessment in real situations means that the candidate carries out tasks which arise in day-to-day reality, without intervention in this situation. An example of a real situation is giving a lesson to one's own group or supervising one's own students in carrying out independent tasks. All teaching tasks can arise and have to be carried out on the spot. Success or failure in performing teaching tasks has direct consequences for students.

In simplified real task situations the candidate carries out a real task, which however is less complex than in reality, such as a mini-lesson with a small group of students. In simulated work situations, the direct consequences for students and the possibility of 'stopping' the work situation are also lacking. The authenticity of the evidence of competence is reduced in simplified real or simulated task situations compared to real working situations. The advantage, however, is that it is possible to present relevant tasks which do not often occur in work conditions. Competence can also be assessed in symbolic lesson situations in which the situation does not actually arise and the time pressure and immediacy of the lesson situation

are lacking. Emphasis is on collecting evidence about decisions in various task situations. Although the level of authenticity is low, good coverage of tasks and situations can be achieved in described lesson situations.

In general, developers of assessment instruments skip deliberations about the nature and extent of the evidence required and immediately start designing instruments. Consequently, the significance of the various sources of evidence may become unclear. This problem arises in assessing (un-structured) portfolios. The nature of evidence gathering can vary dramatically in the case of portfolios. Portfolios may contain direct evidence in the form of lesson artifacts, student achievements and reflective reports, but also products which in themselves are the outcome of assessments, such as the results of written tests, letters of recommendation, and assessments by peers. A portfolio can be very useful for putting together various pieces of evidence of competence. However, the assessability is heavily dependent on the structure of the portfolio and the admissibility, observability, and scorability of the recorded evidence (Heller, Sheingold and Myford, 1998).

# 4. Discussion

This article presents a comprehensive framework for teacher competence that can form the basis for valid assessments. This section starts by drawing up some conclusions. It then discusses possible advantages of the model when using it to set up interpretive arguments. It concludes by looking at recent applications of the model in video portfolio assessment.

The first part of the article is devoted to developing the model. Based on reviews of literature it concluded there is no sound and broad-based scientific framework of what constitutes competent teaching. Several different elements of teacher competence have been emphasised throughout the history of evaluating teachers: personality traits which help to make a successful teacher; essential knowledge elements involving subject matter content, teacher thinking within a discipline; forms of teacher behaviour which contribute to learning performance; practical knowledge and subjective theories of teachers determining teachers´ actions in specific teaching situations, and teaching as promoting powerful learning activities among learners.

All separate elements of teaching cover some aspects of teacher competence, but none of them fully describe or explain what competent teaching is. Therefore a unified comprehensive concept of teaching competence was introduced to consider all the different elements of teacher competence.

In summary, the model states that teaching competence is reflected in the consequences of teachers' actions, the most important being students' learning activities. Starting from the consequences, the remaining components of the model were mapped in reverse. The component 'actions' re-

fer to professional activities that foster student learning or other consequences. The component 'decision-making' means a teacher has to make many decisions, either long-term or immediately in a classroom situation, e.g. whether or not to initiate certain actions. In addition, it was emphasised that decision-making, actions and consequences take place within a specific context in which teachers carry out their professional tasks. Finally, when making decisions and performing activities, teachers will have to draw from a professional knowledge base and from some personal characteristics.

The second part of the article describes how the model can help develop assessment domains, performance criteria and collect evidence of competence. It also discusses how three of Messick's criteria for construct validity could be met: content, theory and process models, generalisability.

Following the model of competent performance, criteria should start with desirable learning activities and outcomes among students, from which acceptable teacher actions and decisions can be derived. Increasingly, domains of competence are being stated in this way, not favouring a certain line of action but describing broad categories of activities and developing desirable learning activities. In addition, to distinguish levels of desirable performance, systematic comparisons between novices and experts within a profession can be made.

The focus for developing instruments is on obtaining the best possible evidence of competence of candidates. Considering validity requirements related to content representation, underlying theory and process models, and generalisability, 'best possible' refers to the representativeness of tasks and task situations and the degree to which the assumed processes and effects of competent performance are adequately represented in the assessment.

On selecting sources of evidence, this should depend on the degree to which the complete process of competent performance is represented, i.e. teacher decisions, teacher actions, student actions. Finally, a set of tasks and task situations should be chosen which can be considered representative, both quantitatively and qualitatively for the domain of competence under study.

According to Kane (1992), the model can be used to set up interpretive arguments to substantiate judgements on teacher competence. We agree with Kane that competence can hardly ever be proven. More likely, an interpretive argument about teacher competence can at best be plausible. If assessors are able to interpret assessment results in terms of the postulated processes of our model, the interpretive argument is supported. For example, assessors judging the quality of instruction may interpret student results in the way teachers make decisions when giving instruction, how they act, and what the consequences are for students in a specific classroom environment.

An advantage of the model is that varying or changing views on teach-

ing do not affect itse structure. Different views on teaching, such as programmed instruction versus discovery learning, will somehow be reflected in some kind of desirable learning activities, a repertoire of adequate actions, and accompanying decision processes on the part of the teacher. Whatever the view on teaching, assessment developers can base their data collection decisions more consciously on the processes they would like to elicit in their assessments.

The model presented may form the basis for further professional development on the part of teachers as it describes the processes teachers engage in. These processes can be changed and adapted when teachers receive feedback and engage in reflective activities. It may thus help improve the quality of training and learning process of teachers.

Starting with a comprehensive model of teacher competence raises the question to what extent all aspects of competent performance should be covered in one assessment task. In other words: if different tasks and different sources of evidence are used, how will they be combined into one judgement? We would like to conclude with some findings of a recent study at the University of Leiden and the Dutch Institute for Educational Measurement (CITO) in which our model was used as the basis for collecting evidence of competence. Using video portfolios, different pieces of evidence for competent performance related to the same set of teaching situations were collected coherently. Teachers' actions (on video), underlying decision-making processes (by interview), consequences observed for students (on video), and the lesson context (situation) in which the teaching actions were demonstrated (using lesson documents) were recorded. A scoring system was constructed through which experienced assessors arrive at overall judgements on instructional competence. The first results of a pilot study (Roelofs and Van den Berg, 2004, 2005) show that portfolios as cohesive and assessable collections of evidence. However, assessors do not use all evidence for arriving at judgements. Assessors had evidence on teacher decision-making and on the task context but did not use it for their judgements. But when reporting their judgements to teachers, they discussed these sources of evidence to provide more comprehensive feedback to teachers. This is how the general model of competence was used for giving an interpretive argument.

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# Competing approaches towards work process orientation in German curriculum development

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SUMMARY

**In 1996, a new curricular framework for vocational education in schools called *Lernfelder* (learning arenas) was implemented in Germany. In the concept of learning arenas learning situations in schools have to be related to work activity in a particular occupation. For this reason work process orientation currently plays a significant role in German curriculum development. However, there is not just one approach on how to transform work activity into vocational curricula, but various competing approaches. In this paper two important approaches are characterised and strengths and weaknesses of each are identified.
Summing up, it may be said that the work-oriented turnaround in German curriculum development has not yet fully happened. Problems of analysing work situations in companies, transforming work process knowledge into curricula and assessing competences which students or apprentices have acquired are still being solved.**

## The work-oriented turning point in German VET curriculum development

In Germany, school curricula for vocational education and training in a particular occupation (*Beruf*) were traditionally derived from corresponding academic disciplines (e.g. engineering sciences or economic sciences) whereas curricula for in-company training were produced in a bargaining process between the social partners, guided by ministries and the German

National Institute of Vocational Education and Training (*Bundesinstitut für Berufsbildung*). Although there is also a process of synchronisation, the gap between these two curricula in the German dual system was and still is remarkable, especially in the practice of teaching and training. Since 1996, the situation has begun to change as VET policy-makers decided to implement a new curricular framework for VET schools called *Lernfelder* (KMK, 1996; 2000) ([1]). *Lernfelder* ([2]) are didactically reflected occupational fields which follow the international trend of competence-based and work-related curricula. This new curricular framework formed the background of a pilot project programme called 'New learning concepts within dual vocational education and training' (Deitmer et al., 2004). This programme was running from 1998 to 2003 and involved 21 pilot projects in 14 federal states. In total about 100 VET schools (with about 13 000 students who take part in school programmes for one or two days per week and take part in in-company training the rest of the week) and 20 VET research and teacher training institutes participated and developed new learning concepts such as *Lernfelder* (learning arenas). The Institute of Technology and Education at the University of Bremen (ITB) acted as programme administrator and evaluator. Results summarised here stem from the authors' involvement in evaluating that programme.

The key purpose of learning arenas is to link curricula and ultimately learning processes to the work activity and simultaneously promote action learning at curricular level. Thus, the gap between school-based learning and in-company training, between theory teaching and practical work experience is considered in the *Lernfeld* approach. This approach implies quite radical changes for the practice of teaching, at least for everyday teaching practice in German vocational schools. Usually German students, e.g. in the car service sector, begin at school with contents such as 'electro physics by the example of power transmission'. For many students (and even teachers) it might be difficult to understand what this has to do with their usual tasks of car repair and car service. In this case the gap between school-based learning and the learner's experience of company-based

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([1]) In the German dual system there is one curriculum on a national level for the apprenticeship in companies and another main curriculum which is formed by the syllabi for VET schools in each federal state (Bundesland). The new *Lernfelder* framework affects as legal provision only VET schools, but not the initial in-company training.

([2]) Terminology is often a problem within a cross-national scientific dialogue. The term *Lernfeld* would be directly translated into 'learning field', but this expression does not really exist in the English language in this context. Also in Germany it is a new term. A common term like 'learning area' would not be appropriate for describing the new curricula. In Germany, this term refers to the old terminology for the discipline-oriented structure of curricula. A 'learning area', for example, would be 'foundations of electronics' or 'electrical machines'. *Lernfelder* are structured differently and they should refer to occupational fields and work processes. An example of a *Lernfeld* would be 'maintenance of a mecatronic system' or 'haircutting'. A term suggested by Pekka Kämäräinen is 'learning arena' might provide a better idea of what is meant by *Lernfeld*. The term 'learning arena' reveals that we do not speak about a given terrain but a pedagogical construction for providing a dialogue between work and learning.

training is obvious. Indeed, surveys in Germany among apprentices have found that they have enormous difficulties relating theoretical knowledge learned at vocational schools to practical experiences with in-company training, especially those apprentices who have developed a particular interest in their own vocational education and training (Pätzold, 1997).

This gap shall be closed by action learning within learning arenas which has to be holistic, situated, contextualised and should support practical experience. Therefore, the learning process via *Lernfelder* is related to a complete process of work including self-directed planning, execution and evaluation of one's own action while also being aware of interdisciplinary aspects (e.g. technology, economics, ecology, law, etc.). Regarding the curricular concepts a paradigm shift from discipline-organised curricula in VET schools towards work-process-related and competence-based curricula can be observed. In this perspective, the *Lernfeld* approach refers to the European debate about work process knowledge (Boreham et al., 2002). As a result, the challenge for curriculum developers and VET teachers is to identify occupational situations which are significant for the work activity and also have a potential for learning (Fischer and Rauner, 2002a).

The German policy document for the new framework sets out four criteria for constructing *Lernfelder*:

- learning arenas should be derived from occupational fields which represent the area of working;
- they should be related to the work and business processes which show the process character of working (and learning);
- they should be competence-based;
- the *Lernfelder* and its contents should be structured according to work-oriented competences. However, it is under heavy dispute whether this structure may partly follow or must not at all follow the systematic structure of a corresponding discipline (in a 'logic of subject matter') [3].

The transformation from significant work processes to learning situations entails a complex series of steps beginning with analysis of work activity and the required competences, followed by the development of work-process-related and competence-based curricula and ending with the design of work-process-related learning situations. However, it is an open question how work activity and the occupational background can be considered, how it can be transformed into curricula and how these curricula can guide the everyday teaching and training in German vocational schools.

The manual for the new curricular framework does not provide answers to these questions. Because of this gap between VET policy/administra-

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[3] Structuring elements and contents of curricula is especially important for long-term vocational training as in Germany, because the basic way of learning is prescribed by the structure of the curriculum. The policy document for the implementation of learning arenas says that the contents should be structured appropriately. Unfortunately, it does not describe exactly what is meant by that. Hence, the question is, whether any criterion exists for sequencing curricular contents in the logic of work activity and competence development.

tion and VET practice/research different concepts were established for analysing work processes and occupational tasks as well as different models for developing curricula or *Lernfelder* respectively. The common aim of all approaches was to identify the content and forms of work activity and competence as an empirical basis for curriculum development and its impacts upon learning processes. In this way, the researchers in the programme "New learning concepts within dual vocational education and training" attempted to close the transformation gap between the empirical analysis of work and normative construction of curricula. In this paper two main approaches towards work process orientation (including research methods for work and competence analysis, and models for developing curricula according to the new *Lernfelder*) are described and discussed. However, there is still a lack of appropriate methods in qualification research focused on curriculum development (Rauner, 2000; Fischer and Rauner, 2002b).

## The theory-guided pragmatic approach towards construction of learning arenas by Reinhard Bader

In the programme 'New learning concepts within dual vocational education and training' two large projects 'NELE' ([4]) and 'Seluba' ([5]) involving four German federal states followed the Bader approach and developed a manual for constructing *Lernfelder* (Müller and Zöller, 2001).

The basis of the concept is the 'theory-guided pragmatic approach for constructing learning fields in technical vocational areas' (Bader, 2001) in eight curricular steps. The manual starts by analysing the relationship between a vocational occupation, the work processes and the VET conditions. Based on this analysis, the occupational fields can be identified and described. The identified occupational fields can be transposed into *Lernfelder* after validating and reflecting on them. *Lernfelder* must be described using didactical criteria. Finally, learning situations are developed from *Lernfelder*, including reflection on the occupational fields, which is basically the task of VET teachers.

An occupational field in this concept is defined as 'a complex task that contains significant situations for the occupation, life and society'. The core goal for VET is to foster ability to cope with these occupational situations and work situations respectively (Bader, 2001, p. 26).

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([4]) '*Neue Unterrichtsstrukturen und Lernkonzepte durch berufliches Lernen in Lernfeldern* - New teachings structures and learning concepts through vocational training in learning arenas'.

([5]) '*Steigerung der Effizienz neuer Lernkonzepte und Unterrichtsmethoden in der dualen Berufsausbildung* - Increasing the efficiency of new learning concepts and teaching methods within dual vocational education and training'.

**Figure 1**: The eight curricular steps for constructing *Lernfelder* and learning situations ([6])

| Step | Task | Reference system |
|------|------|------------------|
| 1 | Analysing the relationship between the occupation and the work processes | Occupational field |
| 2 | Analysing the circumstances of VET in the occupation | |
| 3 | Identifying the occupational fields | |
| 4 | Describing the occupational fields | |
| 5 | Selecting appropriate occupational fields | |
| 6 | Transforming the selected occupational fields into an arrangement of learning arenas (*Lernfeld*) | Curricula |
| 7 | Describing the learning arenas | |
| 8 | Designing learning situations by concretisation of the learning arenas and orientation on the occupational fields | Learning situation |

The reference system for gathering and structuring the work processes in this approach is the sociotechnical activity system ([7]).

The sociotechnical activity system represents the thinking and action of human beings in technical occupational fields and is based on scientific and technological concepts. Bader supposes occupational fields and work processes should be identified in this system. But the project manual does not explain exactly where work processes can be found. Thus, it is not clear if work processes are located in the vertical process or in the horizontal function unit. Further, modern organisational structures no longer follow this traditional hierarchal structure. Unfortunately, the manual does not mention precise methods for the empirical analysis of work processes. It only provides some suggestions, such as analysing curricula, visiting companies or interviewing experts.

The important criteria for transforming the occupational fields into *Lernfelder* and for their selection are based on the critical educational theory of Klafki (1996). This means that occupational fields have to be valued with respect to societal core problems and their significance for the present, future and its representativeness.

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[6] Each step in the manual also contains several questions of analysis which should be answered before proceeding to the next step. In total there are 63 questions. But the quality of the questions varies considerably. For example, if one intends to describe occupational fields, a question like, 'how can an occupational field be described', does not elicit the answer. Therefore a more precise question is needed.

[7] Sociotechnical systems theory was formulated in the Tavistock Institute in London in the 1950s and was subsequently developed by American and Scandinavian researchers. Initially, the sociotechnical systems approach emphasised use of autonomous work groups to humanise manual work. In Germany Ropohl developed a theoretical basis for the sociotechnical system (Ropohl, 1979).

**Figure 2**: The socio-technical activity system
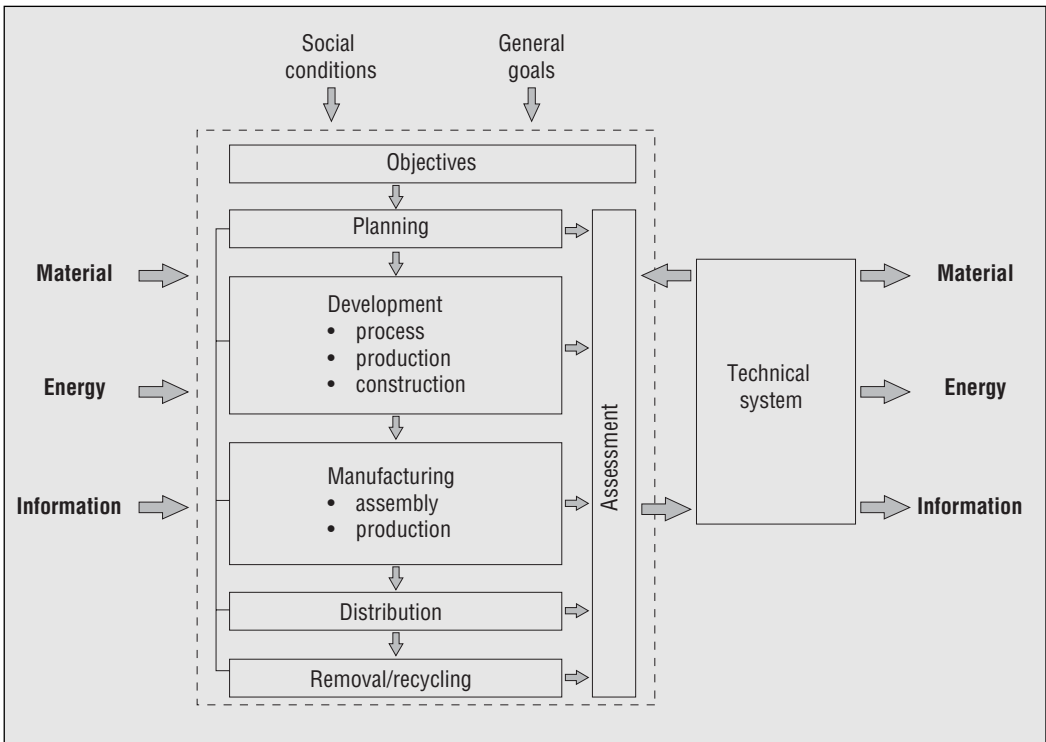


The development of competences in this concept is defined as the process of acquiring skills, abilities and knowledge up to the level of theoretical, autonomous and responsible understanding and shaping of technology. It is assumed that this process begins with everyday experience, followed by workplace experience, model development and culminating with the forming of theory. Thus, it is supposed that theoretical knowledge is the centre of expertise of skilled workers and that theory can explain and solve every technical problem in work life. In terms of selecting and sequencing both the occupational fields and the learning fields, reflection on the theoretical foundation is proposed, but no systematic approach is offered.

# The ITB approach towards constructing learning arenas

The ITB approach (Reinhold et al., 2003) towards constructing learning arenas was developed in a large project called GAB [8]. This project included vocational schools in three German *Bundesländer* and all national production units of a major automobile company. Thus, initial in-company training, the other part of the dual system, was represented.

In the ITB approach it is assumed that every *Beruf* (profession or occupation) could be empirically described by a defined number of tasks. A specific *Beruf* is described through a relationship between different aspects of work (e.g. objectives, tools and requirements for work) and through tasks that are both typical of the occupation and provide a complete picture of it. Tasks as elements of the curriculum are not regarded as a single ability or action, but rather as a complete process of work that encompasses all aspects of the occupation. A general description of how a task is carried out contains the specific requirements of the task, its planning and execution and assessment and evaluation of the resulting work (Kleiner et al., 2002).

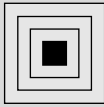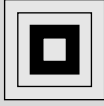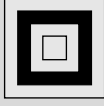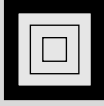**Figure 3**: The ITB-approach for developing vocational profiles



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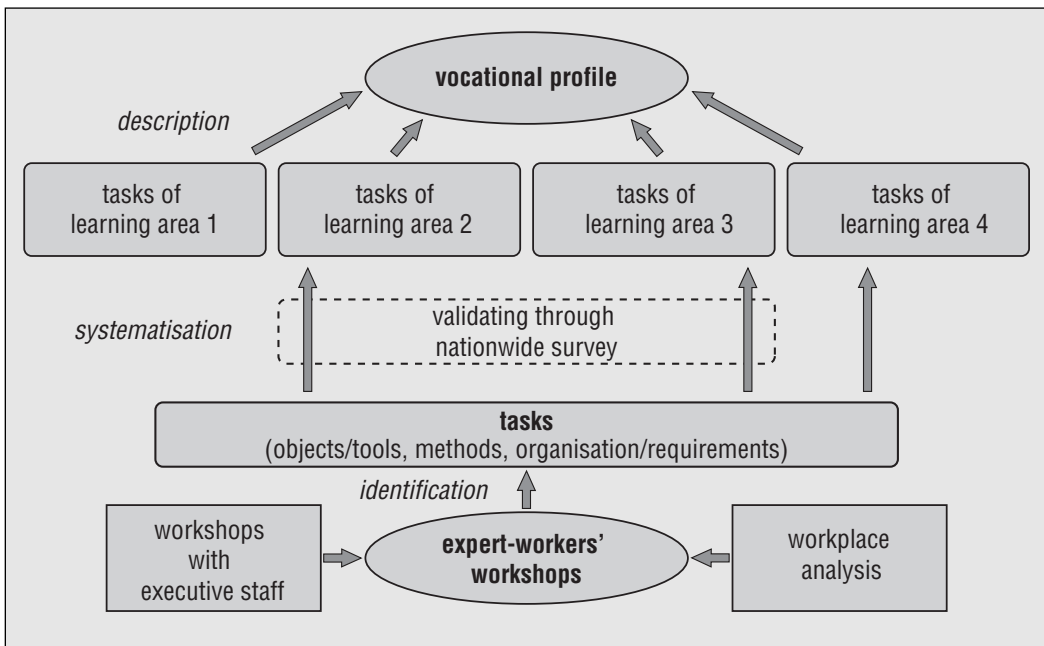
[8] '*Geschäfts- und arbeitsprozessorientierte Berufsausbildung* - Business and work-process oriented VET'.

Such tasks are identical to *Lernfelder* in the ITB approach. Of such tasks or learning arenas, 12-20 respectively form the curriculum for VET in a particular *Beruf*. Tasks and thus *Lernfelder* are structured according to different levels of competence. There are tasks which can be carried out by a novice or more complex ones, which only an expert can manage [9]. Building on this understanding it is supposed that it must be possible to describe empirically competence development based on the difficulty of tasks. There are some similarities to Havighurst's concept (1972) of developmental tasks which have to be fulfilled successfully to reach the next stage of development. In the perspective of VET, the challenge is to identify such developmental tasks of a *Beruf* (Benner, 1984; Rauner, 1999).

In the ITB concept a method-triangulation (see Figure 3) approach is used for identifying the tasks described above. The first and most important step in this methodology is identifying and describing the tasks

**Figure 4**: Macro-structure for the systematisation of tasks

| Acquisition of knowledge in four areas | | | | |
|---|---|---|---|---|
| Learning areas | | | Learning tasks | Methods for problem-solving |
| (4) Specialised and advanced knowledge | How things can be explained in detail and problems solved contextually? | | Unpredictable work-based problems | Experience-based (non-deterministic) performance |
| (3) Detail and functional knowledge | What is important for skilled work and how things function? | | Problem-based special work tasks | Theory guided (non-deterministic) problem-solving |
| (2) Coherent knowledge | How and why are things connected? | | Systematic work tasks | Systematic, rule-based problem-solving |
| (1) Orientation and overview knowledge | What is the main content of the occupation? | | Work tasks as introduction into the occupation | Guided (deterministic) performance |

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[9] For the car-mechanic an example for working tasks for a novice would be car care or standard service of a functioning car, a more complex one would be expert diagnosis and repair.

themselves and the stages of development of skilled workers in so-called expert-workers' workshops (Kleiner et al., 2002) [10].

The general objective of expert-workers' workshops is to gather and describe the tasks of a *Beruf* and finally to put them in order in a learning scheme (see Figure 4). Three categories for analysing and describing such tasks are used:

- objects of the occupation,
- tools, methods and organisation of the occupation,
- requirements of the occupation.

These categories for describing the contents of work and learning are also used in the curricula (*Lernfelder*) (see Figure 5). The defined tasks were then verified by workplace studies in companies and evaluated by other experts of the domain in a nationwide survey. The GAB research approach is domain-specific, because the content and forms of work and expertise can only be analysed by a researcher who is also an expert in the domain.

The main characteristic of the ITB concept is linking the empirical analysis of work activity with a competence model. This model is based upon the novice-expert-paradigm of Hubert and Stuart Dreyfus (1986) and the assumption that competence is acquired by the successful performance of a task [11]. Dreyfus and Dreyfus proposed a five-stage sequence of developmental stages from novice to expert: novice, advanced beginner, competent, proficient and expert. These stages differ not just on experience, but also on commitment to the problem (increasing with expertise), the degree to which knowledge has been internalised, and the degree of awareness of theory behind knowledge [12]. According to the novice-expert-paradigm developing competence proceeds in this general pattern in five steps. In the ITB concept developmental stages of competence are transformed into a curricular concept. The four curricular areas of learning are basically located between the five competence stages in the Dreyfus model (Rauner, 1999, p. 436). Thus, a reference system was developed through the help of which tasks can be identified as curricular elements and be arranged according to the 'logic of development' (see Figure 4 where the development from novice to expert is illustrated through icons start-

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[10] This is close to the DACUM approach (Norton, 1997). But the DACUM concept follows the US-American philosophy of jobs. Therefore the duties and tasks represent usually a small part of a complete working task, especially under the condition of modern organisational structures. In contrast, the concept of the working tasks in the ITB approach is broader, because it represents a complete process of work. The second difference between both concepts is that the ITB concept also tries to identify the stages of development of the expert workers to find a way to structure the tasks according to a competence model. DACUM only tries to describe competence in relation to a single job profile.

[11] Benner approved this concept within the nursing sector and identified paradigmatic cases (or developmental working tasks) for nursing (Benner, 1984).

[12] This five stage scheme has been applied for chess playing and flying fighter planes (Dreyfus and Dreyfus, 1986). The goal in the developmental approach is to come up with explanations of the process behind evolution to the different stages.

ing with the acquisition of orientation-/overview knowledge and ending with the acquisition of specialised and advanced knowledge).

In a didactical perspective the four sectors of learning were pedagogically described. This normative description and the empirical results of the tasks description link qualification research with curriculum development.

Using this concept in the GAB project, tasks for six industrial occupations, namely industrial electronics mechanic, industrial mechanic, toolmaker, mechatronic fitter, car mechanic and industrial clerk were identified ([13]). Based on the empirical results and the curricular concept GAB organ-

**Figure 5**: The tasks of an industrial electronics mechanic

| Tasks of an industrial electronics mechanic in GAB |
|---|
| **Learning area 1: knowledge of orientation and overview** |
| (1)  Planning and executing electrical installation |
| (2)  Inspecting and repairing electrical equipment |
| (3)  Purchasing and ordering spare parts and electrical material |
| (4)  Preventive maintenance of a production line |
| **Learning area 2: coherent knowledge** |
| (5)  Controlling/operating and setting up production lines and ensuring product quality |
| (6)  Drawing up/revising and maintaining electronic devices and equipment |
| (7)  Documenting the operating conditions and the repair process |
| (8)  Installing/replacing and implementing PC-components and application programmes |
| (9)  Checking and replacing conductions, devices and components at production lines |
| **Learning area 3: knowledge of details and function** |
| (10)  Repairing electrical drives |
| (11)  Installing, dismantling and adjusting sensors and actors at production lines |
| (12)  Troubleshooting and fault clearance in the electrical installations of production lines |
| **Learning area 4: specialised and advanced knowledge** |
| (13)  Repairing production lines and machines in the case of a fatal error |
| (14)  Optimising the processes of manufacturing |
| (15)  Revising, rebuilding and overhauling a production line |

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([13]) GAB also established 'core occupations' by reducing 27 occupational profiles to six. Therefore, the question about the boundaries of a Beruf appeared. GAB also developed an assessment system to evaluate competence development using evaluation tasks.

**Figure 6**: An example of a *Lernfeld* for an industrial electronics mechanic

| *Lernfeld* 8<br>Learning area 2 | Repairing electrical drives | Time schedule<br>Company: 12 w.<br>VET school: 80 h. |
|---|---|---|

This task includes both disconnecting and connecting a new (identical) electrical drive, and the integration of a new similar electrical drive which respects the most important parameter (velocity, acceleration, moment of torque). This task requires profound knowledge of electrical drives and its control. This type of knowledge is even more important than the knowledge of the mode of operation of electrical machines. The core task of a specialist in the workshop is parameterising the control of an electrical drive.

**Objectives of learning at both places of learning**

**In-company training**
The apprentices check and repair electrical machines and drives taking characteristic values and operating parameters into account. The manufacturers' instructions have to be considered (e.g. characteristic values, power electronics, control system).
The apprentices analyse the failure-free operation of electrical devices and document parameters professionally.

**VET school**
The students know the elements of electrical devices like electrical machines, power electronics and control systems. They are able to analyse and assess the electrical drive system and its components according to the application and the necessary connection. They analyse the flow of energy and information. They apply basic measurements for parameterising the electrical drives. They are able to justify the use of special measuring instruments and have a good command of them.

**Contents of work and learning**

**Objects**
- Inspecting and starting electrical drives taking the specific application into account
- Replacing worn components at electrical drives and machines
- Work safety while operating electrical drives

**Tools**
- Electrical drive system (electrical machines, controller, power-electronics)
- Software for parameterizing
- Special measuring instruments (e.g. true RMS)
- Installation diagram
- Manuals and manufacturers' instructions
- Electromagnetic compatibility (EMC)

**Methods**
- Estimating and accessing the actual state of an electrical device
- Testing and using control systems and software
- Replacing electrical machines, wires and components of power electronics and control systems
- Parameterising the electrical drive with respect to guidelines and application (booting programmes for testing and inspecting)
- Selecting standardised components (e.g. electrical machines)

**Organisation**
- Work safety (voltage, rotating parts)
- Self-directed gathering of information (parameter of electric devices)
- External processing of repair orders

**Requirements**
- Analysing the characteristics of electrical drives
- Parameterising electrical drive professionally
- Handling special measuring instruments securely and professionally
- Applied handling of special tools/software for the parameterising
- Professional maintenance of electrical drives
- Work safety while operating machines
- Professional selection and replacement damaged or worn out parts
- Respecting EMC
- Handle external processing of repair orders

ised the tasks according to the competence model described above. Figure 5 shows an example of the tasks of an industrial electronics mechanic (Rauner et al., 2001).

From the empirically based description and the systematisation of working tasks in combination with the pedagogical description of the learning areas, it is a very short step to the construction of work-related and competence-based curricula. Figure 6 shows an example of a *Lernfeld* for an industrial electronics mechanic (op.cit., 2001) ([14]).

## Problems of research and development

Research and development activities in the German project 'New learning concepts within dual vocational education and training' have revealed several problems which need to be solved to put the *Lernfeld* approach into practice. To summarise, the new curricular framework of learning arenas implies three main problems.

- Problem of analysis. How can the occupational fields and the work and business processes be analysed for developing curricula? A methodological concept with adequate empirical methods and categories is necessary to describe work activities.
- Problem of transformation. How can the empirical results be transformed into curricula on competence development? Within this transformation process a conceptualisation of educational, psychological and societal criteria is needed.
- Problem of assessing competences which students/apprentices have acquired. How can the elements (*Lernfelder*) and content of curricular elements be arranged to support competence development? This question implies that a competence model is required to describe an appropriate way of learning and methods are needed to assess individual competence development.

It is important to note that not only researchers or VET administrators are confronted with these problems. With the implementation of the '*Lernfeld*' approach curriculum development has become an additional task for VET teachers. VET teachers are members of curriculum development committees which have been established in each federal state in Germany. These committees, however, deliver a curriculum for each *Beruf* (occupation) which is more or less a framework curriculum that has to be filled with content for vocational schools. Therefore, a much larger number of VET teachers than those participating in federal state committees have to cope in their everyday work with curriculum development.

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([14]) The *Lernfeld* structure of GAB is beyond the curriculum structure for the dual VET system in Germany, where there are two curricula: one for VET schools and one for in-company training. GAB developed integrative curricula for the teaching and training in VET schools and in companies to support cooperation between both learning places.

### The problem of analysing work situations in companies

The key purpose of the *Lernfelder* is to implement the related work process and competence-based curricula. However, our comparison between the most important approaches shows that different concepts have been developed. Although in both concepts occupational/work analysis is seen as an empirical basis for developing curricula, different procedures and different frameworks are used.

How do the different concepts handle the problem of analysing work situations in companies? In our view discussion between teachers and developing mind maps as suggested in the Bader concept is not sufficient to analyse work situations. Teachers in German vocational schools with an average of approximately 25 years teaching experience do not have up-to-date work experience. Interviewing experts is also rather vague if it is not made clear who an expert for work analysis is.

A better methodology is using expert-worker-workshops for work analysis because this may help integrate real work process knowledge into curriculum development. However, this method is difficult to execute and validate. A first difficulty arises in selecting workers for the workshop: who represents not only the present but also the future of work? A new curriculum should not represent yesterday's working practice. Thus, workers have to be selected who have experienced modern work systems and are in the middle of technological and organisational change.

If such workers are selected a second difficulty will arise during the workshop: the ITB concept is based on tasks and workers are asked to identify relevant tasks which later form the curriculum. Some will probably identify only one task for the entire occupational field, e.g. maintenance staff might declare: 'Our task is to keep the machines running'. Others will identify more than 300 tasks because every single screw they have to tighten appears as a new task to them. Therefore, as an introduction to the workshop, clarification is needed on what a task in the sense of a complete process of work is, and why a VET curriculum consists of 12 to 20 tasks.

In the end the question arises: are the tasks determined representative for the *Beruf* (occupation) as a whole? As 10 to 20 workers participating in an expert-worker-workshop are not representative of the entire occupational field, validation is needed through a survey involving researchers, social partners and experts from the relevant national VET institute. However, involving such people risks emphasising political opinions instead of empirical findings.

All in all, the Bader concept also seems feasible for VET teachers but it might only revitalise those teachers' prejudices about working life. The ITB concept seems much more able to integrate real work process knowledge but it is doubtful this concept can be carried out by VET teachers alone. Such a doubt is particularly justified if we consider that the ITB concept transcends the boundaries of the VET system in Germany (as it aims at an integrated curriculum for schools and companies). In current German curriculum development numerous committees have been established in

each federal state for each *Beruf* and it is not clear which of the approaches described is used and how the goal of work process orientation is reached.

## The problem of transforming work situations into curricula for vocational schools

After relevant occupational fields have been analysed the problem of how to transform the findings into curricula arises. In Germany, there were and still are criticisms of the work process orientation in curriculum development. In this debate an important argument was published: a curriculum cannot be derived from work situations, because work situations as such do not imply educational issues. Work situations have to be related to educational, psychological and societal criteria (Lisop and Huisinga, 2000, p. 42).

While we agree, it must be asked to what critics of the *Lernfeld* approach relate their educational, psychological and societal criteria - if not to the work process knowledge which apprentices do acquire or do not acquire in the process of learning. For this reason, identifying work situations and the relevant work process knowledge is required, even if we regard the problem of transformation as a process of relating work and education instead of deriving educational issues from work. Indeed, both concepts for constructing learning arenas introduced here try to combine empirical findings with normative criteria for curriculum development.

The question is how reasonable are the framework and methods of the two competing approaches. In the Bader concept the model of a socio-technical activity system should serve as a guideline for solving the problem of transformation (transforming work situations into curricula). Our view is: through the help of a socio-technical activity system *Lernfelder*, tasks and contents can be located in an ideal business process. However, real life phenomena such as economic demands towards work and the aspect of competence development is missing. The socio-technical activity system also does not fit for non-technical jobs.

The ITB concept on the other hand, offers a model of competence development as a reference point for curriculum development - but the devil is in the detail. Our view is: *Lernfelder*, tasks and contents can be located in an ideal process of competence development. However, it is difficult to relate a particular task to only one learning area (e.g. to follow the theory that the standard service of an automobile is exclusively a matter of orientation knowledge). This is a practical difficulty. More important is that up to now the assumed steps of competence development have not been empirically justified - either by Dreyfus and Dreyfus, or by Benner or in the GAB project. It is a matter of future research to find out which tasks can be regarded as paradigmatic tasks for reaching the next stage of development.

To summarise, two different concepts for structuring curricula can be observed. We have concepts such as the ITB concept oriented towards a model of competence development and assign the *Lernfelder* to

knowledge and competence levels. On the other hand, concepts like the Bader concept are oriented more towards the content and objects of a work system interpreted as a socio-technical activity system. The latter approach allows a connection to a discipline-oriented structure of the curriculum whereas the ITB concept abolishes the logic of a discipline as a reference system in favour of an assumed 'logic of development'.

The transformation process from occupational fields to *Lernfelder* was the focus of most projects in the programme 'New learning concepts within dual vocational education'. These projects applied different criteria to this transformation process often derived from the critical educational theory (Klafki, 1996). Nobody derived curricula from work situations without any intermediate considerations. It is worth emphasising that a critical evaluation of the identified work process and tasks is necessary to assess the curricular usability. In the projects didactical criteria were mentioned, but a precise procedure for the transformation process was not established. Thus, in current curriculum development it is not clear which approach towards transformation is used and how competence development is considered.

## The problem of assessing competences of students/apprentices

In Germany, most examinations apprentices have to pass are multiple-choice tests, especially the final examination. This is an assessment of 'know-that', but not an assessment of 'know-how' which apprentices should acquire through learning in *Lernfelder* (learning arenas). Examinations are generally not competence-oriented.

Up to now, there has been no thorough investigation into if and how *Lernfelder* (learning arenas) strengthen the process of competence development. Some projects report an increase in students' motivation, others report some students having difficulties to organise self-directed learning in *Lernfelder.* In the GAB project an assessment of competences which apprentices had acquired after 12 to 18 months revealed most (almost 900 students took part in this study) were not able to create the kind of work process knowledge that would help them cope with real tasks which skilled workers have to face - despite teaching and training being already, at least officially, organised according the *Lernfeld* approach (Bremer, 2005). This quite surprising result was explained by teachers' and trainers' refusal to change their teaching and training practices radically and it was traced back to biographical strategies of apprentices (Heinz et al., 2005) who had developed a much stronger company orientation than a vocational identity towards their particular *Beruf* (occupation).

Nevertheless, as the GAB project used the developmental tasks they had established as evaluation tasks the project developed a methodology to assess work-oriented competences which students/apprentices have (or have not) acquired in the course of their vocational education and training. This methodology has been applied to one of 21 projects. As most

projects focused on developing curricula and not on assessing students' competences there is a lack of large-scale evaluation studies ([15]). For this reason we are unable to conclude that the *Lernfeld* approach leads to improved competences of students. Further, in the everyday practice of teaching and training, traditional examinations counteract the idea of work process orientation and competence development which stands behind the implementation of *Lernfelder* (learning arenas).

## Overall conclusions

Although intended and dictated by national policy, the work-oriented turnaround in German VET curriculum development has not yet fully happened.

There are political reasons: no policy decision exists or can be expected on which of the different approaches developed to construct *Lernfelder* (learning arenas) should be followed.

The differences in the concepts and results of occupational analysis and developed curricula are evidence of the ambiguity of the new curricular framework. Due to the different approaches, various definitions and conceptualisations of terminology exist, e.g. the difference between tasks, work processes, occupational fields, learning arenas and learning situations. As a follow-up effect there are also practical reasons for a lack of clarity: there is no transparency on how committees for curriculum development solve the problems of analysis, transformation and assessment. Clear guidelines to solve these problems do not exist. Only one fact is known: in each of the 16 German *Bundesländer* it is done in different ways.

If we look at the situation from an empirical point of view, up to now we do not have convincing empirical findings that the *Lernfeld* approach is superior to the traditional disciplinary structure. Much more research is necessary to clarify and to assess the process of competence development. The results of research should be fed back into VET practice which means that VET teachers or trainers should be provided with useful instruments for constructing work-related tasks, for designing learning situations and for competence assessment.

And, last but not least, there are structural reasons why the work-oriented turnaround in German vocational education and training is only half way through: the *Lernfeld* approach does not fit into traditional school organisation, the German system of specialised subjects or the competences teachers have acquired in that system.

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([15]) See description and results of the project programme 'New learning concepts within dual vocational education and training' (Deitmer et al., 2004).

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# Reading

## Europe International:
## information, comparative studies

**The challenge of eCompetence in academic staff development / Ian Mac Labhrainn [et al.].**
Centre for Excellence in Learning and Teaching – CELT;
Galway: CELT, 2006, 237 p.
ISBN 0-9551698-1-X

The book contains 24 contributions on eCompetence, which discuss theoretical approaches and analyse competence development measures for academic teachers within local university contexts. One thing has become clear in the comparative analysis of eCompetence approaches – the universal definition of competence does not exist. We have not found 'the one' eCompetence or 'the three' key eCompetences, which are most important for academic staff. Instead, the competence concept has many different facets. The main reason for this is the decisive role of the context which determines the specific competence profile and definition. What is important for one lecturer, when he or she is using ICT in a teaching activity, is not important for the next lecturer. Which competence is required, depends to a high degree on the context of performance. We think that the eCompetence topic is highly relevant as one key component for educational innovation. There is a growing awareness in Europe that human resources development and management needs to become a vital ingredient for strategic planning in universities. One innovation challenge of European higher education is the sustainable implementation of ICT in the work processes of the university – and the ability of lecturers to use ICT in teaching and learning is one key aspect of strategic technology integration.

**The development of a national system of vocational qualifications: a discussion paper.**
International Centre for Technical and Vocational Education and Training – UNEVOC; Scottish Qualifications Authority – SQA
Bonn, 2006, IX, 29 p.
(Discussion Paper Series, 2)
ISSN 1817-0374

The aim of this paper is to inform readers about the development of national qualifications systems and to provide guidance for countries aiming to set up or reform their systems. The paper is written in the context of vocational qualifications – that is, qualifications that are designed to prepare people for work or to assess their performance in the workplace. Nevertheless, the contents are generally applicable to any qualifications which are based on standards of performance. It also gives some information about the development of a National Qualifications Framework that allows comparisons to be made between qualifications. The paper draws on the experience of the Scottish system of vocational qualifications since the mid-1980s, when the system was subject to a series of major reforms. It covers both the development of the integrated and comprehensive system of vocational qualifications (which is SQA's responsibility), and the introduction of the Scottish Credit and Qualifications Framework which includes these qualifications. Section 1 of the paper looks at the background to vocational education and training (VET) reforms in Scotland. Subsequent sections focus on the qualifications themselves and the infrastructure required to develop and operate the qualifications. Finally, the paper describes national qualifications frameworks in general terms and the Scottish Credit and Qualifications Framework (SCQF) in particular. The SCQF was launched in 2000 to bring together general, VET and university provision with a view to supporting and increasing lifelong learning in Scotland.

http://www.unevoc.unesco.org/publications/pdf/IntLib_DiscP_SQA.pdf

**Framework of actions for the lifelong development of competences and qualifications: evaluation report 2006.**
Union des Confédérations de l'Industrie et des Employeurs d'Europe – UNICE; European Centre of Enterprises with Public Participation and of Enterprises of General Economic Interest – CEEP; European Trade Union Confederation – ETUC; Union européenne de l'Artisanat et des Petites et Moyennes Entreprises – UEAPME
Brussels: UNICE, 2006, 128 p.

The European social partners have prepared Evaluation Report 'Framework of actions for the lifelong development of competencies and qualifications'. This is an attempt to evaluate the impact of their actions on both companies and workers after three annual reports about the annual actions carried out on the priorities identified in their work programme 2003-2005. The evaluation report comprises national evaluation reports jointly elaborated by social partners in the different Member States, which highlight the key features of social partners' work to promote the four priorities from 2003 to 2005. European social partners also report on actions taken at the European level separately. In addition, a section entitled 'main trends' summarises the information available on the initiatives taken from

2003 to 2005 and assesses the impact of the actions on labour markets across Europe.
http://www.etuc.org/IMG/pdf/Fram_of_actions_LLL_evaluation_report_FINAL_2006.pdf

**Standardisierung und Zertifizierung beruflicher Qualifikationen in Europa / Ute Clement [et al.]**
**[Standardisation and certification of vocational qualifications in Europe]**
Bielefeld: Bertelsmann Verlag, 2006, 197 p.
ISBN 3-7639-1075-1;

The volume discusses the further development of vocational education and training systems, a subject that is currently the centre of focus in and beyond the European Union. Materials and information are offered on the following questions: What do certification and standardisation mean? What concrete vocational training policy measures are planned? Can the quality of vocational education and training be comprehensively and adequately assured by means of the formulation and testing of standards? What consequences does the European process have for lifelong learning? In addition, concepts and models of standardisation and certification that are being developed and tested in selected EU countries (Spain, Hungary, Luxembourg) are introduced and discussed.

**ICT skills certification in Europe / Peter Weiss [et al.].**
European Centre for the Development of Vocational Training – Cedefop
Luxembourg: EUR-OP, 2006, 120 p.
(Cedefop Dossier, 13)
ISBN 92-896-0434-4; ISSN 1608-9901

A great variety of ICT certification schemes and systems exist throughout Europe. Certification and quality assurance in ICT education and training are extremely important for both employment in the ICT industry and as a basis for a sustainable professional career. CEPIS (Council of European Professional Informatics Societies) studied and compared, on behalf of Cedefop, existing approaches to e-skills certification in 21 European countries. The survey aims to contribute to the current debate on promoting e-skills, to economic competitiveness, better jobs and social cohesion. It supports the current debate on skills frameworks, quality standards and the increasing attractiveness essential for this labour market segment.
http://www.trainingvillage.gr/etv/Upload/Information_recources/Bookshop/431/6013_en.pdf

**Typology of knowledge, skills and competences: clarification of the concept and prototype / Jonathan Winterton [et al.].**
European Centre for the Development of Vocational Training – Cedefop
Luxembourg: EUR-OP, 2006, 131 p.
(Cedefop Reference, 64)
ISBN 92-896-0427-1; ISSN 1608-7089

This report is one in a series launched by the European Commission and Cedefop to support the work of the Copenhagen Process Technical Working group (TWG) on Credit Transfer. The mandate of the TWG comes directly from the Copenhagen Declaration on Enhanced Cooperation in vocational education and training (VET), namely to investigate: how transparency, comparability, transferability and recognition of competences and/or qualifications, between different countries and at different levels, could be promoted by developing reference levels, common principles for certification, and common measures, including a credit transfer system for vocational education and training. This report, the third commissioned by Cedefop, focuses on the typology of learning outcomes in terms of knowledge, skills and competences.

**Re-theorising the recognition of prior learning / Per Andersson and Judy Harris.**
London: NIACE, 2006, 200 p.
ISBN 1 86201 265 2

The recognition of prior learning (RPL) is an educational response to the need to widen participation in education and training for economic advancement and social inclusion. The social meanings of RPL have different configurations depending on historical, cultural, economic and political forces in different places. One constant is the reliance on the widely pervasive educational philosophies of experiential learning: constructivism and progressivism. This book challenges the orthodoxy of experiential learning and the particular readings of knowledge, pedagogy, learning, identity and power which it privileges. It does this by introducing different theoretical resources to RPL and drawing on experiences of RPL in the UK, South Africa, Australia, Sweden, Canada and the USA. The book provides a range of re-conceptualisations of the relational terrain between adult experience and learning on the one hand, and specialist or academic knowledge on the other.

**Recognition in the Bologna Process: policy development and the road to good practice / Sjur Bergan, Andrejs Rauhvargers.**
Council of Europe – COE
Strasbourg: COE, 2006, 202 p.
(Higher education series, 4)
ISBN 92-871-6007-4

The Bologna Process aims to create a European Higher Education Area by 2010, a geographical area in which students, graduates and holders of qualifications can benefit from widespread mobility. Its implementation therefore requires measures to facilitate the process of obtaining the recognition of qualifications, the cornerstone of this ambitious project. In addition to a comprehensive overview of recent developments in the recognition fields, this work includes articles on topics such as the impact of emerging qualifications frameworks on recognition, recognition and quality assurance, learning outcomes, credit transfer, recognition and the labour market, transborder education and recognition issues outside the European Higher Education Area.

**Australian qualifications framework lower-level qualifications: outcomes for people over 25 / John Stanwick.**
Adelaide, SA: NCVER, 2006, 31 p.
ISBN 1-921169-74-5

This study investigates where certificate I and II qualifications lead people aged 25 and over. The main aims of these qualifications are to provide vocational outcomes, generally at lower skill levels, as pathways to further study and/or jobs requiring supervision. Findings indicate that, while the qualifications were not particularly useful in terms of gaining employment, there were some modest career advancement benefits. It was projected that low proportions of people aged 25 and over will complete these courses. Notably, further study pathways were not among the outcomes of these courses.
http://www.ncver.edu.au/research/core/cp0406b.pdf

## European Union: policies, programmes

**Adult learning: It is never too late to learn**
Luxembourg: EUR-OP, 2006, 12 p.
(Documents COM, (2006) 614 of 23.10.2006)

This Communication highlights the essential contribution of adult learning, through the acquisition of key competences by all, to employability and mobility in a modern labour market and to social inclusion. It draws on lessons learnt from the dialogue with Member States in the framework of 'Ed-

ucation and Training 2010' and from experiences gained in the existing EU education and training programmes, in particular the 'Grundtvig' action of the Socrates programme. It also reflects the approach outlined in the Communication on efficiency and equity, namely that reforms are possible which make education and training systems both more efficient and more equitable. It recalls that the Structural Funds, and in particular the European Social Fund (ESF), have the potential to support the development of infrastructures and strategies. It underlines the importance of certain specific issues: the gender dimension, in particular regarding data collection, differences in access to lifelong learning and in preferred forms of learning. It provides the necessary policy underpinning for the implementation of the future 'Grundtvig' programme, which will form part of the overall Lifelong Learning Programme 2007-2013. Finally, it proposes a reflection on adult learning involving Member States and relevant stakeholders, leading to the formulation of an action plan in 2007.
http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0614en01.pdf

**Council conclusions on the European indicator of language competence.**
Council of the European Union
Official Journal of the European Union, C 172 of 25.07.2006, p. 1-3
Luxembourg: EUR-OP, 2006

The Council of the European Union reaffirms that foreign language skills, as well as helping to foster mutual understanding between peoples, are a prerequisite for a mobile workforce and contribute to the competitivity of the European Union economy; periodic monitoring of performance through the use of indicators and benchmarks is an essential part of the Lisbon process, allowing good practice to be identified with a view to providing strategic guidance and steering for both short and long term measures of the 'Education and Training 2010' work programme.'
http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/c_172/c_17220060725en00010003.pdf

**Proposal for a Recommendation of the European Parliament and of the Council on the establishment of the European Qualifications Framework for lifelong learning.**
Luxembourg: EUR-OP, 2006, 21 p.
(Documents COM, (2006) 479 of 5.9.2006)

This European Qualifications Framework for lifelong learning (EQF) will provide a common language to describe qualifications which will help Member States, employers and individuals compare qualifications across the EU's diverse education and training systems. The adoption of the proposal follows almost 2 years of consultation across Europe. The core element

of the EQF is a set of eight reference levels describing what a learner knows, understands and is able to do – their 'learning outcomes' – regardless of the system where a particular qualification was acquired. The EQF reference levels therefore shift the focus away from the traditional approach, which emphasises learning inputs (length of a learning experience, type of institution) and shifts the focus to learning outcomes. The draft recommendation anticipates that Member States will relate their national qualifications systems to the EQF by 2009.
http://ec.europa.eu/education/policies/educ/eqf/com_2006_0479_en.pdf

## From the Member States

**CZ**  **Migrace odborníků do zahraničí a potřeba kvalifikovaných pracovních sil / Jana Vavrečková [et al.].**
**[Migration of experts abroad and the need for a qualified labour force.]**
Prague: VUPSV, 2006, 87 p.
ISBN 80-87007-00-X

The publication analyses the issue of international migration of experts as a specific problem. It defines motivation and stimuli influencing migration abroad in this group of the population. Furthermore, the publication describes the creation of specific programmes aimed at retaining the outstanding specialists and activities that focus on attracting qualified foreign labour force in many developed countries. The main focus of the publication is the identification of the shortage of qualified experts on the Czech and European labour markets.
http://www.vupsv.cz/Fulltext/MSVavpu.pdf

**DK**  **Livslang opkvalificering og uddannelse for alle på arbejdsmarkedet: rapport fra Trepartsudvalget: sammenfatning.**
**[Lifelong qualification and education for everyone on the labour market: report from the tri-partite committee.]**
Copenhagen: Finansministeriet, 2006
ISBN 87-7856-771-8

Danish VET is often analysed and evaluated. This report analyses and evaluates the existing adult education and further education efforts in relation to the future challenges on a global labour market. It offers suggestions on how the competences in the overall working force can be developed in cooperation with employees, employers and the public sector. The report sums up the report 'Lifelong qualification and education for all on the labour market'.
http://www.fm.dk/db/filarkiv/14295/sammenfatning.pdf

**Realkompetencevurdering i EUD**: **Praktiske muligheder /
Steffen R. Søndergaard, Marianne Kragh, Elsebeth Pedersen.
[Real competence assessment in the EUD: practical possibilities.]**
Copenhagen: UVM, 2006, 62 p.
ISBN 87-603-2566-6;

In 2003, the evaluation of real competences was linked by law
to the preparation of the personal training plan in Denmark. The objective of this publication is to present educational schemes which
offer and carry out vocational education, and a range of basic qualifications for the work with real competence evaluation of the students. The publication offers ideas on how the evaluation can interact with the preparation of the personal training plan. It presents a
series of case examples representing different types of students. It
refers to the formal rules on evaluation of the students' real competencies, and refers to literature and websites on the subject.
http://pub.uvm.dk/2006/realkompetence/realkompetence.pdf

**DE** **Dialog in lernenden Organisationen**: **Dialog als Kernkompetenz
zur Förderung kollektiver Intelligenz in organisationalen Lern-
und Entwicklungsprojekten**: **Modellversuch / Doris Lau-Villinger.
[Dialogue in learning organisations: dialogue as a core skill for
promoting collective intelligence in organisational learning and
development projects: pilot project]**
Bundesinstitut für Berufsbildung – BIBB
Frankfurt: Bildungswerk der Hessischen Wirtschaft, 2006, 133 p.

The goal of the pilot project commissioned by the BIBB was to
work out jointly with enterprises, consultants and researchers how
dialogue-oriented interaction could be expanded in organisations,
how dialogue and knowledge management could be linked with one
another and in what form dialogue-oriented interaction helped to
optimise decisions and business processes. The experience and
insights acquired are described in detail.

**Dynamische Zeiten – langsamer Wandel**: **betriebliche Kom-
petenzentwicklung von Fachkräften in zentralen Tätigkeits-
feldern der deutschen Wirtschaft / Volker Baethge-Kinsky, Ruth
Holm und Knut Tullius.
[Dynamic times – slow change: in-plant development of the
competence of skilled workers in the central fields of activity
in the German economy]**
Soziologisches Forschungsinstitut Göttingen – SOFI
Göttingen: SOFI, 2006, 577 p.

The final report of the research project headed by Prof. Dr. Martin Baethge, 'Competence development in German enterprises, forms, prerequisites and dynamics of change', FKZ; LK 600.03 is, inter alia, divided into the following fields: prospects of in-plant competence development in central fields of activity in the German economy; skilled production work in different fields; service work, customer advisory services, management consultancy, software development and project management, product development; external recruitment and working-in, training and on-the-job practice, continuing vocational education and training; trends in in-plant competence development.
http://www.sofi-goettingen.de/index.php?id=584

**Handlungskompetenz für mittlere Führungskräfte / Claus Drewes [et al.]**
**[Occupational competence for middle management]**
Bundesinstitut für Berufsbildung - BIBB;
Gütersloh: Bertelsmann Verlag, 2006, 147 p.
ISBN 3-7639-1060-3

The examination for qualification as certified metalworking foreman, which was revised some years ago, is based on real in-company tasks. These have been identified within participating companies and structured as learning tasks. The combination of several in-company tasks enables the sound design of the coherent learning processes necessary for the development of the required competence for managerial staff. The article presents approaches and solutions combining the aims of the new examinations with appropriate didactic concepts.

**Qualifikation als Standortfaktor**: **Ausbildung im erweiterten Europa.**
[**Qualification as a location factor: vocational training in an enlarged Europe.**]
Kuratorium der Deutschen Wirtschaft für Berufsbildung – KWB
Tagung der gewerblich-technischen Ausbildungsleiter. Hamburg. 2005
Bonn: KWB, 2006, 64 p.

The enlargement of the EU and the creation of a European education area present a great challenge for the Member States. For the German vocational education system with its closely interlocked links between education and employment, the important factor is to convince enterprises and candidates of its attractiveness

in view of strong competition with other education systems and pathways. The introduction of a three-year Bachelor course will also accentuate the competition for the best candidates. In view of the demographic development expected in the coming years, this competition will become even more acute. The attractiveness of the dual system of education in the European context will depend to a decisive extent on which skills young adults can offer companies after they complete their training, and which career perspectives they see in the dual system. An important pre-requisite for this is the permeability between different forms of skill acquisition. A German education and vocational education system with well-designed permeability and a balanced structure offers much better perspectives for good European and international positioning. 'Qualification as a location factor' and 'Vocational training in an enlarged Europe' were the leading contributions from practice in the working group meetings of the training managers.

**Schlüsselkompetenzen nach drei verschiedenen Ausbildungswegen im Vergleich**: **mit einer zusammenfassenden Einführung von Gisela Feller: Mitgebracht oder dazugelernt? / Kirstin Müller. [Comparison of key competences according to three different training pathways: with a summary introduction by Gisela Feller: inherent skills or acquired skills?]**
Bundesinstitut für Berufsbildung - BIBB
Bonn: BIBB, 2006, 155 p.
(Wissenschaftliche Diskussionspapiere / BIBB, 80)
ISBN 3-88555-789-4

Within both the education system and the employment system key competences are considered to be particularly relevant. Data collected in the 'Key competences and occupational outcomes' research project, conducted at the Technical University of Dresden on students who had completed training in the three training courses of qualified office management clerk (dual programme of vocational education and training), IT specialised management assistant (school-based), and physiotherapist (specialist health sector occupation), were specially evaluated for BIBB. In the light of the current imbalances prevailing in the training and employment market, considerable significance can be attached to these research results. Knowledge of employment-related competences makes it possible to promote them in a targeted manner to improve occupational outcomes.
http://www.bibb.de/dokumente/pdf/wd_80_schluesselkompetenzen__im_vergleich.pdf

**IE** **Draft policies and criteria for the inclusion in, or alignment with, the National Framework of Qualifications of the awards of certain awarding bodies.**
National Qualifications Authority of Ireland – NQAI
Cork: NQAI, 2006, 23 p.

This paper concerns the final area of policy development for the National Framework of Qualifications (NFQ) prior to moving to the full implementation of the Framework. It concerns the recognition of the awards (or the learning outcomes associated with them) of certain awarding bodies which are not already recognised through the NFQ and sets out policy proposals for this. Some of these awards concern bodies outside the state which make awards in Ireland. Others concern Irish bodies which make awards on a statutory basis and certain Irish bodies which regulate professions e.g. accountancy and legal bodies.
http://www.nqai.ie/en/FrameworkDevelopment/File,1330,en.doc

**Towards the completion of Framework implementation in the Universities – a discussion paper.**
National Qualifications Authority of Ireland – NQAI
Dublin: NQAI, 2006, 23 p.

The Framework referred in the title is the National Framework of Qualifications launched in 2003. The universities have been operating the major award types from Level 7 to Level 10 in the Framework. This paper invites discussion on a number of issues that have yet to be resolved to complete the process of Framework implementation across the university sector. Outstanding issues which need to be addressed include non-major awards such as certificates and diplomas which are not yet included in the Framework; the need to clarify the level and precise award-types of the universities' major diplomas at Levels 8 and 9 and to ensure they are named consistently across the university sector; and the need to address the issue of where awards made before the Framework was established, will fit into the Framework.
http://www.nqai.ie/en/Publications/File,1183,en.doc

**FR** **Décret no 2006-166 du 15 février 2006 relatif au comité de développement de la validation des acquis de l'expérience.**
**[Decree no 2006-166 of 15 February 2006 relating to the committee for the development of the recognition of experience.]**
Ministère de l'emploi, du travail et de la cohésion sociale;
Paris: Journal Officiel, 2006, 4 p.

The committee defines and implements promotion activities relating to the validation of acquired experience and proposes measures or actions which can contribute to the development of the validation of acquired experience.
http://www.admi.net/jo/20060217/SOCF0610003D.html

**La VAE [validation des acquis de l'expérience] , quand l'expérience vaut le diplôme / Sofia Adjas.**
**[Validation of acquired experience (non-formal learning), when experience is equivalent to a certificate.]**
Adjas, Sofia
Paris: Demos, 2006, 168 p.
ISBN 2-915647-12-7;

The validation of acquired experience or non-formal learning is an important innovation in the fields of employment and education. This possibility of giving a formal certificate for acquired experience is in itself a cultural revolution. What does legislation prescribe? What are the procedures to be followed?  Who finances this? Who validates it? How can this mechanism be introduced in the company? And how can the company respond effectively to the demand for validation of acquired experience or non-formal learning?

**IT**   **Insegnare agli adulti**: **una professione in formazione.**
[Teaching adults: a developing profession.]
Istituto per lo sviluppo della formazione professionale dei lavoratori – ISFOL
Rome: Isfol, 2006, 73 p.
(I libri del Fondo sociale europeo)
ISSN 1590-0002;

The volume presents results of the first national research of socio-institutional characteristics, competences, training needs and professional work of teachers of adults in the local centres for lifelong learning.

**HU**   **A kompetencia fogalma a szakképzésben és a foglalkoztatáspolitikában / Borbély Tibor Bors.**
**[The concept of competence in vocational education and employment policy.]**
Munkaügyi Szemle, Vol.2006. No.5. pp.22-26.
Budapest: Struktúra Munkaügyi Kiadói Kft., 2006

This study (as part of a larger research project) attempts to introduce the different concepts of competence – such as those used in psychology, public administration and education. The level and quality of competence demanded by certain occupations and positions has changed a great deal in recent decades. Developed technologies introduced snap-demand economies. In human resources management a competence-based system has been adopted, and adult learning relies on modular training. In conclusion, suggestions are offered for the development of a competence-based employment service.

NL    **Matrix voor competentiegericht beroepsonderwijs**: **instrument voor het ontwikkelen van beroepsonderwijs op basis van competenties / R. Wesselink [et al.].**
**[Matrix for competence-based vocational education: an instrument for the development of vocational education based on competences.]**
Wageningen: Universiteit Wageningen, 2005, 76 p.
ISBN 90-6754-997-5;

This publication, intended for vocational education experts in the field, outlines a framework for introducing competence-based education. Eight principles, fundamental for implementing competence-based education, are discussed. Each principle is divided into four development phases and discussed separately in detail. Schools can then use the resulting competence-based vocational education matrix to determine the extent to which their courses are competence-based and which aspects they wish to emphasise in the future. To illustrate this, the brochure analyses three agricultural training courses.

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**CINOP**

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**TI**

Teknologisk Institutt
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**BKKK**

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**DGERT**

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Qualifications and Curriculum Authority
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**CINTERFOR/OIT**

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**EFVET**

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**ETF**

European Training Foundation
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**European Schoolnet**

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**EURYDICE**

The Education Information Network in Europe
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**EVTA / AEFP**

EVTA – European Vocational Training Association
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