

# Germany

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Further information on the CCP can be found on DeSeCo's web page: <http://www.deseco.admin.ch>

Definition and Selection of Key Competencies in Germany .....	1
1 (Key) competencies in research and in the public debate .....	3
1.1 Defining (key) competencies.....	3
1.2 Classifying competencies .....	5
2 General rationales for fostering (key) competencies .....	7
2.1 Intrinsic arguments: Strengthening human personality.....	8
2.2 Extrinsic arguments: Structural changes in society and economy .....	10
3 Selecting (key) competencies .....	14
3.1 Main concepts of (key) competencies in Germany.....	14
3.2 Compiling a catalogue of (key) competencies.....	22
3.3 Relating the catalogue to DeSeCo's three generic key competencies.....	23
4 Key competencies and education .....	24
4.1 Overview of institutions with responsibility for key competencies .....	25
4.2 Key competencies in German school curricula .....	26
4.3 Relating the catalogue to special groups and fields of life.....	26
4.4 Research projects on (key) competencies.....	27
5 Assessment: Indicators and benchmarking.....	29
5.1 Scientific measurement of key competencies in German research programmes .....	29
5.2 Measuring key competencies in comparative studies .....	32
5.3 Practical assessment of key competencies within the 'dual system' .....	32
5.4 Key competencies in job advertisements.....	33
6 Public debate: Negotiating and legitimating.....	35
7 Assessing and developing DeSeCo .....	36
8 Bibliography.....	38

# 1 (Key) competencies in research and in the public debate

## 1.1 Defining (key) competencies

In his state-of-the-art paper on “Concepts of Competence” (1999) WEINERT gives a detailed overview of different meanings of competencies and key competencies in the social sciences, particularly in the psychology of teaching and learning.

The purpose of the paper in hand as a German contribution to the CCP is not to comment on or to add to WEINERT’s paper. Rather, the purpose is to sketch recent discussions in Germany. However, this discussion is to cover not only research but the public debate, too. This means referring to a large number of documents on curriculum development in the Bundesländer (for both general and vocational education), strategies and assessment practices of staff recruitment in the commercial world, pilot projects in schools and other educational institutions, and various essays and other papers .

As WEINERT demonstrated in detail, the notion of competence is already used very ambiguously in scientific writing. Now that public discussion is to be included, the family of competence-related expressions is still growing, definitions are becoming more complex, and classifications are becoming more heterogeneous. In particular, there is no conceptual process by which key competencies can be distinguished from competencies in general. As a result, many people who are working on problems related to the notion of key competencies reject this terminology. In other cases, people who are opposed to projects of, say, fostering metacognitive capacities take over the criticism concerning vagueness and proliferation as a rhetorical means of attacking the substance of these projects.

However, the lack of clarity in the common use of competence-related terminology is not an issue of style only, but is a feature of the difficulties given *in rebus*. There is a need to solve the problems associated with defining competence, but there is as yet no consensus on a terminology appropriate for scientific and public purposes. It is for this reason that only a few meta-level remarks can be given on the question of how to deal with the heterogeneity and vagueness in defining and classifying (key) competencies.

According to the philosophy of science, definitions can be made in two ways: by enumerating sets of entities referred to (extensional definition) or by explicating sets of properties with specific relevance for certain problems (intensional definition). Concerning competencies both approaches are necessary.

The extensional (or external) method of defining competencies is to characterise a certain class of tasks, demands, or results (T) and then to add the prefix “the ability to”, thus “the ability to do T” is an extensional definition of a competence.

The intensional (or internal) method is to theorise about internal structures (C) the activation of which is assumed to yield certain results. Modelling the features of C will provide intensional definitions.

The different types of definition are related to different problems. Thus, they can contribute to problem solving only if there is not too much confusion between them. Roughly speaking, defining (key) competencies by sets of demands is related to issues of relevance (i.e. what are the results we need key competencies for?), whereas internal structures are related to questions of development, learning, and instructional design.

Although this distinction between intentional/internal and extensional/external aspects is useful for defining competencies, it provides formal criteria only. A substantive criterion for distinguishing *key* competencies against competencies in general cannot be derived directly from this distinction. But it seems to be the general assumption that there are some internal structures (or features of structures) that enable individuals cope with a variety of different tasks and demands. The metaphor of the *key* is a useful symbol for this hopeful hypothesis.

### **1.1.1 Competencies as abilities to provide external results**

RYCHEN & SALGANIK (2000) focus in their report to the INES General Assembly 2000 on an extensional mode of defining, when they plead for a “*functional approach which places complex demands facing individuals at the forefront of the concept of competence*”. Their rationale for this approach to defining is that mastering complex tasks requires complex combinations not only of knowledge and skills but also of motivation, emotion and so on. This argument is convincing because there is empirical evidence that schooling tends to disaggregate the complexity of factually given tasks and thus to produce ‘inert knowledge’ (cf. REETZ & WITT 1974; DFG 1990, p. 73; MANDL, GRUBER & RENKL 1993)

Another reason for focusing on external definitions is that they play the main role for the public. Job advertisements or job references, for instance, seem to be the most frequent cases of using externally defined notions of key competencies.

Nevertheless, there are problems with extensional definitions as well. First of all, it is an inviting temptation to ‘create’ (key) competencies by simply adding ‘the ability to’ to whatever demand or result one may think of. In a content analysis of about 200 papers on “Schlüsselqualifikationen” LENHART (internal) calculated a number of 368 expressions concerning this topic. MINNAMEIER (1997) reports that as many as 650 kinds of key competencies can be found in German writings. From these numbers we may conclude that the terminology at issue is in danger of running short on substantive content, although the underlying problems still remain important.

A more crucial limitation is the following: As mentioned above, the main reason for choosing task-related definitions of (key) competencies lies in the fact that given tasks (particularly important ones) require combinations of knowledge, motivation, experience, and other factors and that, therefore, isolated fragments of knowledge are not sufficient to meet the demands. But this argument can be inverted and then stresses the assumption that not only given tasks require broad ensembles of skills and knowledge but that also given knowledge can contribute to solve varieties of problems. As stressed by most authors, it is just for this chance of transfer that the idea of key competencies is so attractive.

### **1.1.2 Competencies as internal structures**

Intentional definitions are urgent as a complement to (but not a substitute for) the extensional ones. Historically, the paradigmatic relevance of the notion of ‘competence’ was established by

CHOMSKY's pioneering work on linguistic theory (CHOMSKY 1965). There are two main points at issue. The first is to distinguish between *competence* and *performance*, with performance being defined in terms of producing output and competence in terms of generative rule systems underlying the production of this output. This distinction is analogous to distinguishing extensional and intensional mode of definition. The second point is that CHOMSKY provided new fundamentals for modelling competence at a very high level of explicitness.

Although CHOMSKY's distinction between competence and performance has been widely generalised in many fields of social science, his specific models do not seem to be appropriate for the purposes of DeSeCo (1999, p.16). But as part of the debate on competencies as an educational problem, it is worth mentioning that CHOMSKY explicitly refers to W. v. HUMBOLDT's principle of *infinitely using finite means* as the basic idea of his generative theory. This means that the notion of key competencies must imply references to HUMBOLDT as well.

The main elements of this paper will focus on research-driven approaches to the definition of (key) competencies. This accentuation of the intensional aspects of constructing concepts does not conflict with the above-mentioned preference for a functional approach focusing on sets of tasks and demands. *Without the functional approach, no consideration of relevance is possible for competencies; without research on internal structures, no barriers can be provided against the temptations and traps of mere 'ability-to' expressions.*

## 1.2 Classifying competencies

Obviously, coping with complex and demanding tasks requires sets, or combinations, of competencies. The problem is, how to distinguish, to classify, and to condense the manifold competencies (or better to say: the manifold expressions as assumed to refer to competencies). For instance, research institutions such as the BIBB try to investigate the demand for qualifications by content analyses of job advertisements. Recent results are shown below (Table 2 and Table 3, pp. 34f). Although both tables are placed in the same research context, there are actually only a few similarities between the sets of categories.

On the one hand, scientific research is based on methodological rules used for classifications. But if classification problems occur for practical needs, such as recruiting or assessing staff in the business world, problems have to be solved practically. Thus, there is a relevant gap between defining and classifying competencies in research and everyday problems. It is a challenge for DeSeCo to bridge this gap. Two aspects could be helpful:

First, classifications of both demands and internal structures are conceivable in respect of their 'content' (external tasks, internal dispositions). In employment research this aspect is called the *horizontal dimension* of classifying. The catalogue as given by FORUM BILDUNG (see below) is extended in the horizontal dimension.

Second, classifications can refer to different levels of abstraction or complexity (*vertical dimension*). The stages of moral judgement (see KOHLBERG 1984) are an example of vertical classifications of intensions of competencies.

A central problem is defining *key* competencies against competencies *in general*. Are such differences to be found in the horizontal or in the vertical dimension? MERTENS (1974) defines 'frequent elements' (see below) as key competencies because they support problem solving in different situations. Thus far, the specifics of key competencies are a question of the horizontal

dimension. However, if key competencies are conceived as metacognitive competencies this is an example for the vertical dimension.

### **1.2.1 Measuring and assessing key competencies**

Although the demands on defining and classifying are more sophisticated in science than in practical life the underlying ideas are similar. The question of measurement is inseparably linked to the definition, classification, and selection of key competencies. Each suggested concept will present measurement problems of its own. For the moment it will be necessary, in each instance, to demonstrate that the conventional criteria for measurement which are relevant not only for scientific work can be met:

*Objectivity:* The degree to which any key competency can be assumed to be present must be determined independent of coder/rater influences on the outcomes of measurement. Standardised settings of measurement (including computer-based arrangements), if available, are to be preferred. The requirement of objective measurement does not rule out the use of rating procedures. However, in this case, clear rubrics need to be provided and their proper functioning needs to be established.

*Reliability:* In most cases, repeated measurement will be required, if an acceptable level of measurement is to be attained. Key competencies may involve cognitive, motivational, volitional, and emotional dispositions. In all of these cases, the stability of measurement needs to be demonstrated across items, situations, and time. If raters are to be used, inter-rater agreement may be considered as a special case of reliability. Methods are available to assess both the quality of individual ratings and the reliability of scores derived from two or more sets of ratings. It is highly desirable to employ, in all of these dispositional domains, techniques based on modern (probabilistic) scaling techniques.

- *Generalisability:* Generalisability theory may be conceived of as an extension of the concept of reliability, inasmuch as it makes it possible to determine the precision of estimates based on a finite set of situations (e.g., items, ratings, sessions) with respect to a potentially infinite set – a ‘universe’ – of comparable situations. Since transfer is a constitutive element of the notion of key competencies, this approach is essential.

*Validity:* As a minimum requirement, construct validity needs to be established for any proposed measurement arrangement, applicable to a suggested concept of competency. While problems of content validity and concurrent validity encountered in this field may arise especially in cases where highly innovative (and not yet clearly delineated) concepts are proposed, predictive validity presents a number of rather difficult issues, given that it will rarely be possible to study the development and long-term effects of dispositions as measured in the original context. This remark may serve as a warning against overly optimistic expectations possibly linked to a broad use of the term ‘key competency’.

It is assumed that these four criteria will be at the core of quality assurance measures in the DeSeCo Programme. The Technical Standards for IEA Studies (MARTIN, RUST & ADAMS 1999) may be recommended in this respect.

## 2 General rationales for fostering (key) competencies

In Germany, since about 1970 writers throughout all fields of learning and education tend to use the expressions of “Kompetenz” and “Schlüsselqualifikation” when referring to aspects of educational aims and goals they consider to be important. Although most of these writers recognise and admit the semantical problems of this terminology they continue using it because no better alternatives seem to be available to struggle with the insufficiently resolved problems behind the notions at issue.

For a recent catalogue of such problems the Bund-Länder Commission for Educational Planning and Research Promotion (BLK) may be quoted (BLK 2000, p. 6):

“In the sphere of educational planning, tasks accrue to the BLK

- from the impact of demographic developments on the education and employment systems,
- from the structural changes going on in the economy,
- from technological and economic innovation and the resulting changes in qualification structures and requirements in work and society,
- from the erosion of normal employment contracts and
- from the growing internationalisation as well as advancing European unification.
- Another important factor with an impact on the education system are the modern information and communications technologies.”

Further aspects are mentioned in other papers: e. g.: equal opportunities for men and women, different talents and their specific learning needs, European unification and increasing international interlinkages, ecological requirements and so on. Because of these changes the claims for fostering key competencies have arisen. In order to condense the large number of arguments a distinction between intrinsic and extrinsic arguments is useful.

The main *intrinsic reason* is that human life and development is, basically, an end in itself (KANT 1788/1990). Thus, if higher stages of development are possible they are in themselves the reason of why to aim for them.

The *extrinsic reasons* refer to ongoing changes in economy and society. The most important changes (‘deep structure’ changes) are related to the *role of knowledge* (including information technology) and increasing *competition* in a global context. These basic transformations are causing more surface-related changes in the management of firms and in the structure of education. Concepts like ‘knowledge management’ or ‘learning organisation’ show that differences between learning and work are diminishing. On the other hand, there is a growing understanding of education as a competitive process (including international comparison of achievement).

A fundamental question concentrates on the relationships between intrinsic and extrinsic reasons. In his foreword to the Memorandum of the DFG Senate’s Commission on Research on Vocational Education ACHTENHAGEN postulated a “coincidence of economical and pedagogical rationality” (DFG 1990, p. VII). FORUM BILDUNG (2001, p. 18) gives similar arguments. On the other hand, BECK elicits the problem that efforts to boost the individual’s moral development to the highest level attainable can be in conflict with competence in business affairs that are ruled by the principle of strategic exchange located at level 2 in terms of KOHLBERG’s theory (for details see below).

For DeSeCo's emphasis on normative aspects in defining competencies, the question whether and how economical and pedagogical rationality are conflicting is central.

## 2.1 Intrinsic arguments: Strengthening human personality

In occidental philosophy, the development of human life is not only related to external purposes, but is an end in itself. According to KANT's Critique of Practical Reason this postulate holds because only man is the subject of the moral law (1788/1990, p. 102). In the same tradition stands HUMBOLDT's sharp distinction (1809/1956) between "allgemeine(r) Menschenbildung" (strengthening abilities as an end) and "spezielle(r) Bildung" (in the sense of meeting demands, i. e. being a means). Thus, if key competencies are conceived as higher stages in human development they are an end in itself and worth working on, irrespective of (additional or conflicting) external demands.

### 2.1.1 Aspects of development

According to PIAGET, cognitive development proceeds in terms of changing internal structures instead of adding new pieces to a set of knowledge items. His basic idea of how changes in the structured whole are achieved is articulated in the notion of abstractive reflection: "*En un mot l'abstraction réfléchissante procède par reconstructions qui dépassent, en les intégrant, les constructions antérieures.*" (BETH & PIAGET 1961, p. 203)

Similarly, KOHLBERG's theory on moral competence is based on incorporating former stages of moral judging in higher-level ones with a tendency of widening the horizon of arguing from an *egocentric* to a *sociocentric* and finally to a *universalistic* level.

Again, the PIAGETian paradigm holds for KEGAN's theory that "complexification of the mind" develops in the sense that "what was 'subject' in our knowing (that with which we are identified, and the principle by which we construct our knowing) becomes 'object' in our knowing (that which we can reflect on, take responsibility for, integrate with some other aspect of our knowing, exercise control over)" (2000, p. 69). Based on this dialectics of making 'object' (or content) what formerly was 'subject' (or process), KEGAN elaborates an intensionally defined hierarchy of five stages in cognitive development which also can be understood as levels of competence. Based on this taxonomy, he provides empirical evidence that "more than half of even advantaged adults may not yet possess the level of mental complexity that would equip them to enact successfully the competencies we suggest are necessary for adults in the 21<sup>st</sup> century" (p. 78). From his point of view the acquisition (or internal construction) of key competencies can be conceived of as reaching higher stages of "complexification of mind".

Whereas PIAGET focused on evolving structures of action, BRUNER (1966) emphasised the role of representation in cognitive growth. According to his research there is a sequence of *enactive*, *iconic*, and *symbolic representation*, and cognitive development is driven by 'translating' experience from one code to another. The relevance of this representation aspect is strongly underlined by the new media and information technology.

In a perspective inverse to reflective abstraction, J. R. ANDERSON (1983) explains the development of expertise in terms of converting *declarative* into *procedural* knowledge. Without success in such translation verbal knowledge remains 'inert'.



### **2.1.2 Aspects of learning**

Whereas theories of development are related to long-term structuring of wholes, the notion of learning is more specifically related to short-term and to more content-related processes.

As a general rule, all of the competencies addressed have their basis in learning processes which take place long before formal schooling starts, most of them in early childhood. According to all experience, children arrive at school with greatly varying levels of development, both within and across the competencies here considered. This implies that schools and subsequent educational institutions have an obligation to compensate for such inequality to the extent that this is compatible with every human being's right to develop his or her potential to the highest attainable degree.

Traditionally, early school instruction is dominated by the acquisition of method-based and instrumental competencies – reading, writing, and arithmetic. More recently, foreign-language instruction has also found its way into the early primary years, and it remains to be seen whether the acquisition of basic media skills can also be implemented in the early primary grades with some degree of success and without unwarranted side effects. The question of how to arrange both the acquisition and automatising of such skills is not to be dealt within the present report. Suffice it to say here that reform-oriented primary education in Germany is very much centred around the notion of self-regulated learning in an attempt to combine the acquisition of instrumental competencies with the development of learning competencies. To what degree these aims are attained is still very much open to empirical investigation, but this in itself underscores the need to develop and apply good measures in all of these domains of competency. It should also be noted that the acquisition of some fluency in at least one foreign language has special importance for Germany, not only as a corollary of globalisation with its trend towards English as a universal language, but also as a consequence of growing ties with other European countries in the context of the European Union. Therefore, much of the available instructional time in secondary schools is devoted to such activities.

The development of intelligent knowledge with its emphasis on vertical transfer is very much domain-specific, as research on cognitive learning has shown. While early primary education in this country (grades 1 through 4) does contain elements of domain-specific learning, reform-oriented pedagogy in Germany appears to rely heavily on horizontal transfer, once more under the expectation to achieve early lateral transfer as a combination of vertical and horizontal transfer. This is reflected to some extent in the organisation of the curricula and typical teaching-learning arrangements as well as the training and allocation of teachers. Whether or not such early introduction of project work and integrated subjects (e.g., Sachkunde as a combination of science and civic education) lives up to its promises, is still open to question.

Secondary schooling, however, is still very much governed by principles of domain-specific learning, organised in fixed school subjects. Indeed, adolescence is arguably a stage where vertical (and horizontal) transfer is relatively easily accomplished. Thus, in German secondary schools, cumulative learning is emphasised and integrated project work is mostly limited to a few days in a school year. Justifications for such orientation are often given with reference to the disciplinary structures later encountered by the students both in vocational and academic education.

However, there are strong efforts to reorganise secondary schooling within vocational education. According to KMK (see below) instruction is now to be arranged along 'learning fields' ("Lernfelder") which are intended to mirror fields of tasks at the work site. In the DFG priority

programme as referred to below, emphasis is laid upon both the long-term integration of action-based learning arrangements and the embedding of structured knowledge in multidimensional contexts (BECK & DUBS, 1998; BECK & HEID, 1996).

The ability of schools and other educational agencies to enhance the development of applicable knowledge has always been the fundamental premise of institutionalising education. It is known from careful analyses of the Third International Mathematics and Science Study (TIMSS) data (BAUMERT, LEHMANN ET AL., 1997; BAUMERT, BOS & LEHMANN 2000), however, that German students have been rather slow to develop such abilities up to the middle school years and that they continue to show weaknesses in this respect at the end of formal schooling. Currently, ways are being sought to improve secondary mathematics teaching in such a way as to overcome the current primary occupation of teachers with routinely performed algorithms in favour of more emphasis on applicability and transfer in mathematics (cf. the so-called SINUS program of experiments in mathematics instruction and a corresponding special research program of the German Research Association (DFG) which is also focused on new approaches to the teaching of mathematics).

From this, it is clear that the development of learning competencies has been, so far at least, mostly implicit (cf. WEINERT's call for a necessary "instructional revolution"). "Lateral transfer" is certainly aimed at, but it is largely unclear how it is measured and under which conditions it is likely to occur, except that it requires ways to facilitate conscious reflection of learning. It is argued by some that such reflection can and should happen even in the early school years. It is also likely, however, that the required dispositions are developed to their full extent only at a relatively late stage of maturity. While it has been known or at least suspected for some time that learning competencies can also decline – at least in certain sub-groups of the population – during later stages in life (cf., as an analogy, the decline of reading comprehension among older citizens as demonstrated by the International Adult Literacy Survey (IALS: OECD/Human Resources Development Canada 1997, 61ff)), this demonstrates once more the need for timely development and constant cultivation of such competencies.

It is generally recognised that social competencies and value orientations have strong roots in early childhood experience and extra-school environments. They are further developed in work and learning situations during later stages in life. This is not to say, however, that schools and other educational institutions have nothing to contribute in this respect. In fact, the recent IEA Study of Civic Education (TORNEY-PURTA, LEHMANN, OSWALD & SCHULZ 2001) has shown for 28 countries that a democratic school environment significantly influences not only civic knowledge, but also attitudinal and motivational patterns considered desirable for democratic societies.

To sum up, from both a developmental and a learning point of view (key) competencies are not to be conceived of as separate components but as specific aspects of structured wholes. The normative implications of these considerations converge in the proposition that the possibility of cognitive growth is in itself a rationale for aiming at realising each individual's full potential.

## **2.2 Extrinsic arguments: Structural changes in society and economy**

Since SENECA's complaint *non vitae sed scholae discimus*, the problem of successfully relating schooling and life requirements are the material for a never-ending story. In the German language the notion of "Schulwissen" has derogatory connotations. On the other hand, the coming of the knowledge society urges individuals, enterprises and societies as a whole to have

access to appropriate knowledge bases and to make intelligent use of knowledge. Thus, there is a gap between knowledge in relation to schooling and knowledge as today's most important resource.

In Germany it was an economist (the then director of the INSTITUTE FOR EMPLOYMENT RESEARCH (IAB)) who first focused on the priority of "Schlüsselqualifikationen" (MERTENS 1974) as a means of bridging this gap.

The centrality of knowledge goes hand-in-hand with a growing intensity of worldwide competition. For coping with competition it is not enough simply to have access to knowledge; there is an urge to have the 'better' knowledge. This parallelism between knowledge and competition has obviously been fostered by the development of information technology. But from a philosophical point of view the connection between knowledge and competition is deeper. According to the falsification theory in POPPER's "Logic of Scientific Discovery (1935, 1959) and to KUHN's theory of scientific revolution (1971) the validity of knowledge itself is a question of competition.

From the point of view underlying this paper, *knowledge* (including information technology) and *competition* are the two most relevant phenomena having a conjoined impact on the business world and most other (if not all) fields of society. Lean management and team work are examples for changes at the work site that are mainly caused by the deep structure changes<sup>1</sup> in the role and range of knowledge and competition.

### **2.2.1 Knowledge society**

In his book on "The coming of post industrial society", BELL (1973) unfolded the hypothesis that knowledge is not only an important issue (as it has been ever before) but is the modern society's "axial principle". In a similar sense STEHR (1994) underscores a "centrality of knowledge" in society. The question, now, is in which specific ways this axiality or centrality of knowledge has an impact on the life of society.

To illustrate the pedagogical implications of this question a review of BRUNER's media theory of cognitive growth (1966) may be helpful. From a number of comparative studies he derives evidence that children in Greenland acquire highly differentiated knowledge about dozens of kinds of snow, ice, and other forms of frozen water. On the other side, children in central African states are learning about a hundred of shades of the colour green. One might say that what is most important for survival is learned at the highest degree of classification. But what about knowledge in the knowledge society? Do children know dozens or hundreds of features of knowledge? Or do they simply acquire knowledge— without reference to criteria relating to its type, its quality, its structure and so on?

Keeping this illustration in mind, a preliminary distinction will be given for the main relations between knowledge and work.

The traditional point of view is that knowledge provides the precondition for people to do good work. Of course, this relation is still important and is even more important than in the past.

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<sup>1</sup>"Deep structure change" is intended to mean "changes in deep structure" - with 'deep structure' being a kind of *terminus technicus* in analogy to Chomsky's theory of syntax.

People have to acquire more knowledge than before and have to cope with knowledge at higher levels of complexity and abstraction. We can refer to this relation as the qualification aspect of knowledge. From this point of view knowledge is part of the worker.

But there are inverse relations emerging, too, in which knowledge appears as part of the work. This is the case whenever employees have to operate on documents, contracts, codes of law, computer software, and so on. All these objects explicitly represent or implicitly embody expert knowledge. Operating on such objects means operating on knowledge.

Thus, what is significantly *new* with the ‘centrality’ of knowledge are the features of combining knowledge as a part of the worker and knowledge as part of the work.

Furthermore, modern work and life are not only shaped by single knowledge-based objects but even more by the increasing artificiality of environments and their “systemic rationalisation“ as BAETHGE & OBERBECK (1986) put it: more and more historically grown environments are undergoing a reconstruction according to principles located on higher levels of abstraction and complexity. A similar consideration is pointed out by LEINFELLNER (1974) who makes a distinction between the “cognitive function“ and the “realisation function” of knowledge. The cognitive function refers to representing and explaining already existing reality, whereas the realisation function refers to creating new (and artificial) reality. Artificial systems like computer software, advanced techniques of accounting, or legal constructions are examples for reconstructing living circumstances as ‘knowledge-based systems’. In this sense, knowledge is not only part of the worker and not only embedded in different objects to operate on, but knowledge (and scientific knowledge in particular) is the abstract generative power underlying and creating new conditions of life.

If these considerations are true the central question of a knowledge society is how to operate on knowledge as realised in single things and in the environment as a whole. This question can be put in mimicking AUSTIN (1975): ‘*How to do things with knowledge*’ (instead of simply ‘How to do things with things’). Hence, a central aspect of selecting key competencies is visible: they are necessary for doing things with knowledge and for understanding the knowledge underlying things and conditions around.

In philosophy, such knowledge is called ‘*meta-knowledge*’. In psychology, a corresponding notion is ‘*metacognition*’. However, metacognition mainly refers to one’s own cognition (i. e. to knowledge as part of the worker) whereas meta-knowledge as the point at issue here refers to knowledge about knowledge as part of the work. *Both aspects, subjective metacognition and meta-knowledge about externally realised knowledge objects, are of supreme importance for the key competencies problem.*

If in this paper emphasis is put upon the notions of knowledge instead of information technology and if ‘knowledge society’ is used instead of ‘information society’ this is also related to normative considerations. It is the content of (technically transmitted) information and its cognitive transformation into meaningful networks of knowledge that deserves the main attention. According to MANDL, REINMANN-ROTHMEIER & GRÄSEL (1998) the notion of knowledge society can be defined in a sense of a society that obtains its basic resources from both reflected and evaluated knowledge and makes use of it with consciousness and responsibility within a democratically legitimated framework.

### 2.2.2 Globalisation of competition

The second fundamental challenge in modern society is the increasing relevance of *competition*, not only in a regional or national framework, but competition crossing national boundaries. In the days around 22<sup>nd</sup> of July 2001, when this paper was finished, the TV was broadcasting pictures revealing the dark side of globalisation. However, it is not the role of this paper to comment on these events. *But a deeper understanding of competition in its economical, political, and social aspects is located at the very forefront of the key competencies problem.*

One of the core issues is that competition urges firms to provide competitive quality at a competitive price and that this demand cannot be met without employees working at a high level of qualification, particularly including key competencies. Table 2 and Table 3 on pp. 34 give evidence for this argument. It is not the least important point for this argument that the proposition that pedagogical and economical rationality may coincide is widely accepted in the German theory and practice of vocational education.

However, a deeper understanding of market and competition is given by V. HAYEK's view of markets as knowledge processing systems (1991). Most actions in business as well as in everyday life imply projections of their results. To this extent they are conjectures. The problem is at which point in time feedback will be obtained as to whether these conjectures are right or wrong. According to V. HAYEK, the specific function of the market consists in providing this feedback *early* whereas activities based on centralised plans and programmes are given *late* feedback.

V. HAYEK was a good friend of POPPER whose main principle was the criterion of falsification. According to POPPER we do not know but have to guess. We can not know for sure if our hypotheses are *true*, but we have a chance of discovering errors. Falsification is basic for understanding scientific research *and* the functions of markets because the market tells us if our assumptions are erroneous. Correcting erroneous production plans as the result of falsification also contributes to a better allocation of resources. If they are transformed into products which do not sell, they are lost. If they are transformed into better selling products, this indicates that people seem to be benefiting more from them. Thus, there are *moral* implications in the allocation function of markets, too.

To sum up: Knowledge (in its twofold appearance as part of the worker and as part of the environment) and competition are the two main deep structure phenomena of modern societies providing an external rationale for fostering key competencies.

### 2.2.3 Changes in organisational structures

As a consequence of the role of knowledge and of competition the organisational structures of enterprises and other institutions are undergoing far-reaching changes of which lean management and total quality management are well-known examples. These organisational changes, in turn, have significant impacts on the criteria for hiring and training employees and increase the necessity, for example, for enhanced social and communicative competencies. It is for these reasons that key competencies are an important topic not only for the management of firms but for the trade unions as well (see below).

In most German writings the connections between organisational changes and key competencies are discussed *in extenso* so that we need not discuss this issue any further.

### **2.2.4 Changes in understanding education**

The impact of the new centrality of knowledge and competition on the definition of educational aims and goals is the topic of the present paper as a whole. But as one of the main consequences the fact should be highlighted at this juncture that schooling is undergoing an obvious change in respect of competition. Quality management is one of the most frequently discussed issues in recent papers. Another aspect is the dramatic growth in attention paid to comparative studies such as TIMSS and, of course, the coming studies as prepared by the DeSeCo project.

## **3 Selecting (key) competencies**

### **3.1 Main concepts of (key) competencies in Germany**

#### **3.1.1 Deutscher Bildungsrat**

In Germany, thinking about the aims of education is strongly influenced by the distinction between general and vocational education as originally postulated by W. von HUMBOLDT in the early 19<sup>th</sup> century. Although from his point of view both aspects of education are important they are related to different principles and, therefore, should be separated strictly. In particular, HUMBOLDT (1809) assumed that general education and individual development would fail if individuals are restricted by the concerns of every day life at a too early stage.

Since the beginning of the 20<sup>th</sup> century, generations of scholars on vocational education have been concerned by this principle of separation. In the early seventies a practical as well as theoretical breakthrough seemed to have been achieved with the idea of reconciling individual development and economic needs (qualification) under the idea that critical capacities are the genuine medium of Bildung (DEUTSCHER BILDUNGSRAT 1970, 1974). One may say that the notion of competence was adopted as a *tertium comparationis* in respect of Bildung and qualification.

The most influential concepts of competence were the triangles of “Sachkompetenz”, “Sozialkompetenz”, “Selbstkompetenz” (H. ROTH, 1971, p. 389) or “Fachkompetenz”, “politische Kompetenz”, “humane Kompetenz” (DEUTSCHER BILDUNGSRAT 1974, p. 49).

In respect of our introductory remarks on classifying competencies these approaches are unfolded in the *horizontal* dimension and are conceived in an *intensional* way. Vertical aspects, such as stages of development or degrees of competence are not explicitly focused on. As compared with classifications to be discussed subsequently the fact should be stressed that competencies of autonomy and reflectedness are included in the notions of self competence or human competence. To some extent the triangles are related to HABERMAS’ influencing theory of three generic domains of human interest (technical, practical, and emancipatory) creating work knowledge, practical (or social) knowledge, and self-knowledge (translations from DAN MACISAAC, 1996). There are similarities to DeSeCo’s three generic competencies, too.

### 3.1.2 Mertens (1974)

Quite another approach was developed by the then director of the INSTITUTE FOR EMPLOYMENT RESEARCH (IAB) with his paper on “Schlüsselqualifikationen” (MERTENS 1974). MERTENS was an economist. But in his analyses of the labour market he was confronted with the fact that many people were working in fields they did not get their qualification for. Vice versa, on given work places people were found with quite different education. Insofar there is no 1:1-correspondence but there are n-n-relations between work and education: Given a certain education, people are able to work in different jobs; in employment research this 1:n-relation between education and work is referred to as ‘flexibility’. Given a certain work place, different educations enable to perform this job; thus there is a n:1-relation between education and work which is referred to as ‘substitution’. Now, MERTENS tried to explain the functioning of flexibility and substitution. A related problem he tried to find a solution for was the ‘speed of obsolescence’ or the decreasing ‘half-life period’ of job-related knowledge.

The key MERTENS proposed for explaining flexibility and substitution and for enabling to cope with the obsolescence problem was the twofold hypothesis that in each of these cases the main point was having *access to new knowledge* and that this access could be fostered by certain specific cognitive dispositions he called “Schlüsselqualifikationen”.

From the beginning, this idea was eagerly taken up. Many teachers and scholars in pedagogy found themselves deeply satisfied and encouraged that even an economist strongly pleaded in favour of ideas which apparently were similar to their own philosophy: strengthening human abilities in order to cope with demands in many fields of life.

Stimulated by his metaphor of a *key to new knowledge* MERTENS worked out a pragmatic classification of key qualifications by combining the horizontal and the vertical dimension and by combining extensional and intensional aspects of definition.

*Basic qualifications* are defined as capacities of transfer in a vertical sense (mediated by a ‘common third’ on a higher level of abstraction).

*Horizontal qualifications* refer to using the ‘horizon’ of sources of information<sup>2</sup>.

*Frequent elements* are ‘normal’ pieces of knowledge but applicable to a broad spectrum of situations and tasks. They are defined along to horizontal axis.

*Vintage factors* focus on bridging knowledge gaps between the generations (e. g. set theory in the seventies; information technology as a more recent one). These factors are defined along the horizontal axis, too.

For each of his key qualifications MERTENS provided ensembles of external tasks and examples of knowledge content to cope with them, thus combining extensional and intensional aspects of definitions.

Whereas the triangle of Sach-, Sozial- and Selbstkompetenz was conceived with the intention of covering the whole field of curricular aims, MERTENS focused on identifying a subset of aims

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<sup>2</sup> To avoid misunderstanding of terminology: horizontal qualifications sensu MERTENS are nevertheless defined along the vertical axis of our meta-classification because knowledge of how to access knowledge is meta-knowledge and, hence, higher-level knowledge.

related to the specific idea of supporting access to new knowledge. Thus he provided criteria for identifying differences between competencies in general and key competencies in particular.

- (1) Competencies are key qualifications insofar as they enhance the ability to transfer given knowledge to new fields of application (basic qualifications).
- (2) Competencies are key qualifications insofar as they enhance the ability to access new knowledge (horizontal qualifications).
- (3) Competencies are key qualifications insofar as they are applicable without further transfer to a wide range of tasks and problems (frequent elements).
- (4) Competencies are key qualifications insofar as they bridge the knowledge gap between different groups of people, mainly between the younger and the elder generation (vintage factors).

### **3.1.3 KMK on aims of general and vocational education**

#### *3.1.3.1 Educational aims of the Abitur*

According to the KMK (1972/2000) the Upper Secondary Stage of the gymnasium focuses on preparation for a course of studies at the university. Besides this, fundamentals for a subsequent vocational education are to be laid, too. In respect of this aim the main emphasis is upon:

- German language (especially conciseness in a written line of thought),
- foreign languages (especially thoughtful reading and understanding domain-related texts in these language),
- competent use of mathematical symbols and models.

Around these main competencies further aspects of competence are placed: relevant structures of knowledge; self-directed learning; reflecting on one's own learning, thinking, judging, and acting; metacognitive evaluation of one's own capacities; cognitive flexibility and creativity; concentration, precision and perseverance; understanding basic social, economic, political, and technological perspectives; the ability to apply knowledge in different contexts; communicative competence; the ability to co-operate in teams; the ability to make decisions.

In a final report of the expert commission on elaborating the principles of the Upper Secondary Stage of the gymnasium (KMK Expertenkommission 1995) the question of whether the notion of "Schlüsselqualifikationen" would be adequate for the gymnasium was considered, but received a negative response, partly because of the vagueness and insufficient precision of this notion, and partly because this notion was regarded as being more closely related to the demands of the work site than to the demands of entering an academic course of study.

Nevertheless, the capacity to use languages and mathematical models could be understood as basic qualifications in the sense used by MERTENS. Furthermore, there are close connections between the further aspects of competence mentioned above and other aspects of key qualifications (see MERTENS) which, however, cannot be discussed in more detail in this paper.

Worth mentioning is the argument that MERTENS' ideas would be too closely related to the work site. It is true that MERTENS comes from employment research. But graduates of the gymnasium



and the universities aim at employment, too. The subtitle of MERTENS' treatise is "Schooling for a modern society"--so, why argue against too much connection with the work site?

### 3.1.3.2 *Educational aims of vocational education*

In a detailed paper the KMK (2000) presented recommendations on how to develop curricula for vocational schools within the dual system and how to co-ordinate these curricula with the regulations for the work place part of training and education.

The legal framework of vocational education and training within the dual system is a bit complicated because there are two kinds of duality. On the first level of duality, arrangements for instruction and training take place at both vocational schools and in firms. The second level of duality is given by the responsibility of the Federal Republic for the work-place elements, and the responsibility of the Länder for the vocational schools. For each vocation ("Ausbildungsberuf") curricula for both the work place ("Ausbildungsordnung") and the school ("Lehrplan") are developed. There is one Ausbildungsordnung valid throughout the whole Federal Republic whereas each of the Länder has a Lehrplan of its own. In a complicated procedure representatives of the Federal Republic, the Länder, and (that is an important feature) of both the trade unions and the employers' associations co-operate in producing a framework of curricula for the schools ("Rahmenlehrplan") and the Ausbildungsordnung. This procedure is time consuming but allows a substantial co-ordination of the regulations for both sides.

The Ausbildungsordnungen are mainly structured along domains of work in the companies whereas the Lehrpläne for the vocational schools are organised by subjects. According to the KMK paper of 2000, the content of the school curricula is now to be organised along learning fields ("Lernfelder"). These fields are thematic units comprising goals, content and frames of time assignment, but their curricula structure is derived from vocational tasks and processes.

Within the learning fields a combination of different competencies is aimed at. The guiding notion is "Handlungskompetenz" which comprises "Fachkompetenz", "Personalkompetenz", "Sozialkompetenz", and "Methoden- und Lernkompetenz".

*Domain-related competence* (Fachkompetenz) is defined as the ability to use domain specific knowledge for performing specific classes of tasks and for solving related problems. This competency includes the ability to evaluate the results.

*Personal competence* is defined as readiness and ability to analyse and to reflect on one's own opportunities and limitations for individual development within family, job, and public life. Aspects of this personal competence are self-directedness, critical faculties, self-confidence, reliability, responsibility, sense of duty, the thoughtful construction of one's own values and commitment to these values.

*Social competence* is defined as readiness and ability to construct social relationships, to understand affection and conflicts, and to communicate with others. As particular aspects of social competence, social responsibility and solidarity are emphasised.

Method-based competence and learning competence are emphasised but not given explicit definitions.

As compared with the classifications of the early seventies, the main difference is constructing a separate category for method-based and learning competence which formerly were conceived as subqualifications of Fachkompetenz. The new accentuation can be interpreted as a reflection of

the discussion initiated by MERTENS but also as a reflection of the importance assigned to metacognitive issues in recent psychological and pedagogical research.

### **3.1.4 Forum Bildung 2000**

As mentioned above, the FORUM BILDUNG, an initiative of the FEDERAL MINISTER OF EDUCATION AND RESEARCH in co-operation with the (Länder-based) Ministers of Education in the Federal Republic of Germany as well as influential societal groups, accepted, in December 2000, a set of “Preliminary Guidelines” for articulating future-oriented educational aims (FORUM BILDUNG 2001).

In respect of the repeatedly mentioned tradition of interrelating ‘Bildung’ and qualification, the initial principle of the FORUM BILDUNG is that “‘Bildung’ and qualification always aim at developing personality, participation in society, and employability. These three dimensions of (educational) aims cannot be separated from each other” (p. 7). The forum underlines that the understanding of Bildung and qualification as being in opposition is diminishing. Bildung aims at both individual development and social participation. However, as a consequence of the challenges of technological and of social changes the aim of employability is increasingly including personal and social competencies and, vice versa, employability is a necessary condition for one’s own personality and social participation.

The guidelines draw heavily on a condensed German version of WEINERT’s DeSeCo Expert Report “Concepts of Competence” (1999); they distinguish six fundamental competencies:

1. Intelligent knowledge,
2. Applicable knowledge,
3. Learning competency (Learning how to learn),
4. Method-related/instrumental key competencies,
5. Social competencies,
6. Value orientations.

Much of what is (or should be) done in both general and vocational education can be subsumed under these six concepts:

*Intelligent knowledge* emphasises vertical transfer and linkage to lifelong learning. It is related to ‘deep’ understanding and problem-solving. It is hierarchically structured and can be used reflectively, although it can and should also be routinely accessible. It is most easily acquired in domain-specific settings, but it facilitates transfer across domains as well. Subject-based teaching and learning is a prototype of the acquisition of this competency.

*Applicable knowledge* emphasises authentic (often unusual) situational experience, project-based learning, solutions to ill-defined problems, and horizontal transfer. It enhances the development of adequate and flexible schemata of planning, acting, and self-control. Cross-curricular activities (‘projects’) are particularly conducive to the acquisition of this type of competency. The respective competencies are not a substitute for, but are complementary to intelligent knowledge.

*Learning competency* requires conscious expertise in relation to one’s own learning processes. It facilitates lateral learning transfer and is enhanced by reflections on one’s own learning successes. ‘Lateral transfer’ refers to the integration of vertical and horizontal transfer in situationally variable contexts as well as to both conscious and highly routinised learning

strategies. According to WEINERT, the acquisition of this competency requires an “instructional revolution” – it may well be the central concept under the perspective of growing needs for learning after the end of formal education.

*Method-related/instrumental key competencies* imply multiple, flexible, variable, and highly routinised applications; they comprise, for instance, mother-tongue and foreign-language competencies, and many fields of school mathematics, as well as the ability to utilise media and modern information technology. It may be noted that the term ‘key competency’ is used explicitly only in this category which is justified by the obvious linkage to any future learning. It goes without saying that such competencies can be taught and learnt, but it should be noted that they are not confined to simple skills: rather, they encompass, at least in principle, complex abilities as well.

*Social competencies* refer to social comprehension, skills and responsibility as well as the ability to resolve conflicts by socially acceptable means. They require reflection on social experience, and their development is enhanced by rule-guided co-operation, group-based instruction, team-based working arrangements, and conflict resolution exercises, among others. Again, the relationship to future phases in life, and to working contexts in particular, is obvious.

*Value orientations* (norm-based patterns of action, social, democratic, and individual values) are acquired through the experience of living in a community with shared values and a functioning democratic environment (especially in educational institutions). They are enhanced by “unspecific transfer”, i. e., usage, insight, experience, reflection. It should be noted that they comprise not only universal moral norms, but also individual values and competencies (e.g., the ability and motivation to act autonomously, reliably, responsibly), social values (e.g., tolerance), and cultural values (socially acceptable behaviour, cultural engagement). This category, in particular, provides justifications for such important components of the curriculum as Literature, Arts, History, and Music, as well as Physical Education.

This taxonomy of competencies has been developed in close connection with psychological theories of knowledge acquisition. Its clear emphasis on cognitive competencies is in line with the general demand for an ‘education for a knowledge society’, but the significance placed on social competencies and value orientations should not be underestimated. Although this list has been developed for the formulation of educational objectives, it is not incompatible with older principles and guidelines governing general education in Germany, such as the Agreement on Rules Governing the Gymnasium, Upper Secondary Stage (resolved by the Standing Conference of the Ministers of Education in the Federal Republic of Germany in 1972 and last modified in 2000; KMK 1972/2000). What is new here is the attempt to relate the articulation of aims consistently to findings from psychological research on the acquisition of the competencies in question.

For each of these competencies expert essays are added in the forum documentation on learning and development at different ages and in different educational settings. The FORUM BILDUNG emphasises that learning and acquisition of competence are a life-long process covering all fields of life. Competencies are developed (and should be fostered) from the kindergarten to continuing education for the adults and are not only acquired in schools and through training at the work site but also in the arenas of family, public media, peers and neighbourhood, all kinds of associations (religion, political parties, etc.).

### **3.1.5 Further (key) competencies in discussion**

In addition to the papers referred to above further key competencies play a significant role in recent German writings. To a certain extent they can be related to the taxonomy of the FORUM BILDUNG. But they also have accents and priorities of their own so that the question of how to integrate them within or to add them to this taxonomy is still open. Among them are:

#### **3.1.5.1 Thinking in networks**

According to J. R. ANDERSON's influencing "architecture of cognition" (1983) and to other authors in different fields of research, declarative knowledge is organised in the form of semantic networks. But degree of connectedness and spread of activation cause great differences in the efficacy of individual knowledge networks. Well-structured and active networks allow better performance. This suggests that there are good reasons to regard the patterns of *how* internal networks are structured as a (holistically defined) key competency of its own. An additional reason for a specific emphasis on thinking in networks can be seen in the rather advanced level of research on this issue and the instruments available for both measuring and fostering this competency (WEBER & SCHUMANN 2000, MANDL 2000, FÜRSTENAU 2001).

#### **3.1.5.2 Metacognition and meta-knowledge**

Each of the three knowledge-related competencies in the taxonomy as given by FORUM BILDUNG is in different ways related to 'doing things with knowledge'. In order to specify metacognition and, in particular, external meta-knowledge on features of knowledge, such as criteria for structure of knowledge, validity of knowledge and schemata for operating on knowledge (e. g. Hempel-Oppenheim schema for explaining or schemata for subsuming cases under codes of law), WITT (1996a,b,c) emphasises the importance of investigating levels of explicitness and reflectedness in performing operations on knowledge. As a recent means of classifying the operations Bloom's taxonomy and particularly its revised edition (ANDERSON & KRATHWOHL 2001) could be taken in consideration.

#### **3.1.5.3 Communicative competence**

Communicative competence is frequently mentioned but mostly as a subcategory of social competence. Although there are relevant intersections between communicative and social competence, reasons to regard the former as a category of its own may be drawn from the its double-side structure which on the one side is related to philosophical and social aspects but on the other side to command of languages. For instance, VAN BUER & MATTHÄUS (2000) refer to communicative competence within a perspective of social philosophy and make a classification of *effective communication* (technically successful in respect of communicative means), *strategic communication* (conceived as professional competency controlled by success, for instance in negotiating), and *successful communication* (determined by consensus orientation). For each of these categories of communication criteria of competence are developed. On the other hand, communicative competence in the framework of (foreign) language instruction is defined by a set of subcompetencies with grammatical competence, textual competence, illocutionary competence, socio-linguistic competence, and strategic competence as its main components (cf. BACHMANN 1990, KOCKOT 2001).

#### 3.1.5.4 *Media competence*

The relevance of media as an important aspects of human competence has been stressed in many contexts. BRUNER's media based theory of cognitive growth (BRUNER, OLVER & GREENFIELD 1966) or MERTENS' notion of horizontal qualifications as key qualification may be referred to as well known examples. A more recent definition of media competence can be derived from a list of goals on media education presented by the BLK in 1995 (quoted from MANDL ET AL. 1998, p. 25). It underlines that media education is a social task, and not only due to schooling. It comprises manifold knowledge and skills. Students have to acquire a specific 'reading literacy' related not only to language but to understanding pictures and dynamic processes as well. Networking and co-operation are required and students have to develop the competence of interpreting and evaluating information with missing contexts. The ability to make use of technical facilities and tools is asked for. Distinctions are necessary between reality and virtuality, between relevant and irrelevant information, and between authentic and less credible information. Media competence is defined not only in a receptive sense but includes active and co-operative utilisation of the means available. Reflections on the relationships between human intelligence and technical information processing are important. Finally, esthetical and ethical standards for both analytically and creatively dealing with media are important for development of individual identity.

#### 3.1.5.5 *Economic Competence*

*Economic Competence* is a theoretical construct with a specific ambiguity. On the one hand a domain specific character is obvious in the twofold sense of referring to both an important set of (commercial) vocations and a well established subject matter in schooling. On the other hand, there are important reasons to think of 'economic literacy' or 'economic thinking' as a subset of those traits that are used to be understood as intelligence ('economic intelligence'). For DeSeCo, the concept of economic competence (or economic literacy) is of importance not only because DeSeCo is an OECD project but particularly for the reason that thinking economically is restricted neither to economics as subject matter in schools and university nor to commercial vocations and the business world but is thought to be a central (and insofar overarching) principle of conduct of life by an increasing number of writers. In addition, economic literacy does not only cover the basic intentions of DeSeCo but also matches its concrete purpose of preparing comparative studies in educational achievements because there are ready-to-use instruments, the TEL (SOPER & WALSTAD 1987) and WBT as its adaptation for the German speaking countries (BECK, KRUMM & DUBS 1999). A subset of the TEL has been integrated in the IEA CIVICS study as mentioned above. As a further (but not final) reason for including the TEL or WBT it should be stressed that the relationships between economic competence and moral competence lead to a fundamental problem of schooling.

#### 3.1.5.6 *Cultural competence*

Cultural competence is not a member of commonly known sets of key competencies. But there is recent work on this issue within a BLK project which could be a particular German contribution to DeSeCo. A differentiated but reflectively 'open' overview of aspects from which further research may be derived is given by PAZZINI's programme "Kulturelle Bildung im Medienzeitalter" (1999). It implies intersections with media competence as referred to above. Further projects granted by the BMBF cover cultural competence in its impact on shaping the work site.

### 3.1.5.7 *Intercultural competence*

Intercultural competence is a concept developed in foreign language teaching on the one hand and in vocational education, not at least in commercial vocations, on the other. It directly focuses on the globalisation of economic processes (WEBER 2001). In respect of the reasons for concentrating on key competencies (knowledge and competition in a global context) it is reasonable to include intercultural competence although there are again intersections with other key competencies.

### 3.1.5.8 *Emotional intelligence*

Emotional intelligence is not explicitly mentioned in most catalogues of key competencies. But in almost any paper on the general considerations underlying the concept of key competencies the argument appears that key competencies are complex phenomena including emotion. Thus, it would make sense to include this concept in the corresponding catalogues. HASTE (1999), for instance, explicitly includes the “management of motivation, emotion and desire” as one of her five key competencies. In the field of research on vocational education the role of emotion has particularly been investigated by SEMBILL and his co-workers (SEMBILL 1992; SEMBILL, SCHUMACHER, WOLF, WUTTKE & SANTJER-SCHNABEL 2001). However, in respect of their own fields of research both authors hesitate to comment on the question as to whether measures for emotional intelligence should be included in a set of indicators mainly intended for international comparison of educational outcomes.

### 3.1.5.9 *Motivation*

Motivation is a central aspect of achieving results and success. Similar to emotions, motivation is not a member of most assemblages of key competencies but, as mentioned above, is explicitly referred to by HASTE (1999). Concerning the work site, motivation plays a central role as an attribute demanded in job advertisements or as an aspect of assessing employees. Within recent research on vocational (particularly commercial) education motivation is one of the central topics, not only as an influencing factor but also as an important dimension of intended learning and development outcomes. In the framework of the DFG priority programme, 4 projects were directly related to motivational factors. In particular, attention should be given to PRENZEL’s project on “Self-determined and interested learning in vocational education” (PRENZEL, DRECHSEL & KRAMER 1998) in which a hierarchy of 6 different types of learning motivation has been constructed with reliable, valid and easy-to-use rating scales assigned to each of them. A relevant aspect of the six levels of motivation is their connection with content issues. In particular, level 6 (“interested”) is explicitly related to the individual and general meaning of subject matter content. It is for this reason (and for existing measurement instruments) that it seems to be reasonable to include (in an appropriate way) the level of motivation in a set of indicators for comparative studies.

## 3.2 **Compiling a catalogue of (key) competencies**

In respect of the German background as sketched above, a catalogue of relevant (key) competencies (or factors that could be regarded as key competencies) can be compiled. The catalogue is intended to demonstrate what seems to matter in the actual debate on key competencies but also resembles the still unsolved problems of classification. According to standard criteria of making categories these have to be free of overlap. However, there is no chance to meet this requirement for this catalogue. The main reason is that key competencies are

not conceived as separate components of human capabilities but are aspects under which holistic phenomena (either internal structures or external systems of means and ends) may be focused. To put it as a metaphor, key competencies are ‘entries’ to complex networks that (on the surface) differ in their locations but (once being inside) provide no axe to strip down the jungle of relationships to a well-organised tree of hierarchical categories.

**Table 1 Catalogue of competencies**

Intelligent knowledge		Thinking in networks
Applicable knowledge		Meta-knowledge
Learning competency		Communicative competence
Instrumental competencies		Media competence
Social competencies		Economic competence
Value orientations		Cultural competence
		Intercultural competence
		Motivation

### 3.3 Relating the catalogue to DeSeCo’s three generic key competencies

In their contribution to the INES GENERAL ASSEMBLY 2000, RYCHEN & SALGANIK propose a short list of three generic key competencies: Acting autonomously and reflectively, using tools interactively, and joining and functioning in socially heterogeneous groups. As compared with the German papers they have a more than superficial resemblance to the trio of the early seventies which were (in an order corresponding to RYCHEN & SALGANIK): “Selbstkompetenz”, “Sachkompetenz”, “Sozialkompetenz”. A detailed comparison of the specific components (or features) of both lists of competencies cannot be given here. But as a *tertium comparationis* KEGAN’s basic ideas might be referred to again. Given the background of his developmental theory of moving on a helix of transforming former ‘hows’ of knowing and thinking into new content on a higher level of reflective abstraction, KEGAN particularly focuses on the ‘how’ of our knowing.

In RYCHEN & SALGANIK’s three competencies this ‘how’ is underscored as well, mainly in “acting autonomously and reflectively“ but with clear references to both of the two others as well. It should not be ignored that a definition like “*Acting autonomously means that individuals can assert their own rights and interests, think and act for themselves, initiate interactions with their physical and social environment, form and conduct projects, and develop strategies to attain goals.*“ could be directly taken from a textbook on economical behaviour and competition as well.

Further, it deserves strong attention that autonomy and reflection are thought of as being intrinsically intertwined with each other and that reflection is particularly related to the wide spectrum of cognitive content in the sense of knowledge, values, rules, rites, codes, language, law, and institutions. Each of these notions refers to explicitly represented or implicitly embodied knowledge (in a broader sense of this word).

Thus, the concept of acting autonomously and reflectively is strongly convergent with a point of view (as it is taken in our paper) that focuses on a grounding in developmental theory and on emphasising knowledge and competition as the central challenges to meet.

The broadening of the notion of ‘tool‘ is in complete accordance with the catalogue as given in this paper (and with the reflections behind). In particular, using knowledge as a tool is very close to the notion of ‘doing things with knowledge‘ as has been strongly emphasised above. If using a tool “implies not only having the tool and being able to use it effectively, but also understanding how the tool affects the way one interacts with the environment“ the relevance of knowledge about knowledge (meta-knowledge) is clearly stressed.

The third key competency “joining and functioning in socially heterogeneous groups“ is obviously related to social competence as an important member of all catalogues referred to above. However, the details of defining this competence excel in their level of differentiation and, as a specifically modern aspect, in emphasising the heterogeneity of the groups in question.

RYCHEN & SALGANIK promise future work on considering how these generic key competencies are interrelated. The same holds for the details of relating the catalogue put forward in this paper to the three generic key competencies. Perhaps one of the differences between both catalogues is just the level of accretion the models aim at. There seem to be no difficulties in pulling apart the model of *three* competencies to form a much longer catalogue. But one assumes this idea would not match the intention of RYCHEN & SALGANIK, which is very likely to emphasise the organisation of parts into structured wholes. The same intention is implied in most of the competencies as listed in our catalogue, for instance: intercultural competence or media competence.

Considering these differences in classifying, the methodological question of grouping comes back. RYCHEN & SALGANIK explicitly concentrate on arranging competencies around complex tasks, and they draw attention to the normative implications of this procedure. It is at just this point that the methodological alternative has to be thought of, i. e. thinking of competencies not as a normative construct (to be defined *a priori*) but as internal structures investigated by psychological measurement and constructed *a posteriori* as a result of, for instance, multidimensional classification, factor analysis or the like.

From this paper’s point of view scrutinising these methodological alternatives should be stressed as the possibly most important next step.

## 4 Key competencies and education

As can be seen from the considerations and reports above, the definition and selection of key competencies is one of the most important issues in Germany when discussing goal-setting and the curriculum of all sectors of the education system covering the kindergarten, schooling, training at the work place, and life-long learning. As a central prospect envisaged the taxonomy of the FORUM BILDUNG may be referred to.

With respect to the past decade the most effective and efficient way of overall policy-making for promoting the teaching and learning of key competencies can be seen in funding research and development projects. It is not an exaggeration to assign the deepest impact by far on the German educational system to TIMSS and related studies. These investigations worked by instilling a sense of competition, i. e. they provided feedback concerning not the normative basis but the factual outcomes of schooling. The better the feedback obtainable, the better the chances to promote change.



The value of comparative studies increases if these can be related to research on instruction (in the broadest sense of this notion). The results of the DFG priority programme on teaching-learning-processes in initial business education (BECK 2000a) include a variety of carefully developed learning arrangements, most of which have been practically implemented in the meantime. It is necessary to know what is not working. But it is helpful to have access to well proven prototypes of better practice.

Another set of possibilities to improve the educational system and its capacities - not at least to foster the acquisition of key competencies - is offered by pilot projects funded by the BLK.

The third way is by improving the education of teachers. It is, however, not the intention of this paper to discuss the (controversial) details of this question. But preparing teachers for their tasks in the knowledge society could not truly be thought of as effective without establishing strong connections with producing (not only imparting and mediating) knowledge on the one hand and without 'authentic' experiences in relevant fields of life. To express this more directly: A teacher who has experiences of his own in being involved in serious research projects and in being involved in professional practice in business, health system or the like may be assumed to perform better than his colleague being educated by reading textbooks on his subject matter and some training in performing traditional instruction. (However, this is an assumption like any other, and has to be proved within international comparative studies.)

#### **4.1 Overview of institutions with responsibility for key competencies**

The main institutions with explicit responsibility for the training of key competencies are

- the schools at any stage and in both general and vocational education,
- the enterprises participating in vocational education,
- the universities and other institutions of tertiary education (e. g., Fachhochschulen and Berufsakademien),
- a broad variety of private institutions for continuing education,
- and a sizeable number of further institutions.

However, in many public papers emphasis is laid as well upon experience gained in almost any setting. It is not possible to provide more details in this paper.

In addition, the aim of fostering key competencies has been adopted by virtually all official bodies with responsibility for education. Many of them have been mentioned before. Among these institutions and bodies are:

- the Ministries of Education and Research,
- the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany (KMK),
- the Bund-Länder Commission for Educational Planning and Research Promotion (BLK),
- the Federal Institute of Vocational Training (BIBB),
- the Forum Bildung,
- the Federal Employment Services (Bundesanstalt für Arbeit),
- the Institute of Employment Research (IAB),
- the trade unions (including teachers' associations),
- the chambers of commerce, trade associations and further chambers, and many others.

## 4.2 Key competencies in German school curricula

In accordance with the recommendations of the KMK regarding curriculum development in most of the German Länder, revisions of the curricular are going on. In preparation for this paper each of the 16 ministries of education and science were asked to provide documents concerning their actual state of curriculum development. Most of them voluntarily and immediately offered lots of documents. Although they were inspected thoroughly it is, unfortunately, not possible to refer to them in more detail at this juncture. But as a summary it can be stated that for both general and vocational education the competence approach is distinctively dominating. In most of the cases the notion of “Handlungskompetenz” is being used with the triangle of “Sachkompetenz”, “Methodenkompetenz” and “Sozialkompetenz” as its integrative components. Unlike the KMK-paper most of the Länder do not refer to the notion of ‘Personalkompetenz’ or ‘Selbstkompetenz’ in their curricula.

To include at least one concrete example (out of hundreds of provided documents), the introductory remarks to the curriculum “mathematics for learning-disabled” of Rheinland-Pfalz will be reported on. In this document, math is considered as an “expansible tool for problem solving”. This generic definition is broken down in different directions - one of them being a catalogue of acts that can be performed within mathematics but is not exclusively related to this subject. As members of this catalogue the following verbs are given: *comparing, sorting, putting in order, classifying, symbolising, giving analogies, generalising, putting in concrete terms*. Most of these verbs (or synonyms) can easily be assigned to the revised edition of BLOOM’s taxonomy as referred to above. This is to say that also in respect of disabled students the idea of ‘doing things with knowledge’ (insofar as mathematical object are to be conceived as pieces of knowledge) is made use of.

## 4.3 Relating the catalogue to special groups and fields of life

Key competencies in general education and key competencies in vocational education and training have been referred to above. Some extra comments are given on key competencies in continuing education and on key competencies for further groups of learners

### 4.3.1 Key competencies in continuing education

The significance of certain competencies for and during learning processes in later stages of life has been stressed repeatedly above. Intelligent and applicable knowledge, the competency to learn, and, in particular, method-based/instrumental key competencies are to be named here, although social competencies and value orientations also continue to be cultivated and further developed beyond compulsory education. Research on informal learning (as opposed to formal and informal learning processes) suggests that the development of the relevant (transferable) competencies can be enhanced in formal settings and that such background is more conducive to individual rates of return than reliance on informal learning in specific work settings (cf. OECD/HUMAN RESOURCES DEVELOPMENT CANADA 1997; LEHMANN & VERHINE 1988; BECKER 1964). This appears to be true despite the fact that modern forms of vocational education and training tend towards complex teaching-learning arrangements which are meant to simulate workplace conditions, because the decisive distinction here is the level of transfer and generalisability, rather than the method of instruction or the modes of learning.

Further education in Germany is traditionally divided into three domains: general, vocational, and political further education. This distinction is, to some degree, artificial: foreign-language courses, for instance, may well serve vocational and cultural purposes at the same time. In any event, it is easy to demonstrate the crucial role of the competencies listed above for all of these forms of further education. Depending on the field of study, domain-specific intelligent and applicable knowledge which has been acquired at an earlier stage of life will be highly predictive of learning motivation as well as learning success. Learning competency is in itself a necessary requirement for such activities, as is true for method-related/instrumental competencies such as reading comprehension, the ability to express oneself both in the mother-tongue and in one or more foreign languages, and – at least in certain areas – well-developed levels of mathematical ability. Both in general and political further education, social competencies and adequate value orientations are absolutely central to the aims of learning. It may be noted that even in foreign-language courses – however job-related they may be in a particular instance – it is increasingly recognised that the acquisition of ‘intercultural competence’ (which involves both social competencies and important value orientations) ought to be an integral part of learning activities.

#### **4.3.2 Key competencies for further groups of learners**

Specifying educational programmes for particular groups of learners is a relevant aspect of the activities of the BLK: “The further development of the vocational education and training system, the improvement of equal opportunities both for slower-learning and lower-achieving young people in vocational education and training and for particularly talented children and young people, the promotion of women and the utilisation of new media are further BLK work focuses.” (BLK, 2000). In any case, issues of key competencies are included in these activities.

### **4.4 Research projects on (key) competencies**

#### **4.4.1 German parts of IEA-Studies**

Since the early 1980s, Germany has participated – at least partially – in a number of IEA studies: Classroom Environment (ANDERSON, RYAN & SHAPIRO 1989), Written Composition (GORMAN, PURVES & DEGENHART 1988; PURVES 1992), Reading Literacy (ELLEY 1994), Computers in Education (PELGRUM & PLOMP 1991; 1993), Third International Mathematics and Science Study (BEATON, MULLIS, MARTIN, GONZALES, KELLY & SMITH 1996; BEATON, MULLIS, MARTIN, GONZALES, SMITH & KELLY 1996; MULLIS, MARTIN, BEATON, GONZALES, KELLY & SMITH 1998), Civic Education Study (TORNEY-PURTA, LEHMANN, OSWALD & SCHULZ 2001). German participation in the Progress in International Reading Literacy Study (PIRLS) is under way. For most of these studies, documentations and national reports have been published in German. In the case of the German contribution to the Classroom Environment Study, a comprehensive discussion of findings has been published by WEINERT & HELMKE (1997). The results from the German component of the Written Composition Study are documented in an unpublished research report in English (LEHMANN & HARTMANN 1987). A German national report on the Reading Literacy Study has been published as a book (LEHMANN, PEEK, PIEPER & VON STRITZY 1995). The most important German publications on TIMSS (BAUMERT u.a.1997; BAUMERT, BOS, & LEHMANN 2000) have already been mentioned. A German national report on the Civic Education Study is to be expected in 2002. In addition, there are numerous articles in scientific journals based on findings from these international studies.

#### **4.4.2 International comparison of economic literacy**

The Test of Economic Literacy (TEL) was developed by SOPER & WALSTAD (1987). Its kernel consists of matrices covering four fields of content (basics, micro economic, macro economic, and international relations) and five of the six levels of BLOOM's TEO. A version for the German speaking countries (Wirtschaftskundlicher Bildungstest, WBT) has been derived from the American original and underwent a thorough validation. In the meantime large-scale investigations have been conducted covering Austria, Switzerland, and Germany (LÜDECKE & SZCESNY 1998; BECK 2000d). Data for other countries are available, too. Considering both the relevance of economic literacy as a key competency and the availability of the proven instrument it seems very reasonable to think about including the TEL or WBT, respectively, in the set of indicators for DeSeCo.

#### **4.4.3 Teaching-learning-processes in initial business education**

##### **4.4.3.1 Overview**

In 1990, a commission set up by the Senate of the Deutsche Forschungsgemeinschaft (DFG) published a memorandum on research in the field of vocational education and training (VET). Referring to this memorandum a priority programme on initial business education was established with 18 projects investigating processes of learning and teaching and the development of competencies within the setting of the German "Dual System" of VET.

In most of these projects key competencies were focused on, among them decision making; modelling complexity; graphic competency; action competence and knowledge application; self directed learning; meta-knowledge and metacognitive competence; moral competence; social competence; communicative competence; and motivation.

The contributions of this research programme to the DeSeCo project are to be seen in

- elaborating explicit theories of key competencies, particularly by modelling the competencies in terms of internal structure, definitions and classifications,
- designing and evaluating arrangements for fostering the development of key competencies,
- developing instruments for the measurement of competence development.
- A brief report on the Priority Programme as a whole has been published by BECK (2000a). Reports can also be found in the internet (<http://www.rhrk.uni-kl.de/~dfg/english.html>). Some of these projects have already been referred to. For reasons given above a selective report will be published on BECK's project to prove the so-called homogeneity hypothesis in KOHLBERG's theory of moral development (BECK 2000b). The specific relevance of this project to the problem of key competencies will become obvious if BECK's efforts to interrelate moral competence and economic competence are taken into consideration.

##### **4.4.3.2 Moral development as an example**

In the "Introduction to DeSeCo", a "purely economic viewpoint" on the one hand and a "broader social perspective" on the other are compared. From this social perspective a number of issues can be derived, among them individual participation in democratic institutions, social cohesion and justice, human rights, and global inequality. These are aspects with strong relations to levels of moral development, or moral competence.

According to KOHLBERG, capacities in moral judgement develop in a series of six stages related to three levels. The levels are defined by the range of factors and considerations influencing the judgement: egocentric, sociocentric, and universalistic. A central hypothesis of KOHLBERG'S theory is the homogeneity postulate, i. e. the assumption that stages are "structured wholes" and that people judge with internal consistence once a stage has become internally stable. For measuring the level or stage attained specific instruments have been constructed (GIBBS & WIDAMAN 1982).

The counter-postulate to the homogeneity hypothesis is the segmentation hypothesis. In his research programme, BECK aimed at proving the latter hypothesis against the former one. For the measurement of moral judgement competence questionnaires and partly clinical interviews were administered to German insurance apprentices at yearly intervals between 1994 and 1998. The main findings are reported in a very condensed manner in BECK (2000b); a complete list of project related publications is added. The kernel result is: "Contrary to Kohlberg's assumption and perhaps folk psychology, young adult use different stage principles depending on their perception of the situation, the specific topic and the social environment."

BECK describes the practical relevance of his results as follows: "It cannot be said that in today's vocational training (in commerce) planned education in business ethics is implemented. This applies to both the company's and the school's part. Nevertheless, these two milieus do have a bearing. But the effects that can be measured are produced more or less at random depending on the special social environment encountered in the different institutions and departments. With respect to the fact that apprentices tend to be strongly influenced especially at the beginning of their apprenticeship, it has to be stated that an educational chance is gambled away here – possibly with severe consequences, at least for the behaviour on business and administrative terms."

It is not least for this reason that a thorough consideration should be given to the idea that some way of measuring competence in making moral judgements (which is a bit more specific than "value orientation") should be included in the DeSeCo project.

One of the central problems arising from the segmentation effect is the rather controversial question of how to interrelate economic competence and moral competence. If one accepts the homogeneity postulate as a norm and, therefore, tries to boost the individual's moral development to the highest level attainable, then one runs the risk of making the individual incompetent for a field of tasks and demands ruled by the principle of strategic exchange (which corresponds to stage 2 in KOHLBERG'S taxonomy). BECK makes an effort to provide solutions for this problem (2000c).

## **5 Assessment: Indicators and benchmarking**

### **5.1 Scientific measurement of key competencies in German research programmes**

Since the concept of key competencies as used in this report is rather broad, it would go far beyond the present possibilities to list pertinent research outside the area of education. Also, reference to older investigations appears to be of limited value here. Under these restrictions, just a number of studies deserve to be highlighted which have shed light on the questions under

discussion. International comparative studies are mentioned in other sections (3.3 and 5.1.1); here, only “national options” which transcend the international core program are referred to.

### **5.1.1 *Intelligent (domain-specific) knowledge***

The current special research program of the DFG includes a number of studies under progress where the accumulation of mathematical abilities is investigated. Given that TIMSS has shown that mathematical competencies can be arranged meaningfully on a continuum ranging from basic arithmetic skills across routine procedural knowledge to complex problem solving activities, the scale can adequately map vertical transfer – or the lack thereof. The latter has been shown using analyses of differential item functioning (cf. BAUMERT, KLIEME & WATERMANN 1998). Similar analyses exist (or are in progress) for physics (cf. BAUMERT, KLIEME, LEHRKE, & SAVELSBERGH 2000). Two longitudinal studies focus on longer-term knowledge accumulation: “Learning Processes, Educational Careers and Psychosocial Development in Adolescence and Early Adulthood” (BIJU: Bildungsverläufe und psychosoziale Entwicklung im Jugendalter, conducted by the Max Planck Institute for Human Development, Berlin, and covering mathematics, physics, biology, and English; cf. GRUEHN 2000), and an assessment census in the City of Hamburg (LAU: Aspekte der Lernausgangslage und der Lernentwicklung von Schülerinnen und Schülern an Hamburger Schulen, covering mathematics, German, English as well as cross-curricular competencies; cf. LEHMANN. & PEEK 1997; LEHMANN, GÄNSFUSS & PEEK 1999).

### **5.1.2 *Applicable knowledge***

A project subsequent to IALS (see KLIEME, EBACH, FUNKE, & REEFF in press), PISA (see DOSSEY, KLIEME, CSAPO, & VOSNIADOU 2000; KLIEME, FUNKE, LEUTNER, REIMANN, & WIRTH in press) and LAU have triggered a series of efforts in Germany to measure problem solving skills in complex settings. Obviously, generalisability and transfer represent key issues in this particular field of research. While it is the intention here to investigate non-subject-related competencies, it is nevertheless clear that problem solving skills are moderately highly correlated with domain-specific competencies, even if there is no direct linkage between the subject matter under study and the problem solving situation used to measure this ‘cross-curricular’ ability. The results produced so far are particularly promising to the extent that linkages are also sought with respect to media competencies and social competencies.

### **5.1.3 *Learning competency***

National additions to PISA and an instrument planned for use in LAU (developed by SCHNEIDER, University of Würzburg) exist to measure metacognitive knowledge as an important component of reflective knowledge. Under pilot conditions, the results have proved to be good predictors of other competencies (in particular, reading comprehension).

### **5.1.4 *Method-related/instrumental key competencies***

In addition to the internationally comparative studies to be discussed below (see sections 3.3 and 5.1.1), there have been a number of large-scale regional studies assessing mother-tongue, foreign-language, and mathematical competencies. LAU which has produced achievement data in all three fields for the beginning of grades 5, 7, and 9 has already been mentioned. A special

feature of this study (given that it is census-based) is that it also facilitates the recombination of learning groups for the end of each preceding grade, thus allowing for class/course-referenced evaluations. BIJU has rendered similar information on mathematics and English, based on more frequent measurements across time. QuaSUM (Qualitätsuntersuchung an Schulen zum Unterricht in Mathematik; cf. LEHMANN, PEEK, GÄNSFUSS, LUTKAT, MÜCKE, & BARTH 2001) has studied, on the basis of representative samples, mathematics achievement in grades 5 and 9 in the State of Brandenburg. HELLER, REIMANN & RINDERMANN (2000) have evaluated achievement in a special form of the Gymnasium in the State of Baden-Württemberg. As part of the IEA Progress in International Reading Literacy Study (PIRLS), but with substantial national additions – in particular, a mathematics test based on TIMSS Population I –, a nationally representative achievement study on reading comprehension and mathematics in grade 4 is currently being undertaken by Prof. W. BOS, University of Hamburg (Internationale Grundschul-Leseuntersuchung: IGLU). Another regional achievement census is MARKUS (Mathematik-Gesamterhebung Rheinland-Pfalz: Kompetenzen, Unterrichtsbedingungen, Schulischer Kontext, conducted by HELMKE and JÄGER, University Koblenz-Landau); it has investigated mathematics instruction in grade 9. In each of these cases, highly reliable and valid achievement scales have been used which reflects the fact that in the case of key competencies as taught by the schools, Germany can be assumed to have attained international standards of educational measurement. It may be worth mentioning here that yet another nationally representative large-scale assessment is currently under preparation: Under the auspices of the German Institute of International Educational Research (DIPF: Deutsches Institut für Internationale Pädagogische Forschung, Frankfurt/Main), a comprehensive achievement study (grade 9) of German and English (Deutsch-Englisch-Studie International: DESI) is being prepared, with main data collections planned for 2003 and 2004.

### **5.1.5 Social competencies**

Despite much rhetorical emphasis given to this aspect of school-based education, relatively little evidence exists, as compared with research on educational achievement. BIJU has produced some reliable and interesting results in this field of study (see BAUMERT, KÖLLER & SCHNABEL 2000). The attempt to combine measures of problem-solving skills with measures of social co-operation by arranging complex situations which require communication and co-operation has already been mentioned. National additions to the IEA Civic Education Study, involving measures of authoritarianism and other relevant social attitudes also belong into this context, although first results are expected to be published only in 2002 (for some information on the German component of the IEA Civic Education Study, see HÄNDLE, OESTERREICH & TROMMER 1999). There are, however, some important developmental studies to be mentioned here, e.g., FEND 1990ff; PEKRUN & FEND 1991; OSWALD & KRAPPMANN 1988). It may be appropriate to list here also a number of studies of historical consciousness and awareness (see v. BORRIES, PANDEL & RÜSEN 1991; v. BORRIES 1995).

### **5.1.6 Value orientations**

Important information on value orientations among German adolescents can be collected from a relatively wide body of survey research, both quantitative and qualitative, and too numerous to be listed here. In principle, there is a wide array of instruments to measure such dispositions, also including orientations towards politics, society, and work. What appears to be largely missing, however, are good measures pertaining to cultural value orientations which can, at least in

principle, be transmitted by schools, e.g. in the context of Literature, Arts, History and Music, as well as Physical Education.

## **5.2 Measuring key competencies in comparative studies**

The assessment of key competencies in comparative studies is largely confined to participation in international studies of educational achievement.

Primarily triggered by the poor results of German students in TIMSS, the Standing Conference of the Ministers of Education in the Federal Republic of Germany (Kultusministerkonferenz: KMK) has determined to have full German participation in PISA and to be able to compare their educational achievement (with reading literacy as the major domain and mathematics and science as minor domains) across the States (Länder), in addition to including a wide array of national options for cognitive and noncognitive measures. This decision has amounted to collecting samples for each Land at almost the level of precision required by OECD from participating countries: the total number of students tested in Germany is approximately 57.000. While the results of the international comparisons are expected for late 2001, the inter-state comparisons are not due to be published until 2002.

Participation in PISA 2, with the main data collection envisaged for 2003, has already been authorised, this time on the basis of a smaller sample (440 intact classrooms from 220 schools or approximately 11.000 students), but again with substantial national additions to the international design. It is intended to turn DESI, the future study concentrating on German and English proficiencies as key competencies, also into an internationally comparative exercise; for reasons easy to see, countries like Austria and Switzerland with a German-speaking majority or other neighbouring countries with German-speaking minorities are of primary interest here.

Finally, YOUTH and HISTORY, the comparative survey on historical consciousness and political attitudes among European (and near-eastern) adolescents should be mentioned (see ANGVIK & V. BORRIES 1997; V. BORRIES 1999). While this study may have suffered from the relative unfamiliarity of the addressed scientific community with questions of research methodology, it has opened up new avenues at the intersection of history as a well-established school subject and the social competencies and value orientations it is supposed to nourish.

In addition, the question was asked if key competencies could be identified with specific importance for the home country as compared with other countries. However, at the moment we are not in a position to give explicit and detailed answers to this question.

## **5.3 Practical assessment of key competencies within the 'dual system'**

### **5.3.1 Assessing approaches in schooling and at the work site**

Since about 1987 curricula for vocational education (concerning both schooling and the enterprises) explicitly include commitments to key competencies. Thus the problems arise of how to assess these competencies within examinations. A number of approaches is being developed and evaluated. (REISSE 1996, 1997; GENSEL 1996; KANTZENBACH 1998; SCHMIDT 2000).



A far-reaching research and development project to improve examinations within the dual system has been conducted jointly by the BIBB, the Berufsbildungswerk der Deutschen Versicherungswirtschaft (BWV), the DIHT and the Universität Mainz (BREUER). This project is not directly concerned with key competencies but is based on 'action oriented' tasks in the examinations and as such implies key competencies at least in a sense of intelligent and applicable knowledge (BREUER & HÖHN 1996, 1997).

### **5.3.2 Excursus: Key competencies and Bloom's Taxonomy**

Since it is very recent, a passing reference is given to the revision of BLOOM's Taxonomy of Educational Objectives as published by ANDERSON & KRATHWOHL (2001). There is a common assumption that key competencies cannot be measured in the same way as traditional educational objectives because they are complex structures. Thus the frequently used Taxonomy of Educational Objectives (TEO; BLOOM 1956) will not be fully appropriate for testing key competencies (e. g. BEREITER & SCARDAMALIA 1998). It is true that the TEO is often used to produce isolated single objectives. However, if single tasks are not isolated but integrated in thoughtfully designed systems they can contribute to measuring more complex goals (such as key competencies), too. In this sense, the TEL and WBT have been constructed on the basis of BLOOM's taxonomy. The same holds for BREUER's project in which a task will be accepted only if its author can show how to assign it to educational goals. These potentials of the taxonomy have now been enhanced by the recent revision in which a theoretically grounded classification of knowledge (factual, conceptual, procedural, and metacognitive knowledge) and an elaborated classification of cognitive processes are combined.

To back this argument an idea of knowledge management can be picked up. PROBST, RAUB & ROMHARDT (1998) identified the central strategy of knowledge management to transform management problems (or situated problems) into knowledge problems (or problems of using knowledge). In other words, they focus on a shift from 'doing things with things' to 'doing things with knowledge'. The problem, then, is to classify operations on knowledge. But it is just such a classification which is given by the taxonomy!

As a further argument for making use of the revised taxonomy we refer to PIAGET's and KEGAN's principle of reconstructing as content what formerly had been process. With this idea in mind, the taxonomy table could be read inversely: Not first selecting content and then assigning operations - but first selecting an operation (say 'explaining') and then reflecting on its structure with the intention of creating new content on a higher level, for instance, some kind of HEMPEL-OPPENHEIM-schema. For almost every one of the taxonomy's processes research on its internal structure is available. In this sense, the taxonomy table appears as a near-to-practice schema for relating research results to the measurement of key competencies.

## **5.4 Key competencies in job advertisements**

A research issue of increasing importance in the field of qualification and employment are content analyses of job advertisements. So, for instance, the Report on Vocational Education and Training for the year 2000 (BUNDESMINISTERIUM FÜR BILDUNG UND FORSCHUNG 2000) provides results from such an analysis covering 23,433 advertisements concerning overarching qualifications (or key competencies). Among these advertisements a number of 3,519 were related to 'new qualifications' (i. e. information technology and the like). The data as given in

Table 2 clearly show that in most cases key competencies were asked for and that the relevance of key competencies appears significantly higher in the field of ‘new qualifications‘.

In a similar investigation DIETZEN (1999) has conducted a content analysis of n=3,928 job advertisements. Some of her results will be given in Table 3 with columns differentiating whether academics or non-academics are being looked for. Similarly, the importance of key competencies is significantly higher for academics.

**Table 2 Job advertisements I**

	A (all advert.)	B (new qualifications.)
Performance, motivation, personal disposition	46..%	60.0%
Team, co-operation, and communication	33.4%	49.1%
Experience and professionalism	27.8%	35.2%
Cognitive capabilities and problem solving competencies	22.7%	36.2%
Participation and designing (making arrangements)	20.9%	34.0%
Customer and service orientations	14.3%	23.9%
Changes, innovation, and learning	13.5%	21.4%
Entrepreneurial thinking and acting	3.8%	6.7%
Personality	2.9%	4.3%

A= All advertisements (n=23,433)

B= New qualifications (n=3,519)

Further data concerning key competencies in job advertisements can be drawn from a report of the DEKRA AKADEMIE (2000).

A problem is that the results can hardly be compared because of the heterogeneity of the categories, in particular of their combinations. But insofar as comparison is possible the top level, qualifications seem to be achievement or performance and communicative capacities. Cognitive features appear as important, but more in a middle range.

**Table 3 Job advertisements II**

Competence <sup>3</sup>	Non-academics	Academics
Team spirit	38%	56%
Ability to take strain, (achievement) motivation	37%	43%
Self-directedness, single-mindedness, capacity to act	35%	44%
Flexibility	39%	44%
Communicative competence	34%	60%
Responsibility	37%	35%
Learning motivation, internal mobility	31%	48%
Power of self assertion	33%	56%
Creativity, innovative capacities	29%	63%
Organisational abilities	45%	45%
Self-confident conduct	24%	48%
Mobility	22%	66%

<sup>3</sup> The features have partly be drawn from techniques to evaluate potentials of employees and managers (Discovery of Natural Latent Abilities; Copyright Gesellschaft für Management und Personalentwicklung 1997)

## 6 Public debate: Negotiating and legitimating

So far as Germany is concerned, a very intensive public and professional debate on key competencies has taken place, concerning a broad variety of fields with business and vocational education at the forefront (probably!) but covering other arenas as well. Some of the main topics have been described above. Concerning the relationships between work and key competencies on the one hand and education and key competencies on the other shapes of a difference as follows may be discernible. Concerning work there is no doubt that key competencies are asked for as enlarging domain specific qualifications. In any case, they are complementary, but not substitutional to specific qualifications.

Within education, key competencies sometimes seem to be understood as substituting for knowledge or even as antagonistic to the idea of knowledge. For instance, KRAUS<sup>4</sup> (O. J.) publishes a criticism against what he polemically calls a destruction of educational content (“Zerschlagung der Bildungsinhalte”). The details of his argument should be taken seriously, and he is far from being the only one to plead in this way. But the question is whether those who seriously are in favour of key competencies really intend the destruction of well-structured content. Nevertheless, the terminology of key competencies can be used thoughtlessly, and there is, indeed, a danger of overemphasising key competencies and neglecting their close connection to a core of knowledge .

A related criticism has been put forward by ZABECK (1989, 1991), who asks if the notion of key qualifications might not be an example of a “didactic illusion” and focuses on a “key qualifications’ dilemma”: The more generic and the less specific the definitions of key qualifications are, the more probable will it be that transfer (which is a central issue of key qualifications) will succeed.

An overview of controversies on key qualifications is published by GONON (1996). A recent discussion of the vagueness problem with key qualifications is provided by MINNAMEIER (1997).

Aspects of the ambivalence of key qualifications are also discussed within the trade unions. An experts’ commission affiliated to the Hans Böckler Stiftung agreed on a list of quality standards for vocational education as follows: Vocational action competence (“Handlungskompetenz”<sup>5</sup>), problem solving competencies, co-operating capacities, knowledge about the work process in different business contexts, participation in shaping the work site, self-directed learning, life-long learning, international linguistic and vocational-cultural competencies (SACHVERSTÄNDIGENRAT BILDUNG 1998, p. 31). Results of a detailed research project concerning key qualifications are reported on in FELDHOFF, JACKE & SIMOLEIT (1995). Compared to other fields of the key competencies debate, particular emphasis is laid on the aspect of participation. The same holds for ‘innovative’ and ‘normative’ competencies (ibid. 1995, p. 61). But in general key competencies are understood as an important aspect of work. The criticism of insufficient determination and precision of the key competencies terminology can also be found in this context.

Because key competencies are an ubiquitous issue in Germany it is hard to summarise who are the main actors and stakeholders. However, any list would have to include organisations based

<sup>4</sup> Kraus is president of German Teacher Association (Deutscher Lehrerverband) since 1987.

<sup>5</sup> “Berufliche Handlungskompetenz” is a prominent notion in German writings. There is a variety of translations for this expression. We choose ‘vocational action competence’.

on companies, the trade unions, the teacher associations, the institutions of further education, the ministries of schooling and science, and the political parties. The same is true for research institutions (universities, BIBB, IAB).

Considering the public debate on key qualifications there will be more consensus than conflict regarding both the relevance and the definition and selection of key competencies. This report has tried to identify influential positions, but it seems very difficult to figure out which of them would be the most important one.

Given our own professional background and expertise, our position would be best described by emphasis on more systematic research. We share the point of view that key competencies really are a challenge for every field of education. But many definitions and classifications in use still are too heterogeneous and too arbitrary. Among all catalogues of key competencies we know the one compiled by the FORUM BILDUNG seems to be the one with the strictest commitment to the state-of-the-art in pedagogical psychology. As shown above, this taxonomy can also be related to the projects and results of comparative studies in an international context. The capacity to think in networks and the availability of (both reflected and applicable) meta-knowledge are supplements to the Forum's taxonomy to which we assign priority. With specific respect to vocational education, the relationship between economic literacy and moral competence is the top-level problem. On the one hand, this priority is due to the central significance of the problem as such. On the other hand, for this problem a high level of research standards and a considerable quantity of findings and results has already been achieved.

## 7 Assessing and developing DeSeCo

At this point in time, there is much rhetorical but little substantial overlap in Germany between lists of skills or qualifications, attitudes and values presumably required by the economic sector, and the articulation of educational objectives in the pedagogical field (or in schools of education, for that matter). It appears highly desirable, therefore, to encourage both sides to be more precise in their visions and demands, preferably in such a way as to facilitate objective, reliable, generalisable, and valid measures – i.e., indicators – which may serve to guide and control educational practice in the interest of the students entrusted to the respective institutions.

Thus, the principles underlying DeSeCo in its current form meet a strong need for clarity and rational decision-making at all levels of the German educational system. As can be seen from the influence WEINERT's tenets have had on the reformulation of educational objectives already (cf. FORUM BILDUNG 2001), there is much room for a closer link between educational (and psychological) research, the development of new curricula and teaching methods, and the specification of indicators which measure success (or failure) at the various levels of assessment .

It should be noted in this context that WEINERT's concerns may be somewhat biased towards cognitive learning. While it is true that new demands on cognitive learning are likely to arise in modern societies, while it is also true that popular 'key competencies' such as "the ability to work in a team" ("Teamfähigkeit") or "social competency" ("Sozialkompetenz") are easily mistaken for mere attitudinal dispositions and subsequently substituted for, rather than added to the acquisition of instrumental, intelligent, and applicable knowledge, a few questions remain.

Schools do not only serve the function of equipping young people for future economic needs. They are also there to integrate adolescents into society at large, and it has to be admitted that the

present state of research may provide a host of cognitive, motivational and attitudinal measures, but some of the processes pertinent to social integration appear to be poorly understood so far. Thus, developmental work in this area should receive more attention than it has been given so far. Also, integration implies, to a considerable extent, conscious reflection of existing and changing cultural values. This does not mean that an unconditional acceptance of such orientations is to be aimed at, because this would be at variance with the principles of individual autonomy. It does seem justified, however, to also consider the role of Literature, Arts, History, and Music, as well as Physical Education when it is attempted to assess the success of educational processes.

The FORUM BILDUNG initiative (briefly described above) resembles DeSeCo in that it aims at formulating broad aims for (lifelong) education in a modernising German society. So far, it has refrained from making concrete recommendations for the development of new curricula (or curricular elements); neither has it specified (or even aimed at) a set of indicators on the basis of which the acquisition or attainment of competencies can be measured. The latter aspect distinguishes it – at least so far – from the DeSeCo program. It seems to be quite clear, however, that progress in that respect is likely to be achieved in institutions which are relatively independent of the political discourse in the narrow sense: research institutes and universities above all. Thus, it is no coincidence that the German contributions to internationally comparative studies are often complemented by components which aspire to relate cross-curricular competencies (*e.g.*, problem-solving) to the study of curriculum-bound achievement.

The DeSeCo program as laid out in the document submitted to the INES General Assembly 2000 is certainly pertinent to many major concerns currently debated in the German context. The 4 conceptual elements appear to be broad enough to systematise most educational activities, as is the case with the list of 5 dimensions. One might argue, however, that economic and societal concerns receive relatively strong attention, while (not necessarily ‘functional’) cultural concerns (Literature, Arts, History, Music, Sports) are rarely considered.

The integration of programmatic work at the level of DeSeCo with clearly needed research needs – *cf.* the rather loose connection between the philosophically developed “five dimensions” (CANTO-SPERBER & DUPUY 1999) and “dimensions of human ability” as defined by (educational) psychologists – would be a major goal for future activities. This is aptly described as an iterative process in the DeSeCo report to the INES General Assembly 2000; it would, indeed, add breadth to the current, still rather narrow, activities of developing educational indicators and contribute to a better understanding of how learning works in educational settings, institutions, and systems.

Concerning the workplace, the information should be given that the German Institute for Standardisation (DIN) published a catalogue of criteria for assessing the achievement of key qualifications (GRANDKE, SCHMITT, EMMERICH & HENTSCHEL 1998). This catalogue comprises 77 pages of text without any redundancy and is organised very systematically: it is based on 7 dimensions of human-related competencies (personality, intellect, motivation, leadership, efficient acting, communication, and co-operation). For each of these dimensions between 6 and 16 subdimensions are classified, each again equipped with an explicit definition of its own, comments on the definition and a table of positive and negative indicators. For DeSeCo this catalogue might be considered as an important thesaurus of issues with high practical relevance.

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