The implications of the skills-based approach for training design - a paradigmatic shift in work-related training and in organisational knowledge development

Three new contexts to consider when designing teaching and learning

European policy stresses the importance of individuals taking responsibility not only for acquiring initial education and training but also for maintaining that knowledge throughout their working lives. Competences, skills and knowledge are increasingly seen as central to developing social citizenship through informed participation in democratic decision-making. The introduction of new technologies and the increase in scientific knowledge demand continuous learning as a basis for socio-economic participation, which enables people to cope with and master change. The crucial question today is, however, how to empower the existing and future workforce and all citizens 'to handle uncertainties' (2), which co-exist within rather rigid institutional frameworks. Today's trainers and training providers must learn how to handle uncertainties and prepare for an unpredictable future.

New teaching and learning contexts have to cope with the following competences:

- flexibility, adaptability and mobility;
- learning to learn within rapidly changing contexts;
- social participation as a goal.

Stronger emphasis on flexibility, adaptability and mobility

While vocational education and training has found new favour with politicians, policymakers and planners, traditional curricula and learning processes are seen as insufficient to develop the skills and knowledge required by the new knowledge-intensive economies. Traditional definitions and explanations of professional competence or expertise were based on theories of technical rationality – that learning can be applied in predictable and repetitive ways (Edwards, 1993). Vocational education and training curricula and processes traditionally focused on imparting a fixed body of knowledge and skills required for identified tasks within occupational roles. The rapid rate of change in today’s industrial society means that these roles and tasks are no longer fixed and predictable in the medium and longer term. Vocational education and training is now increasingly emphasising the flexibility and adaptability of individuals (Nijhof, 1998; Oates, 1998). Workers need to be able to adapt to new skills and processes and to update their knowledge on a regular basis. Skilled work increasingly requires the ability to deal with unpredictable occurrences. Occupational profiles mutate and migrate over time (Heidegger and Rauner, 1997). They tend to be much broader than the narrow boundaries of skills and knowledge application, which are based on a somewhat Taylorist work organisation structure.

This article intends to disseminate and further develop basic concepts of in-company and work-related training and learning. It aims both to strengthen organisations' innovativeness and competitiveness and to empower the 'modern' worker.

Several decisions will have to be taken, conditions created and (new) attitudes developed by all partners at all decision-making levels. Despite the current short-term focus of most companies’ and organisations’ behavioural patterns, which generally favour immediate benefits and low-cost approaches, there is an urgent need to promote continuity and sustainability in the medium and longer term if Europe wants to succeed in modernising approaches to training, education and learning on the way to the information society. Such new concepts may substantially contribute to strengthening a wider Europe.
concept. New forms of work organisation prioritise communication skills and the ability to work in teams.

There are other significant changes in skills requirements. In the past the vast majority of people lived within five kilometres of their birthplace (Parkes, 1998). Today’s society demands increasing mobility, both within countries and, in the European context, between Member States and beyond. There is a growing need for competence in foreign languages and intercultural learning. However, not only skills and knowledge content is changing. The new information and communication technology industries in particular are demanding higher skills and qualification levels.

Learning to learn within rapidly changing contexts

The pace of change in many aspects of work and work environments puts a premium upon the ability to learn. Learning to learn is fundamental if workers are to be able to adjust to changes in organisational structures, technological innovation and almost constant change in work processes. One key attribute, associated with initial skill development, which needs to be fostered, is the ability ‘to pick up the threads’ when skills need updating in the future, i.e. young people need to be confident about their ability to learn. Learning to learn can thus be seen in terms of the ability to consciously shape and determine one’s own vocational and occupational career. Learning to learn, or self-directed learning, may thus be considered to have a social and cultural, as well as an individual, nature. Gerald Straka (1997, p. 4) proposes that self-directed learning is ‘the key qualification for mastering global competition and constructing a humane society at a European level’.

Social participation as a goal

There is a growing critique that the European vocational education and training agenda is ‘economistic’ in viewing qualifications as necessary for adaptation to technological and economic demand. Gerald Heidegger (1997) argues that it is not enough for skilled workers to be able to respond to the changing requirements of our society. Instead they need the skills and knowledge to shape the application of technology and the social form of work themselves. Heidegger believes there is a dialectical relationship between education, technology and work. Felix Rauner (1998) also points to the inadequacy of existing taxonomies of knowledge, seeing the need to overcome the duality between academic knowledge (brain work) and vocational skill (hand work), which he traces back to the Renaissance. He suggests that in the 21st century, work-related knowledge will become central to both profitability and social interaction.

From these elements we can derive consequences for developing teaching and training within different learning environments. To advance further a sustainable information and knowledge-based society and economy, we can define several environments which are deciding factors in effective learning and teaching against the background described.

Work-related knowledge

The cognitive side of occupational competence is key to developing context-related expertise, with work-related knowledge providing the link between knowledge, which is not context-related, and experience at work, which may not necessarily be used in a generalised way. This implies both the need for active reflection on experience and a shift from information to knowledge: expertise. This cannot be developed through simple yet extended information acquisitions, but only through continuous and subtle cognitive experiences related to implementing knowledge, codeveloping personal and professional knowledge and integrating individual knowledge into the larger dimensions of knowledge possessed by groups and whole organisations.

From training to learning

For VET innovation, a shift of emphasis is required from training to learning and from mere knowledge transmission through training intervention to the facilitation of learning, i.e. the creation, use and circulation of knowledge through more complex interventions in which training is mixed with other kinds of hu-
man resource development (HRD). In particular, it seems that VET has to ensure that individual learners can contribute to the processes of knowledge development, transmission and diffusion within whole organisations. The focus on particular kinds of knowledge development has been identified as a key factor in innovations designed to increase the supply of creative knowledge: ‘what is important for the production of knowledge value is not so much facilities or equipment in the material sense, but the knowledge, experience, and sensitivity to be found among those engaged in its creation’ (Sakaiya, 1991, p. 270). Knowledge is thus assumed to be the real driving force of our era, but is also strictly linked to day-to-day problem-solving and problem-setting in work situations, and more generally with professional competences and expertise.

**Different types of knowledge**

When considering knowledge development in more detail, it may be useful to distinguish different types of knowledge. Lundvall and Johnson (1994) identify four kinds, each requiring different types of mastery: know-what, know-why, know-how, and know-who.

**Know-what** refers to ‘factual’ knowledge: it can be considered as equivalent to what is normally called information and is related to the knowledge ‘corpus’ that each category of experts must possess.

**Know-why** refers to academic or professional/vocational knowledge, which influences technological development and the pace and characteristics of its application in industries of every kind. In this case, knowledge production and reproduction take place within organised processes, such as university teaching, scientific research, specialised staff development, recruitment and so on.

**Know-how** refers to the ability to operate skillfully in different contexts (e.g. assessing the market prospects for a new product, operating a machine tool, etc.). Know-how is typically developed at the individual level, but its importance is also evident if one considers degrees of cooperation taking place within organisations and even at the interorganisational level (for instance, forming industrial networks is largely due to the need for firms to be able to share and combine elements of know-how).

**Know-who** is another kind of knowledge which is becoming increasingly important. It refers to a mix of different kinds of skills, in particular social skills, allowing the access and use of knowledge possessed by someone else, often through a combination of professional and personal networks (Eraut et al., 1998). Vickstroem and Normann (1994) adopt a similar line in their attempt to develop a new perspective of corporate transformation. They distinguish between information, skill (or know-how), explanation, and understanding.

**Information** is knowledge of an objective kind whose importance is mainly related to its ‘factual’ nature but is not limited to that. For instance, adding new information on a certain topic can modify the pattern in which this topic was conceived, letting a new consciousness structure emerge.

**Skill or know-how**, unlike information, is embedded in individuals, as they are able to behave purposefully in a particular situation to achieve a certain result.

**Explanation** refers to scientific/professional knowledge. It is not person-based and can be found in articles, textbooks, and so on. Explanatory knowledge very often provides the basis for problem-solving competences.

**Understanding** is the most profound form of knowledge, arising when principles and connections are recognised. Understanding is thus embedded in individuals and is central to acquiring new knowledge.

**Ways of acquiring knowledge**

Each kind of knowledge is characterised by different channels through which learning takes place. The easiest cases are those of know-what and know-why. They can be obtained through typical ways of acquiring knowledge (reading books, attending courses, accessing databases), while the other two categories are rooted
primarily in practical experience and are more problematic, insofar as they require the availability of informal social channels. They are also types of knowledge upon which dynamic organisations depend, and companies are particularly interested in whether (new) employees are able and enabled to contribute to creating and developing such forms of knowledge (3).

Apprenticeship, alternance training and other forms of VET which involve on the job learning are important channels for acquiring know-how knowledge. They represent the most important way for skillling newcomers in an organisation. These protracted processes of learning by doing are frequently the responsibility of those considered the experts in an organisation, capable of above-average performance. Simulations are used as shortcuts for reproducing the many aspects of the know-how acquisition available in real situations. Know-who – as Lundvall and Johnson (1994) point out – is also socially embedded knowledge which cannot easily be transferred through formal channels of information. It is learned in social practice and through participation in particular networks (like those in professional communities which give participants access to information exchange with and between colleagues).

**Tacit knowledge**

Work-related knowledge is to some extent difficult to pin down for two reasons. First, it contains a tacit dimension and, second, it is bound up with particular social contexts: i.e., work-related knowledge is applied within particular practice communities, whose members develop ideas about how knowledge should be acquired, applied and shared.

The term ‘tacit dimension of knowledge’ was originally proposed by Michael Polanyi (1962). The basic idea is that ‘we can know more than we can tell’. There is a level of knowledge that cannot always be put into words and linearly explained. In this dimension, in which the concepts of know-how, skill, competence, and expertise are rooted, knowledge is a practical and theoretical ensemble whose development and mastery take place through procedures which cannot be identified in linear terms. In fact, the results of cognitive processes are often obtained only by successive approximations. In many cases we acquire specific elements of knowledge that we possess, but may be unable to express, by focusing our attention on further elements and by obtaining feedback on what we have previously learned. The discovery (or acquisition) is facilitated by anticipation of the implications that are yet to be determined. In this way, knowledge accumulated in a cognitive system, although not expressed, makes up an implicit framework orienting the ways in which other elements subsequently enter the system. This is why individual skills are usually tacit. The aim of a skilful performance is achieved by observation of a set of rules which are not recognised as such by the person following them’ (Polanyi 1962, p. 49).

The social nature of work-related knowledge has been underlined by drawing attention to the social context in which knowledge is acquired, developed and applied. The most relevant part of knowledge is seen as interpretation of experience, based on frameworks that at the same time favour and limit the individual process of making sense (Resnick, 1991). Situated cognition, the situation in which cognitive acts take place, is the driving idea behind this approach, recognising that individuals are very sensitive to their cultural context. The latter provides a complex fabric of references (exchange of information, cooperation, etc.) that in the long run shapes individual knowledge and determines social construction of knowledge.

Understood this way, the context creates a dynamic equilibrium between the know-what of theory and the know-how of practice. It is through the tight interdependence, or co-production, of theoretical and practical knowledge (Brown et al., 1989) that competences can be developed and maintained.

The social nature of work-related knowledge is also stressed in a cultural-anthropological perspective. For instance, Orr (1993), analysing the working behaviour of teams for repairing photocopiers, shows that technicians develop their knowledge over time through problem-solving and continuous interaction. The

---

(3) In modern work organisations such informal social channels are less and less available. This underpins the need for a more formal transmission of knowledge and competencies and/or a systematic (LLL) opportunity for social and communication channels either inside or outside the company.
defects of the machines they have to cope with are often very different from the ones reported in the standard operational manuals, therefore problem-solving and problem-setting happen collectively on the basis of the previous experiences of each member of the group and various types of communication, even during informal chatting over coffee. This way, knowledge is continuously created and maintained within a specific practice community, having its own language and myths (partly through the handing down of ‘war’ stories, reporting the main events of repairing machinery and dealing with clients).

Recently, ideas about the application of tacit knowledge in particular social contexts have been developed further in considering moves to form ‘knowledge-creating companies’ (Nonaka and Takeuchi, 1995). The model is based on the assumption that knowledge in organisations, especially in the most innovative enterprises, is created through interaction between tacit and explicit knowledge, continuously ‘converting’ one into the other. The model postulates four different modes of knowledge conversion: socialisation (from tacit knowledge to tacit knowledge), externalisation (from tacit knowledge to explicit knowledge), combination (from explicit knowledge to explicit knowledge), and internalisation (from explicit knowledge to tacit knowledge).

Socialisation is a process of sharing experiences and thereby creating tacit knowledge, such as shared mental models of the application of skills. This occurs in the particular case of on-the-job learning during apprenticeships, in which tacit knowledge directly derives from the master/trainer – not through language but through observation, imitation, and practice – and is then converted into the tacit knowledge of the apprentice. It is a process which cannot be abstracted from associated emotions and from the specific contexts in which shared experiences are embedded. Externalisation is a process of articulating tacit knowledge into explicit concepts. It is generally based on metaphors, analogies, hypotheses, images or models from which new ideas and products can be generated through interaction between individuals who want to reach the same outcome.

Combination is a process of systematising concepts into a knowledge system by combining different bodies of explicit knowledge. The media for this purpose can be very different (documents, meetings, telephone conversations, computerised databases, and so on). Reconfiguration of existing information through sorting, adding, combining, and categorising explicit knowledge can lead to new knowledge. Internalisation is the process of embodying explicit knowledge in tacit knowledge. It is closely related to learning by doing: the sum of experiences gained by individuals through socialisation, externalisation, and combination can become individuals’ tacit knowledge base in the form of shared mental models or technical know-how. But internalisation can also be reached through other forms. For instance, reading or listening to success stories can induce new levels of tacit knowledge in members of the same organisation and establish new shared mental models within the organisational culture.

The knowledge spiral

The four modes of knowledge conversion are structurally interconnected. Different events in organisational life can be viewed from a perspective of incorporating each of these modes into the processes of knowledge creation. Of course, an organisation cannot generate knowledge by itself but can only mobilise tacit knowledge created and accumulated by employees at individual level. Tacit knowledge of individuals is the basis of organisational knowledge creation, ‘organisationally’ amplified through the four modes of knowledge conversion. Nonaka and Takeuchi (1995) define this process as the ‘knowledge spiral’ in which the scale of interaction between tacit and explicit knowledge will grow as the relationships between the four modes are continuously increased and managed.

In this perspective, organisational knowledge creation, which could be considered a subtler way of viewing organisational learning, is a spiral process which starts at the individual level and moves up through expanding ‘communities of interaction’ and crosses sectional, departmental, divisional, and organisational boundaries within and beyond the organisation.
Overall, work-related knowledge appears to be a very complex and multifaceted issue, involving several different and sometimes contradictory dimensions, which can be synthesised in the kinds of relationship between explicit and tacit knowledge. Organisations with business processes highly dependent upon the continuing development of work-related knowledge are therefore particularly interested in whether new recruits and their employees will be able to make substantial contributions to the creation, transmission and diffusion of work-related knowledge. This perspective has clear implications for the relationships and interactions between initial education, school and work, continuing vocational training and lifelong learning.

New approaches to acquiring competences, skills and knowledge

The changing social and economic environments are currently challenging vocational education and training planners and policymakers. The changing nature of highly industrialised and technology intensive economies is placing new demands on knowledge creation and innovation. We have examined how such knowledge may be created. We have highlighted the relationship between competences, skills and knowledge, and their interplay in (lifelong) learning, knowledge development and innovation above. Below we examine the processes which underpin skill acquisition.

Two prerequisites for (lifelong) learning

One of the major challenges for VET which derives from our analysis of the social and economic challenges and of new knowledge requirements is how to support those undertaking VET programmes in such a way that participants can not only perform more effectively in their existing jobs, but are also better equipped to handle or master changes. The trend has been to develop flexibility in trainees and workers so that they are able to cope with change and are better prepared for what they may be required to do in the future, rather than simply training them for existing jobs. These concerns relate both to initial education and training and to continuing vocational education and training.

Discussion of the interaction between changing initial vocational education and training patterns designed to facilitate learning and changing business processes indicates that there are two essential developmental tasks young entrants have to be able to perform if they are to function effectively in dynamic companies operating in new knowledge-intensive environments.

First, they need to be able to transfer what they have learned in other contexts to their new working environment.

Second, they need to engage in knowledge development within and on behalf of their companies.

Both these processes warrant further investigation as neither process is unproblematic. The issues of transferability and knowledge development and the implications of supporting the development of these within work and initial and continuing vocational education and training are central questions for the future development of vocational education and training in Europe.

Promotion of transferability

The growing complexity of many jobs is putting a premium on the ability to transfer knowledge and skills to different situations. Research highlights the importance of learners developing mental maps (Soden 1993), so they can organise what they have learned, with the increased possibility that they could then apply this elsewhere. However, transfer tends to be highly specific and needs to be guided: it rarely occurs spontaneously. Perkins and Salomon (1989) argue that transfer is possible, depending on how knowledge and skills have been learned and how the individual deals with that knowledge in different contexts, and that two conditions are generally required for transfer to take place: context-specific knowledge and general skills have to be brought together and the learning approach must actively seek ways to encourage transfer.
If one intention of a learning programme is to help learners develop the ability to transfer skills, knowledge and understanding, then learning contexts are required which draw attention to the significance of skill transfer. For example, this could involve actively helping people to look for opportunities to transfer skills, knowledge and experience and giving them opportunities to practise making successful transfers (Blagg et al., 1992). Exposure to a range of contexts can then be valuable by both enhancing a skill and leading to more complete mastery of it (Hayes et al., 1983) and because it allows learners to make connections (and think about transfer) between contexts (FEU, 1984). Pea (1987) argues it is necessary to promote a transfer culture, and this would involve organising an effective climate directed at transfer. Hence attempts should be made to link transfer closely to learner motivation and commitment. The whole thrust of this approach is that it encourages learners in particular, but also trainers and tutors, to analyse contexts for increasing the possibilities of skill transfer.

Hayes (1992) and Achtenhagen (1994) highlight the potential for simulations or extended project work to integrate a number of strands of learning and to seek to promote the ability to transfer from that basis. The requirement that learners integrate a broad range of experiences, besides having the capacity to develop the ability to transfer, can itself also help the development of learners’ critical thinking and conceptual skills (Winter et al., 1981). This does, however, depend upon learners being given opportunities for reflection to broaden the general nature of skills and knowledge learned (Hammond and Collins, 1991). Similarly, in a recent case study in Finland, Anti Kauppi pointed to the value of broad-based learning tasks which guide the students towards acquiring the essential concepts and knowledge structures as well as examining the models of thinking and acting in working life’ (Kauppi, 1998, p. 81).

In a recent document on the need to promote transferability in learning programmes, Oates (1998) emphasises the value of developing learner adaptability to encompass ‘the transformation of existing skills and knowledge in order to perform effectively in unfamiliar tasks’ (Oates, 1998, p. 1). Note that what Oates terms adaptability could be broadly regarded as what is termed transferability in the context of European debates on these issues (Nijhof and Streumer, 1994). Oates also highlights how problem-solving approaches in mathematics have yielded enhanced performance in the application of skills by stimulating enquiry in unfamiliar settings (Boaler, 1996). Medical training is also quoted as an area which has been effective in securing skill transfer. Although Oates refers to evidence of skill transfer in medical training from the USA and New Zealand (Newble and Clarke, 1986), problem-solving approaches are now almost universal in the early stages of medical training in the UK. These have had marked effects on motivation and resulted in significant reductions in dropout compared to the more traditional approaches previously used. These approaches also utilise careful sequencing of theory and practice, a focus on learning styles and deliberate use of a wide range of learning styles and modes (Newble and Clarke, 1986).

Oates goes on to argue that although ‘the precise details of the models vary … they share a common theory-driven pedagogy, focusing on principles of fostering autonomous redeployment of skills, through learning programmes where difference in context is managed carefully as a key aspect of the learning programme … the crucial component therefore seems to be the following: pedagogy and programme management driven by a coherent model of skill transfer, not the simple implementation of a list of key skills’ (Oates, 1998, p. 24).

Learning to learn

There is almost universal recognition of the value of learners learning to learn (Novak and Gowin, 1984), and this can form a basis for continuing learning in the workplace. Consequently, getting learners to learn to learn is often cited as an aim in initial vocational education and training programmes. However, this does not ensure the issue will be addressed in practice (Evans et al., 1987). This is because of the historic problem associated with many education and training pro-
grams which instead focus on tasks that are easier to teach and/or assess (Sockett, 1980). Conversely, the development of more general skills, including learning to learn, which underpin much activity in education, training and employment, can be seen as the responsibility of everyone, and hence of no one in particular in practice.

‘Learning to learn’ can be linked to the inculcation of habits such as *systematic observation, analysis and a questioning attitude* (Annett and Sparrow, 1985). This is important especially if learners are to take advantage of opportunities for learning outside formal education and training settings. This is related to the need not only to embed the development of learning strategies within an occupational context, but also to contextualise the application of learning strategies. People need to learn how to apply effective learning strategies in a variety of contexts, particularly if they are likely at some stage to be in contexts which impose considerable demands to learn while working.

**Reflection learning**

There is a need to create and sustain a culture within organisations which values learning and development, and reflection can be an important process to help achieve this (Brown and Evans, 1994). Individuals with an ability to transfer what they have learned between contexts will need to reflect on both their own practice and their own learning. Attempts should be made within VET to ensure learners reflect on their working practices: ideally so what is learned from reflection on practice can influence action, thereby leading to improvements and further learning (Winter, 1991). While the need for any learning programme to seek to develop reflection among learners should be readily apparent, emphasis on reflection can also draw attention away from concerns with acquiring a fixed body of knowledge or a set of immutable competences: practice itself should always be seen to be developing.

It will therefore be necessary for individuals to continue to build and refine their own base of knowledge and understanding through reflection on practice, building a spiral of action and appreciation, leading to reflection-in-action (Schön, 1983). Critical reflection on experience is seen as a motor for learning at work (Kolb, 1984; Schön, 1987). The staged model of skill acquisition of Dreyfus and Dreyfus (1980) identifies the key to successful progression through to the expert stage as the processes of review and critical reflection. Critical reflection then is widely recognised as pivotal (Hammond and Collins, 1991; Tomlinson and Kilner, 1991) to developing expertise.

**Developing thinking skills**

Just as policy-makers have been acknowledging the importance of developing learning-to-learn skills in learners, increasing interest has been expressed in the further development of thinking and problem-solving skills. Blagg et al. (1993) conclude from a fairly comprehensive review of the evidence that enhancing thinking skills can have positive transfer effects. Collins et al. (1989) put forward the notion of a cognitive apprenticeship, where explicit attention is devoted to the development of cognitive skills. It emphasises modelling approaches to thinking while tackling problems within a domain on demonstrations coupled with coaching, offering hints and regular feedback within situations where learners tackle problems themselves.

Collins et al. also highlight the importance of learners making their thought processes explicit, including through the use of articulation, whereby learners articulate the knowledge, reasoning or problem-solving processes they are using. The sharing of ideas about thought processes can be a valuable means of learning for both learner and coach (Brown et al., 1994). However, such sharing can also be valuable in group settings, where learners can access, develop, organise and become aware of their own and others’ knowledge and approaches to problems (Prawat, 1989).

Soden argues that there is particular value in teaching and making explicit the thinking that occurs during problem-solving in occupational contexts, as ‘good problem solvers have internal representations of fundamental principles relevant to their occupational area and these representations are connected to each other and to
broader relevant knowledge in ways which facilitate application to problems’ (Soden, 1993, p. 12).

Rissland (1985) believes it is therefore essential for tutors to create a framework that can help learners organise their learning in the domain in which they are working. Learners need to develop schemas to organise what they are learning, particularly if training is exploration-based, not least to enable the transfer of what they have learned (Hesketh et al., 1989). One important aim for developing expertise should be to get learners to build integrated knowledge representations (Landa, 1984). Teaching should then ‘have a dual focus – the development of thinking skills as well as the achievement of targeted competence’ (Soden, 1993, p. 3).

Soden also signals the usefulness of getting students to engage in concept mapping. This is compatible with earlier research (Schmeck, 1988) showing that those with a deep learning style were likely to organise ideas into networks, which linked different concepts. Soden was also involved in a project to encourage tutors to teach thinking skills to groups of learners taking vocational modules in Scottish initial vocational education and training programmes. The work demonstrated the potential of the approach and that learners’ problem-solving performance could be enhanced.

Learners, therefore, do not only need to learn efficient mental processes, but also when and how to use them in practice. There is, therefore, an emerging consensus on the value of teaching thinking skills to improve problem-solving performance in particular contexts. This teaching, however, should be embedded in and directly linked to solving problems that occur in a particular occupational/situational context. Learners should also be encouraged to articulate their thinking processes and be given opportunities to practise using and reflecting on the relational networks they are developing.

Development of learner independence

The above examples reinforce the fact that, while greater learner independence might be increasingly required as an outcome of programmes designed to promote transferability (BT, 1993), it may be necessary to pay attention to developing learners’ thinking and learning skills if they are to become independent and autonomous learners. In view of this, however, great benefit can be gained from learners being more in control of their own learning (Long, 1990).

A study of training for skill ownership (Hayes et al., 1983) in England and Wales advocated setting up learning programmes which made maximum use of trainees learning how to ‘find out’. They highlighted the need for skill mastery to be reoriented from the organisation to individuals. Companies too have been paying attention to the need to develop learner independence within programmes of work-based learning. One role of trainers is to ensure there are opportunities for reflection within such programmes so that individuals become more effective at acquiring self-learning methods and individual development techniques (Infelise, 1994).

Teamwork and collaborative learning

Changing skill mixes and the development of multiskilled or interdisciplinary teams require skilled workers to work more intensively with others. Hence ability to operate as a member of a team is becoming increasingly important at work, and the support of others at work can frequently be instrumental in individuals’ learning. Infelise highlighted how large companies in France, Germany, Britain and Italy made use of group-based project work, action learning and learning while working in organised work-based learning programmes. There are increasing numbers of examples where these teams became a focus of support for learning because learners were working in teams in the workplace (Infelise, 1994; Dankbaar, 1995).

Knasel and Meed (1994) suggest that the value of teams in their support and encouragement of learners relates to how:

- they provide opportunities for people to share their skills and experience;
- they provide a forum for exchanging information and generating ideas.
Within a supportive team people would more readily give each other advice, guidance and feedback in an unthreatening manner.

Above all a team – with its defined membership, shared sense of purpose, group consciousness and interdependence – can offer the kind of enjoyable, rewarding environment in which learning is more likely to happen (p. 45).

The extent to which this is feasible depends either on work structure in the workplace (Pettigrew et al., 1990; Keep and Mayhew, 1994) or on a readiness to set up activities for learners to learn and work as a group. Encouragement of cooperative learning can be seen as an important strategy for tutors or mentors to adopt. And it is important that learners learn to value collaborative learning and working relationships and recognise the value of the experience of others. Sanches (1992) points to how group-based problem-solving helps learners develop reflective thinking skills and their capacity for self-regulation, as well as increasing the likelihood that they will incorporate and transfer what they have learned.

The value of group projects in developing the skills of working with others has been demonstrated in several contexts (FEU, 1985; Boud et al., 1991), but the problem is that time for group reflection may be seen as ‘soft’ and be sacrificed or severely curtailed in the face of more pressing demands. Soden (1993) highlights that the most effective way of ‘remedying thinking errors is to discuss them with someone else’ (p. 18). Miyake (1986) also showed that during collaborative problem-solving, individuals were more likely to monitor their own thinking processes. Opportunities for working with others should be built into all learning programmes but, where relatively little working and learning with others occurs at work, it may be that use of action plans, developing of individual training projects and learning contracts can emphasise supporting opportunities for working with others in different contexts.

The social context created by a cooperative approach can also enhance the motivation and commitment of learners (Slavin, 1983). Blagg et al. (1994) see guided group work as invaluable not only for developing teamwork skills, but also as ‘an important means of extending learning and understanding. Effective groups provide a cognitive scaffold for others to climb and build on. Ideas, tactics and solutions evolve in an iterative way, enabling individuals to see possibilities which would otherwise have been unavailable to them’ (p. 9). In this way collaborative learning can not only help individuals to transfer their skills, knowledge and understanding between contexts, but also expose individuals to different strategies for making these connections.

Integration of knowledge development with work-related activities: towards effective work-based learning

What we now require are more imaginative ways of integrating knowledge acquisition, problem-solving and key skill development in work-related activities which are relevant to the workplace and meaningful for the learner. Achtenhagen (1994) and Hayes (1992) argue strongly that extended ‘company’ simulations can deliver such integration. Such simulations would have the potential to help learners engage in broader ‘systems thinking’. Kauppi (1998) proposes ‘ventures’ as essential elements in integrating work and learning. ‘Ventures’ or projects, developed jointly between students and employers, provide a ‘holistic and organised grasp of the work as well a new way of thinking and acting in relation to work’ (p. 82). In this respect, there would appear to be stronger alignments with the development of problem-based learning (Boud and Feletti, 1991): it is learner-centred with the integration of subjects and skills into thematic blocks, coupled with the use of learning-oriented work in small groups and with self-directed learning. Such methods would also be compatible with assessment processes that test knowledge generated from analysis of practice (Atkins et al., 1993). Such an approach consequently needs to be aligned with practical and active work-based learning, concerned with current and future performance in a holistic concept for developing
competence and expertise. This in turn will require a more integrated and imaginative concern for learning and assessment in companies and work organisations, drawing on group or project work and problem-based learning.

We have emphasised the need to design learning programmes to develop transferability. Such programmes can take place in a variety of contexts, so it is worth examining what types and combinations of learning context contribute to making work-based learning effective. One key decision will be the location of and balance between development of more specialised expertise and broader vocationally oriented knowledge.

Nieuwenhuis (1991) argues that a single ‘best’ context does not exist, because effective training can make use of a variety of contexts. Instead it may be more appropriate to audit the learning opportunities available and the advantages and disadvantages associated with particular combinations of education, training, employment and community contexts. Knasel and Meed (1994) argue along similar lines: guidance should be given to practitioners to allow them ‘to make informed decisions about the relative strengths and limitations of off-the-job, near-the-job and on-the-job experiences in relation to specific areas of learning and aspects of the learning process’ (p. iii). It is also important to monitor what happens in practice, as ‘work-based learning has the capacity to deliver an exceptionally challenging and rewarding learning environment. However, it can also produce sterility, where challenges are few and a series of mundane experiences lead to little learning’ (Brown, 1992, p. 134).

There are obvious difficulties for some small companies in providing the full range of learning opportunities required for developing a broad occupational competence. Training practitioners interviewed for a study undertaken in the UK strongly believed that organisational culture itself could be influential, whereby ‘the wrong organisational culture would significantly inhibit effective learning’ (Knasel and Meed, 1994, p. 17). In contrast, in an organisation with a long-standing commitment to learning, it may appear natural for workers to learn with the company (Brown and Evans, 1994). Pettigrew et al. (1988) saw the existence of receptive or non-receptive training contexts as influencing the whole approach companies adopted in the development and management of their human resources.

While some small companies are reluctant to get involved in training and development, other relatively small or medium-sized enterprises are highly innovative, particularly if linked to ‘multifirm networking processes’ (Rothwell, 1993). They can offer very rich learning environments. The GOLO model project in Wilhelmshaven in north Germany has brought together networks of enterprises which collectively offer a broad range of learning opportunities for apprentices (Rauner, 1998). In such circumstances, work itself (and the survival of the company) is concerned ‘with extending levels of organisational adaptability and flexibility and with developing new areas of knowledge and technological competence’ (Rhodes and Wield, 1994, p. 168).

The richness of the work/learning environment is such that knowledge and expertise rapidly develop through work, which itself occurs in different contexts. In such circumstances emphasis is given to the possession of: ‘a broad mix of skills ... required to achieve viable levels of flexibility in the development and delivery of products and services, and to sustain viable inter-firm networks’ (ibid., p. 169).

It is interesting to note the considerable expectations which growing companies in central London, UK, had of new employees being able to learn while working from the outset. In a survey of 950 small and medium-sized companies in central London, Rajan et al. (1997) point out that growing companies were likely to be moving towards a performance-driven business culture, with an emphasis upon empowerment, teamwork, lifelong learning and individuals managing their own careers. Graduates were ‘reckoned to have intellectual and behavioural traits more in tune with the main elements of the new culture’ (Rajan et al., 1997, p. 13), and as a consequence ‘the growing companies in our sample have been recruiting a significant number of graduates in recent years in nearly three out of every five companies in our sample, more than 20 %
of the workforce have graduate qualifications’ (Rajan et al., 1997, p. 13). The training methods most frequently used with new graduate recruits were learning by doing, coaching by line managers, interacting with suppliers and customers and carrying out significant work responsibilities.

Employers following this path could be regarded as developing the additional qualifications individuals need, even to a level above that of the ‘skilled worker’, even though these qualifications may not be formally recognised. These developments may be placed primarily within the ‘organisational’ space of company activities rather than within the formal ‘qualificational’ space, although there may be some variation depending on the different approaches adopted by each of the respective individuals, companies or sectors. Indeed, the employment of inexperienced, ‘overqualified’ young people (for example, graduates without appropriate specialist knowledge) could mean that they are overqualified educationally in relation to the specific job requirements, but simultaneously underqualified in their experience (Tessaring, 1998).

Conclusions

The four most important key messages are formulated below as conclusions:

- change of focus from education and training to learning;
- development of increasing learner independence;
- new learning environments and contexts which may combine learning and working;
- individual learners’ participation in knowledge transfer, and both organisational and broader competence development.

A focus on learning

One key message for those charged with designing effective learning programmes is that the prime focus of the interrelationship between education, training and employment needs to be on learning. It will be important to address issues of learner motivation and seek to ensure learners are given opportunities to improve their learning-to-learn skills and that a sufficient range and quality of learning opportunities are available to develop their key or core skills and competences. In particular, if the intention of a learning programme is to help learners develop the ability to transfer skills, knowledge and understanding, then learning contexts are required which draw attention to the significance of skill transfer. Processes of review and critical reflection are pivotal for this. Organised reflection on what has been learned and what needs to be learned in the future can act as a bridge between working and learning, and as a bridge between the skills that are currently required and those that may be needed in future. Such reflective processes are linked to the development of more elaborate thinking processes that underpin the ability to transfer knowledge, skills and understanding.

More generally, learners should be encouraged to make their thinking approaches explicit, through discussion with tutors, coaches or peers. These discussions should examine their approach to tackling problems in their occupational area and the extent to which learners are developing networks or schemas in order to advance their understanding of concepts and relationships in their respective contexts and in the environment as a whole.

Learner independence

Developing learner independence is also an important goal, as learners need to take increasing responsibility for their own continuing learning across a range of settings. Similarly, being able to learn and work in teams has become more significant in various contexts. Learning programmes should thus provide opportunities to develop these skills. One might think that focusing on the process skills underpinning the ability to be effective in different contexts might result in downplaying the development of a substantive occupational knowledge base. However, this is not the case. Rather, developing process skills should ideally be embedded in appropriate occupational
Further, developing a substantive knowledge base is important because it is central to developing domain-specific expertise and forms a platform for continuing learning in the future. We should remember that the ability to master a substantive knowledge base is itself a process skill, which should be valuable in various learning and working contexts, especially in those where organisations require individuals to contribute to processes of knowledge creation, development, transmission and diffusion or adaptation, thus enabling their participation as ‘independent learners’ in work-related communication and skill transfer.

**Learning contexts**

The design of effective learning programmes to develop competences, knowledge and skills needs to draw upon a variety of learning contexts. Designers need to be aware of the strengths and weaknesses associated with particular combinations of education, training and employment contexts. The quality of learning environments in companies can be quite variable, as organisational cultures can either inhibit or promote effective learning. Similarly, patterns of work may be organised in such a way that practice and expertise can be developed further through a productive combination of working and learning for both young people and the adult workforce. To make optimal use of less favourable learning environments at work, it may be necessary to launch or simulate special work-based projects, to promote individual learning contracts or projects and to establish joint action plans between trainers/tutors and learners to enhance and enrich work-based learning and to make it applicable to contexts beyond the immediate work environment.

**Concluding remarks**

Those designing learning programmes in vocational education and training should pay particular and increased attention to promoting skills and competences so that learners are readily able to incorporate and transfer what they have learned into and between a whole range of different contexts. Individuals should be equipped to contribute to processes of individual and organisational knowledge development and utilisation in companies which, if dynamic, are increasingly offering working environments with considerable opportunities for learning while working.

These working and learning environments would include development of learners’ ability to:

- transfer what they have learned between contexts; to strengthen their own knowledge;
- contribute to other’s permanent knowledge creation and development;
- engage in processes of organisational knowledge and competence development.

**References**


Annett; Sparrrow, J. Transfer of Learning and Training, MSC, Sheffield, 1985.

Atkins, M.; Beattie, J.; Dockrell, W. Assessment issues in higher education. Employment Department, Sheffield, 1993.


Cedefop


Dankbaar B. Learning to meet the global challenge. MERIT, Maastricht, 1995.


Friedman, M. De kwaliteit van de praktijkcomponent in het leerlingwezen [The quality of the practical component in apprenticeships]. KUN/ITS, Nijmegen, 1990.


Onstenk, J. Leren en opleiden op de werkvloer [Learning and training in the workplace], SCO-Kohnstamm Institute, Amsterdam, 1994.

Orr, J. Ethnography and organisational learning in pursuit of learning at work. NATO Workshop on
Organisational learning and technological change, no location, 1993.


