The background of the cover is a dark green, textured image of two hands, one larger than the other, with fingers slightly curled. The image is overlaid with a white curved line and a yellow curved line that sweep across the page from the top left towards the bottom right.

Transformation of learning in education and training

EN

Key qualifications revisited

Transformation
of learning
in education and training
Key qualifications revisited

Pekka Kämäräinen, Graham Attwell
and Alan Brown (eds.)

Cedefop Reference series; 37

Luxembourg: Office for Official Publications of the European Communities, 2002

A great deal of additional information on the European Union is available on the Internet.

It can be accessed through the Europa server (<http://europa.eu.int>).

Cataloguing data can be found at the end of this publication.

Luxembourg:

Office for Official Publications of the European Communities, 2002

ISBN 92-896-0130-2

ISSN 1608-7089

©European Centre for the Development of Vocational Training, 2002

All rights reserved.

Designed by Colibri Ltd. - Greece

Printed in Greece

The **European Centre for the Development of Vocational Training** (Cedefop) is the European Union's reference centre for vocational education and training. We provide information on and analyses of vocational education and training systems, policies, research and practice. Cedefop was established in 1975 by Council Regulation (EEC) No 337/75.

Europe 123
GR-570 01 Thessaloniki (Pylea)

Postal address: PO Box 22427
GR-551 02 Thessaloniki

Tel. (30) 310 490 111, Fax (30) 310 490 020

E-mail: info@cedefop.eu.int

Homepage: www.cedefop.eu.int

Interactive website: www.trainingvillage.gr

Acknowledgements

This book is a result of many joint European activities.

Cedefop and the editors wish to thank all those who have participated in these exercises in knowledge development.

Edited by: **Cedefop**

Pekka Kämäräinen, *Project manager*

Published under the responsibility of:

Johan van Rens, *Director*

Stavros Stavrou, *Deputy Director*

Table of contents

	Preface	5
	Summary	6
	List of contributors	10
Part I	From key qualification debates towards a new framework	
Chapter 1	Key qualifications revisited: an introduction <i>Pekka Kämäräinen</i>	
	1.1. Starting points	12
	1.2. How to use the material	15
Chapter 2	Exploring key qualifications: context, theory and practice in Europe <i>Pekka Kämäräinen</i>	
	2.1. Key qualifications in context	20
	2.2. Development of key qualifications in Europe	24
	2.3. Curriculum design and development	29
	2.4. From key qualifications to new basic skills?	33
	2.5. Beyond key qualifications – new perspectives for educational flexibility?	36
	Bibliography	37
Chapter 3	Rethinking key qualifications: towards a new framework <i>Pekka Kämäräinen</i>	
	3.1. A common framework for dialogue	39
	3.2. Coordinates for analysing the general renewal of education, training and learning	41
	3.3. The new framework for key qualifications – polarities between renewal and change	43
	3.4. Towards a dialogical discourse on the renewal of national frameworks for qualifications and curricula	46
	3.5. Key qualifications - challenges for future research and development	47
	3.6. Key qualifications and shaping future-oriented research capacities	50
Part II	Key qualifications and policy development in Europe	
Chapter 4	Regulation and deregulation: the development and modernisation of the German dual system <i>Günter Kutscha</i>	
	4.1. Introduction and keynote themes	53
	4.2. The dual system – developing future employment in the information and service society	55
	4.3. Learning from Europe: alternative structures for modernisation	58
	4.4. Developing a comprehensive system of vocational education and training: flexibility and modernisation	66
	Bibliography	67

Chapter 5	Qualifications, competences and learning environments for the future: analyses of the development of three parallel approaches <i>Tim Oates, Pier Giovanni Bresciani and Bruno Clematide</i>	
	5.1. Key skills/ Key qualifications: a common policy response	70
	5.2. Key skills/ Key qualifications in the EU Member States	73
	5.3. Developing and implementing key skills/ key qualifications	77
	5.4. Common concerns and future development	83
	Bibliography	85
Chapter 6	A Dutch approach to promoting key qualifications: reflections on 'core problems' as a support for curriculum development <i>Jeroen Onstenk and Alan Brown</i>	
	6.1. Introduction	87
	6.2. Core skills, key qualifications and broad occupational competences	89
	6.3. Core problems: activities, problems and dilemmas of an occupation	94
	6.4. Core problems in the curriculum	96
	6.5. Conclusions	100
	Bibliography	101
Part III	Key qualifications: issues and challenges for developing vocational education and training	
Chapter 7	Changing perspectives on information and communication technologies in the context of education and training <i>Graham Attwell, Nick Boreham, Pekka Kämäräinen and Norma Lammont</i>	
	7.1. Introduction	105
	7.2. Changing assumptions on the impact of ICT and on the consequences for education and training	106
	7.3. The impact of ICT on work organisation	108
	7.4. Informatisation	111
	7.5. Skill needs arising from the introduction of ICT into the workplace	113
	7.6. Changing perspectives on the use and role of ICT in education and training	117
	Bibliography	125
Chapter 8	Rethinking the role of the assessment of non-formal learning <i>Jens Bjørnåvold and Alan Brown</i>	
	8.1. Introduction	128
	8.2. A new direction?	129
	8.3. Why have new assessment methodologies been developed?	142
	8.4. Combining different forms of assessment to answer new questions?	146
	Bibliography	148
Chapter 9	Developing a regional dialogue on vocational education and training <i>Ludger Deitmer and Peter Gerds</i>	
	9.1. Introduction	150
	9.2. The importance of the region as a new platform for VET reform in Germany	152

9.3. Elements of regional VET dialogue	154
9.4. Insights into regional VET dialogue in practice	160
9.5. Guidelines for the implementation of regional VET dialogue	164
Bibliography	165
Part IV Key qualifications and the role of work-related learning in vocational education and training	
Chapter 10 Interpretation of the relevance of work experience for future-oriented educational strategies <i>Toni Griffiths and Fernando Marhuenda</i>	
10.1. Introduction	169
10.2. The European context	174
10.3. Work experience, work process knowledge and a connective model of work experience for the future	177
10.4. Implications for future-oriented educational strategies	181
Bibliography	187
Chapter 11 Bringing work-related learning back to authentic work contexts <i>Peter Dehnbostel</i>	
11.1. Revival of learning in the work context	190
11.2. The growing significance of informal learning	192
11.3. Learning bays as an example of integrating informal and intentional learning	194
11.4. New learning approaches and forms result in a new learning culture	196
11.5. Research proposals and urgent development tasks	198
Bibliography	201
Chapter 12 Transforming vocational curricula with work process knowledge <i>Nick Boreham</i>	
12.1. Changes in the European workplace	203
12.2. Work process knowledge	204
12.3. Work process –structured curriculum development	208
12.4. Challenges for research	210
Bibliography	212
Part V Key qualifications, social shaping and learning in organisational contexts	
Chapter 13 Learning in a social and systemic context - the learning organisation <i>Barry Nyhan and Mike Kelleher</i>	
13.1. Introduction	213
13.2. Contrasting views about the learning organisation concept	213
13.3. Exploring some concepts underpinning learning organisation theory	216
13.4. Meeting organisational and individual needs in a balanced and integrated way	217
13.5. Conclusions	221
Bibliography	222

Chapter 14	The social shaping of work, technology and organisations as a guiding principle for vocational education and training <i>Gerald Heidegger and Graham Attwell</i>	
14.1.	Introduction	224
14.2.	Earlier debates on 'industrial culture' and 'social shaping'	225
14.3.	The 'shaping approach' as a means of developing new curricular orientation	227
14.4.	Social shaping and the perspective of an open future	230
14.5.	Social shaping as a bridge between vocational learning and working life	232
14.6.	Linking VET to HRD by means of the shaping approach	234
14.7.	Conclusions	237
	Bibliography	238
Chapter 15	Promoting learning in and for organisational contexts - the development of key qualifications/ key competences <i>Barry Nyhan</i>	
15.1.	Introduction	242
15.2.	The nature of key qualifications/ key competences	244
15.3.	Integration of different competences	246
15.4.	Integrating working and learning – the 'learning organisation' concept	247
15.5.	Learning processes to develop competences	248
15.6.	Conclusions	252
	Bibliography	254

Preface

This publication brings into broader European discussion the work Cedefop has undertaken on 'key qualifications and curricular renewal of vocational education and training'. The focus is on the transformation of learning within education, training and working life. Cedefop has examined different European approaches to 'key qualifications' and explored the possibility of reinterpreting them to contribute to current educational debates.

Cedefop has not worked alone or within a policy vacuum. Instead, Cedefop has created active links with closely related transnational projects within different European cooperation programmes. In parallel, Cedefop has provided platforms and support for cross-cultural exchanges on current issues involved in deepening European cooperation. Further, Cedefop has tried to link the groundwork to new issues in European and national policy developments.

European policy debates have, since the Lisbon Summit of March 2000, put new emphasis on linking education and training with movement towards creating an advanced knowledge society. This has been prompted by discussions on skill shortages and skill gaps displayed in new innovative sectors and occupational areas. It is clear the gaps are not only related to specialised skills in information and communication technologies, but also to 'soft skills'. This resulted in the current discussion on how best to promote 'basic skills' through lifelong learning.

Because of these developments this new Cedefop publication provides an interpretative web that links different themes and action contexts to one another. The new framework for 'key qualifications' provides general ideas of analysis for modernising education, training and learning. Other sections provide themes and action contexts for examination. The book is essentially a contribution to critical rethinking and knowledge development across different areas of research and development work. Further, the book provides an open learning environment equally for systematic reading or for selective use.

With these preliminary remarks Cedefop invites readers to start their own 'learning exercises' in the learning environment provided by this book.

Stavros Stavrou
Deputy Director

Pekka Kämäräinen
Project manager

Summary

The key themes of the book

This book provides a new perspective on European educational debates on the theme of 'key qualifications'. This theme has been influential from the earlier debates on educational flexibility in the 1970s and throughout the educational reforms of 1980s and 1990s. During this period several parallel concepts were developed to incorporate the main ideas into different education and training cultures and educational action contexts. Gradually, the idea of promoting 'key qualifications', 'key competences' or 'key skills' was included in mainstream educational policies. However, in many cases the pattern for integrating key qualifications or key competences or key skills reduced the innovative potential of the developments. The innovative concepts were taken as labels for specific curriculum contents and for related modes of delivery or for corresponding assessment procedures.

Such reductionist understanding of key qualifications has been challenged in recent educational debates. In many respects current educational discussions are overshadowed by concerns about skill gaps and skill shortages. To some extent these expressions refer to specific needs for specific skills and competences in the context of information and communication technologies (ICT). But alongside these concerns there is a parallel demand for further capability to link ICT-related prospects to context-specific learning and innovations in other domains. Therefore, there seems to be a demand for new educational solutions that promote connectivity and interactivity between different elements of vocational and professional learning.

The concerns that have been expressed in the educational debate have been given a high priority at different policy levels. At the level of European Union in particular there has been a new emphasis on developing common European responses and on linking different fields of policy to each other in promoting new innovative approaches. This emphasis has been expressed very strongly in the conclusions of the Lisbon Summit (in March 2000) and in diverse follow-up measures. It is worthwhile to note that current concerns have been taken as challenges for several fields of policy development and not merely as internal matters for educational policies.

One of the themes highlighted in this context is that of developing a common European approach for promoting 'new basic skills'. The follow-up processes have been challenged to develop an educational interpretation of the concept and to link it to different traditions of curriculum development. In this context it appears that this element of the broader innovative approach is facing the risk of educational fragmentation. On the one hand, it appears that discussion on the concept seems to be developing alternative lists of 'new basic skills' in a similar way that previous debates defined key qualifications, key competences or key skills. On the other hand, the discussion on linking 'new basic skills' to curricula tends to lead to a similar diversity in approach to that of the earlier debate on key qualifications.

The aims and the background of the book

This book aims to build a bridge from the earlier debates on key qualifications to current issues in developing policies, curricula and learning environments. In this respect the book explores the heritage of the earlier debates on key qualifications. It links the concept of key qualifications to current concerns in policy debates and to research themes that open new prospects for developing innovative vocational education and training provision.

The book is based on the conceptual work that Cedefop has undertaken in recent years in the project 'Key qualifications and curricular renewal of vocational education and training'. The project has developed comparative tools for analysing parallel national approaches and their implications for curriculum development. On the basis of these analyses the project has developed a new framework for specifying the role of key qualifications as a context in which to facilitate the transformation of learning in education, training and working life.

In addition to the conceptual groundwork the project has stimulated exchanges and collaboration among several European cooperation projects that addressed more specific themes. Several contributions in this book arise from projects that have been funded by major European cooperation programmes (the Fourth Framework Programme on Research and its sub-programme on targeted socio-economic research or the action programme Leonardo da Vinci). Some of the contributions link the theme of 'key qualifications' to other Cedefop projects that do not immediately deal with curriculum development (e.g. those dealing with issues of organisational learning and non-formal learning). Some of the contributions do not arise directly from European projects but they discuss key issues in developing vocational education and training from the perspective of cross-cultural exchanges and knowledge transfer.

How can the theme ‘key qualifications’ be developed further?

The main thrust of the studies is that concepts like ‘key qualifications’ should be interpreted as ‘relational constructs’ (not as separate content areas). They refer to tensions between the renewal of traditional core qualifications and the emergence of new qualifications (or non-formalised competences). In this context the function of key qualifications is to develop capacity for renewal and change. This requires learning processes that are based on integrative learning spaces, reflective knowledge processing, conversion of content-related learning into context-oriented learning and embedding of ICT-related learning into vocational action contexts.

This reinterpretation of key qualifications is based on a shift from linear thinking to interactive thinking in curriculum development. Linear approaches try to identify key qualifications via skill needs analysis and specify them first at the level of qualification frameworks. Then, the role of curriculum development and implementation is to find the solutions for delivery. Interactive approaches perceive curriculum processes, shaping of main frameworks and investigation of new needs as interactive, and mutually supporting, factors of educational development.

The main contents of the book

The book consists of five parts, each part containing three chapters. The main issues of each part and the specific accents of each contribution are summarised below.

The first part of the book provides an overview of different approaches to ‘key qualifications’ in Europe. It provides a critical reexamination of the content of parallel concepts and draws attention to the role of connectivity and interactivity. It develops an open coordination framework for analysing the general modernisation of curricula in education and training. Furthermore, it develops a more specific framework for analysing the function of key qualifications in the context of renewal and change of vocational learning. In this context key qualifications are specified as qualifications that provide the capacity to respond to challenges for qualitative renewal or contextual reorientation of vocational education and training.

The second part provides examples of cross-cultural knowledge transfer at the level of policy development in Europe. The first contribution provides insights into the debate on pluralisation of the vocational education and training system in Germany and demonstrates how comparative analyses can be used in such a context. The second contribution illustrates the development of a comparative view between three national approaches with somewhat different educational action contexts. The third contribution presents the development of the Dutch approach to key qualifications between different cultural influences. The chapter also links the approach with the analysis of occupational core problems as a method for

supporting vocational curriculum development.

The third part explores new issues for educational policies and practical development initiatives. In this respect the first contribution analyses shifts of emphasis that have occurred in educational debates that have linked information and communication technologies to education and training. The second contribution analyses different approaches to the assessment of non-formal learning in the context of current European debates. The third contribution provides a German input to a broader European discussion concerning the role of regional dialogue on vocational education and training.

The fourth part presents new insights into the role of work-related learning in the context of vocational curricula. The first contribution develops a comparative framework for analysing different patterns to link work experience placements to vocational curricula. The second contribution analyses the recent trend in Germany to integrate work-related learning (that was detached into separate workshops) back into authentic work contexts. The third contribution presents analyses on the theme of 'work process knowledge' in modern organisations. In this context the chapter reflects upon the potential and limits of 'work process knowledge' as a guiding principle for vocational curriculum development.

The fifth part links the discussion on key qualifications to the development of learning cultures within working life. The first contribution presents an overview of current debates on the idea of 'learning organisations'. The second contribution highlights the parallel idea of the 'social shaping of work, technology and work environment' as a bridging principle between educational and organisational innovations. The third contribution presents case studies that illustrate how some aspects of key qualifications can be promoted in learning arrangements that are linked to organisational contexts.

How to use this book

The book has been prepared as a selection of research-based contributions that discuss current issues in curriculum theory, policy development and innovations in the field of vocational education and training. The book has not been designed as a handbook that provides recipes, recommendations and models for 'good practice'. Instead, it provides support for European learning exercises that link research themes and policy issues to each other and to the main theme.

Throughout, the book highlights attempts to facilitate the transformation of learning cultures in education, training and working life. In this context the new framework on key qualifications provides core structures for developing curricula and learning environments with a perspective on renewal and change. At the same time, the framework provides coordinates for linking the more specific research themes and policy issues to the discussion of key qualifications and new perspectives for vocational curriculum development.

List of Contributors

Graham Attwell

Director, Pontydysgu Research
Centre and The Knownet Ltd,
Pontypridd, Wales
www.theknownet.com

Jens Bjørnåvold

Senior researcher,
European Commission,
DG Education and Culture
(seconded from Cedefop)

Prof. Nick Boreham

Professor, University of Stirling,
Institute of Education,
(formerly University of Manchester)
[www.stir.ac.uk/departments/
humansciences/education/htm](http://www.stir.ac.uk/departments/humansciences/education/htm)

Dr Pier Giovanni Bresciani

Senior researcher,
Studio Meta i Associati, Bologna

Dr Alan Brown

Senior researcher,
University of Warwick,
Institute for Employment Research
www.warwick.ac.uk/ier

Bruno Clematide

Director, Kubix - Research and
Development of Human
Resources, Copenhagen
www.kubix.dk

Prof. Peter Dehnbostel

Professor, Universität
der Bundeswehr, Hamburg,
Fachbereich Pädagogik
[www.unibw-hamburg.de/PWEB/
paebap/framezwei.html](http://www.unibw-hamburg.de/PWEB/paebap/framezwei.html)

Dr Ludger Deitmer

Senior researcher, Universität
Bremen, Institut Technik and Bildung
(BLK-Programmträger)
[www.itb.uni-bremen.de/projekte/
blk/programmtraeger.htm](http://www.itb.uni-bremen.de/projekte/blk/programmtraeger.htm)

Prof. Peter Gerds

Professor, Universität Bremen,
Institut Technik and Bildung
(BLK-Programmträger)
[www.itb.uni-bremen.de/projekte/
blk/programmtraeger.htm](http://www.itb.uni-bremen.de/projekte/blk/programmtraeger.htm)

Toni Griffiths

Director of Education and
Professional Development,
University College London
<http://www.ucl.ac.uk/eisd/epdhome.html>

Prof. Gerald Heidegger

Professor, Universität Flensburg,
Berufsbildungsinstitut Arbeit
und Technik
[www.biat.uni-flensburg.de/ariat.www/
index_mitarbeiter.htm](http://www.biat.uni-flensburg.de/ariat.www/index_mitarbeiter.htm)

Dr Mike Kelleher

Director, Learning Futures Ltd.,
General Secretary of
European Consortium for the Learning
Organisation (ECLO)
www.eclo.org

Prof. Günter Kutscha

Professor, Gerhard-Mercator-
Universität, Duisburg
Fachgebiet Berufspädagogik/
Berufsbildungsforschung
[www.uni-duisburg.de/FB2/BERU/
navi/personal_f.htm](http://www.uni-duisburg.de/FB2/BERU/navi/personal_f.htm)

Pekka Kämäräinen

Project manager, Cedefop -
European Centre for the Development
of Vocational Training, Thessaloniki,
Greece
www.trainingvillage.gr

Prof. Fernando Marhuenda

Associate professor, Universitat
de València, Departament de Didàctica
i Organització Escolar
<http://www.uv.es/didorg/>

Barry Nyhan

Project manager, Cedefop -
European Centre for the Development
of Vocational Training, Thessaloniki,
Greece
www.trainingvillage.gr

Dr Tim Oates

Head of research, Qualifications and
Curriculum Authority QCA (formerly
SCAA and NCVQ), London
www.qca.uk.org

Dr Jeroen Onstenk

Senior project manager, CINOP,
Centrum voor Innovatie van
Opleidingen, s' Hertogenbosch, the
Netherlands (formerly senior
researcher, University of Amsterdam)
www.cinop.nl

CHAPTER 1

Key qualifications revisited: an introduction

Pekka Kämäräinen

1.1. Starting points

This book develops a new interpretation of European debates on key qualifications and their contribution to future-oriented learning in vocational education and training. Debates on key qualifications have been characterised by competing perspectives and different terminologies (e.g. 'key skills', 'key competences' and 'key qualifications'). The book draws on the strengths of these different approaches as a learning exercise based on a reflection on current European research. The contributions relate the theme of key qualifications to current challenges in educational policy development, curriculum initiatives and accompanying research. Given that the key qualifications debate was at its most intense in the 1980s and early 1990s, it is worth considering why we wish to revisit the theme. This involves an examination of some of the fundamental questions linked to key qualifications.

1.1.1. Why is the theme of 'key qualifications' worth discussing?

Different approaches to key qualifications promoted flexibility within the main frameworks of vocational qualifications and curriculum development. The main aim of these approaches was to facilitate the renewal of vocational qualifications or the uses of work-related competences in organisational contexts, or to develop the capacity to acquire new qualifications and competences. The need to promote such capacities for renewal and change was acknowledged clearly in the discussion on educational flexibility in the early 1970s. Since then, different ideas have emerged in the different stages of debate on educational flexibility. Some have been incorporated into formal frameworks. Others have been used as working concepts or as analytical tools.

To a certain extent, key qualifications have been introduced as remedial or catalytic concepts to stimulate flexibility in domain-specific vocational learning or learning within organisational contexts. Much of the innovative potential of key qualifications has been absorbed by newer approaches to the renewal of education and training systems and to training by educational institutions and training organisations. The issue of key qualifications may appear almost obsolete but

recent discussion on skill shortages and gaps in information and communication technologies (ICT), and the need to promote the development of ICT-related competences, has led to a revival of these debates. Ideas such as 'new basic skills' are raising issues from earlier debates with similar questions on the definition of 'new basic skills' and their curricular implementation also appearing.

1.1.2. What can we learn from cultural diversity?

The book discusses the potential and the limitations of different approaches to key qualifications development to find a basis for mutual learning. It looks at recent European projects and developments as examples of how such cross-cultural learning can be organised. The aim of the book is neither to launch a 'best practice' competition between different education and training cultures, nor to introduce a European model to integrate current national approaches, but rather to discuss the potential and limitations of cross-cultural innovation transfer.

1.1.3. How can we develop the theme further?

The main thrust of the studies is that concepts like 'key qualifications' should be interpreted as 'relational constructs' (and not as separate content areas). They refer to tensions between the renewal of traditional core qualifications and emergence of new qualifications (or non-formalised competences). In this context the function of key qualifications is to develop capacity for renewal and change. This requires learning processes that are based on integrative learning spaces, reflective knowledge processing, conversion of content-related learning into context-oriented learning and embedding of ICT-related learning into the vocational action contexts.

This reinterpretation of key qualifications is based on a shift from linear thinking to interactive thinking in curriculum development. Linear approaches try to identify key qualifications via skill needs analysis and specify them first at the level of qualification frameworks. Then, the role of curriculum development and implementation is to find the solutions for delivery. Interactive approaches perceive curriculum processes, shaping of main frameworks and investigation of new needs as interactive, and mutually shaping, factors of educational development.

1.1.4. What role can new curriculum development initiatives play?

The book highlights the role of curriculum development in the renewal of vocational education and training. It highlights different opportunities in creating social space for innovation and linking these as instruments of educational planning to innovative practice.

However, not all the contributions focus on curriculum development and those that do, may not necessarily discuss specific examples. The reason is that the book relates key qualifications to cultural changes that provide new prospects for curriculum development and introduce new concepts within curriculum design.

These changes involve inter-institutional relations and new partnership concepts between educational establishments and work organisations. This requires the analysis of new developments at the level of system development and within action contexts involving inter-institutional issues, regional issues or those concerning the introduction of ICT.

1.1.5. What can we learn from system-level developments and from action contexts?

Current developments aimed at renewing education and training systems focus on new power structures and changing patterns of vocational learning. Traditional systems and institutions have become more flexible and there are more opportunities for cross-cultural learning. Traditional institutions have been challenged to develop new working partnerships and new functions in promoting alternative modes of learning. The social space for innovation in education and training has become more complex. Developments within intermediate action contexts may link different initiatives that focus on different policy fields in a more synergetic way. Knowledge sharing and networking among such initiatives may have implications for policy development in different fields.

1.1.6. Where does the material come from?

The book is divided into five parts. The first part is written by Pekka Kämäräinen who is the coordinator of the Cedefop key qualifications project. It provides the conceptual background for discussing the theme and develops a new integrative framework for key qualifications. This discussion is related to cultural change within education and training and to conceptual rethinking within curriculum development. The second and third parts address the development of vocational education and training systems, cross-cultural knowledge transfer and modernisation of education and training systems. The fourth and fifth parts discuss new developments within work-related learning, particularly within vocational education and training and changing perspectives on learning in, and for, organisational contexts.

Most of the contributions derive from European research projects based on cross-cultural cooperation, some reflecting the immediate work while others reflect ideas and learning experiences. Some contributions derive from the work of Cedefop projects on ICT-related competences and assessment of non-formal learning. Others develop ideas on how to promote cross-cultural knowledge transfer in different European contexts. The Cedefop key qualifications project has provided a common platform and an interpretative framework for these contributions.

1.2. How to use the material

The aim of the book is to construct a learning environment to examine the contribution of key qualifications to current issues in vocational education and training. The five parts are the building blocks of this learning environment, each having its own task in building a bridge between theory and practice and offering study in a systematic way or as a basis for selective exploration. Readers are invited to find their own paths through the material and to new insights into European key qualifications debates.

Part 1: From key qualifications debates towards a new framework

The first part provides a contextual overview. Pekka Kämäräinen discusses the role of different key qualifications concepts in European educational debates and in measures to promote educational flexibility. He analyses the diversity of conceptual approaches within different educational cultures, provides an analysis of the development of the theme of key qualifications at European level and reflects on the role of key qualifications in the light of new developments and emerging challenges. The following key questions arise from the related chapters:

- what is the background of different European approaches to the promotion of educational flexibility?
- how can the ideas of key qualifications be analysed in a way that promotes mutual understanding and learning?
- what kind of models of European cooperation and discourse can promote the theme of key qualifications, bearing in mind recent progress in knowledge sharing and collaboration across European projects and networks?
- can the development of a new key qualifications framework be used to inform the debates on 'new basic skills' and provide a basis for common European discussions on educational flexibility?

Part 2: Key qualifications and policy development in Europe

The second part looks at the role of cross-cultural comparisons and mutual learning in analysing national developments in vocational education and training systems.

In spite of the different starting points, all three contributions in this section focus on 'learning from each other' through European cooperation and national policy development. The fourth chapter, by Günter Kutscha, analyses the prospects for developing the German dual system on the basis of pluralisation and opening the structure to influences from other European VET cultures. The fifth chapter, by Tim Oates, Pier Giovanni Bresciani and Bruno Clematide, presents parallel analyses of the development of ideas of key qualifications and development strategies in the United Kingdom, Italy and Denmark. The sixth chapter, by Jeroen Onstenk and Alan Brown, analyses the impact of different European key qualifications approaches on

the development of Dutch policies to promote core competences and examines the transferability of the Dutch approach.

The key questions arising from chapter 4 are:

- to what extent can the factors behind the success of one vocational education and training system become barriers to modernisation in different vocational education and training cultures?
- what kind of cultural impediments are there to opening a national VET system to new influences from other European cultures?
- to what extent can the new framework of key qualifications serve as a basis for discussing the challenges for modernisation and flexibility of VET?

The key questions for chapter 5 are:

- to what extent can the development of the British idea of key skills (or core skills) be related to other European ideas of key qualifications or key competences?
- what are the systemic characteristics of the more decentralised Italian and Danish approaches to promoting curriculum revision and social innovation?
- what kind of common ideas for the future-oriented shaping of vocational learning environments are emerging from the three national systems?

The key questions for chapter 6 are:

- in what ways have German and UK influences been reflected in Dutch key qualifications debates?
- to what extent can the new emphasis on core competences, core problems and core assignments be interpreted as an 'open coordination method' combining needs analysis, structural development and curriculum redesign?
- to what extent can the core problems approach be developed further on the basis of the new framework of key qualifications?

Part 3: Key qualifications: issues and challenges for developing vocational education and training

The third part discusses the more specific challenges for modernisation and flexibility in developing vocational education and training policy and provision. These different challenges are related to the general theme of key qualifications in that they highlight the significance of contextual and organic learning as a perspective for future-oriented vocational education and training. The seventh chapter, by Graham Attwell, Nick Boreham, Pekka Kämäräinen and Norma Lammont, analyses the changing perspectives for the use of information and communication technologies in education and contrasts new working environments and approaches to training specialists for ICT-related occupations. The eighth chapter, by Jens Bjørnåvold and Alan Brown, discusses different European approaches to the identification, assessment and recognition of non-formal learning. The ninth chapter, by Ludger Deitmer and Peter Gerds, explores the possibility of linking regional VET dialogues to new programme-based frameworks for promoting regional educational innovation.

The key questions for chapter 7 are:

- to what extent is the discussion on the educational implications of ICT moving on from the previous linear anticipation of the impact of skill shortages?
- to what extent can the analyses of the impact of ICT on working environments be considered as evidence for the need for pluralistic education and training models?
- to what extent is it possible to develop common quality awareness across different models for education and training of ICT specialists?

The key questions for chapter 8 are:

- what basic approaches have been developed for the assessment of non-formal learning and what links are there to key qualifications?
- what driving forces and contradictions have emerged in such approaches?
- in what way have such approaches contributed to the recent discussion on the educational and societal functions of assessment?

The key questions for chapter 9 are:

- what societal and educational reasons can be put forward for the new regional emphasis in vocational education and training?
- what kind of working agendas and interfaces are emerging for regional dialogue on vocational education and training?
- what conceptual tools and frameworks are emerging to support critical self-assessment within, and monitoring of, regional innovation networks?

Part 4: Key qualifications and the role of work-related learning in vocational education and training

The fourth part discusses the role of workplace-based and work-related learning in the context of vocational curriculum development. The discussion starts with an examination of different models for assessing the educational relevance of work experience and the integration of work-related learning in authentic work environments. The concept of 'work process knowledge' is discussed as an interpretative construct for analysing the character of work-related learning. The theme of key qualifications provides a perspective for deepening the discussion and relating the explorations to each other. Chapter 10, by Toni Griffiths and Fernando Marhuenda, presents a European cooperation project in 'Work experience as an educational strategy for the 21st century'. The core of the approach is a typology for analysing different educational approaches to integrating work experience in the curriculum. Chapter 11, by Peter Dehnpostel presents reflections and models for introducing work-related learning in authentic work environments, and the role of the research and development activities that accompany such measures. Chapter 12, by Nick Boreham is based on an analysis of empirical research undertaken as part of the European 'Work process knowledge' network. The chapter highlights the holistic and organic character of work process knowledge, while at the same time pointing to the limits of the concept for vocational curriculum development.

The key questions for chapter 10 are:

- what is the educational and societal background to the theme of work experience and educational policy?
- what theoretical constructs can promote critical rethinking on the educational relevance of work-related learning?
- how can different curricular models and initiatives be analysed by a common European framework?

The key questions for chapter 11 are:

- what societal and educational factors resulted in the disconnection of work-related learning from authentic work activities and what is behind the current move to re-integrate such learning in modern work environments?
- what specific organisational and curricular aspects are related to the shaping of 'learning bays' as integrative learning venues that link work organisations and vocational education and training providers?
- what challenges for further research and development have resulted from the current pilot measures to link work-related learning to authentic work environments?

The key questions for chapter 12 are:

- what are the main characteristics of work process knowledge applied in working life and organisational contexts?
- what conceptual evolution can be seen in the interrelations between organisational development approaches (from Taylorism to modern management concepts) and curricular approaches to promote work process knowledge?
- what are the limitations on using work process knowledge as a guiding principle for developing vocational learning processes?

Part 5: Key qualifications, social shaping and learning in organisational contexts

The fifth part also focuses on learning in working life but shifts the emphasis from work-related learning environments to a wider discussion on learning organisations and organisational learning. The discussion starts with a general overview of debates on the learning organisation, and then explores the idea of 'social shaping' as a bridge between vocational education and training and human resource development. Case studies are presented to demonstrate how learning is promoted in organisational contexts. These demonstrate the close relationship between educational debates on key qualifications and human resources development and suggest that 'social shaping' is a significant factor.

Chapter 13, by Barry Nyhan and Michael Kelleher, presents an overview of the different theoretical views and conceptual approaches that are influential in the current debate on learning organisations. These analyses derive from the work of the European Consortium of Learning Organisations and from European projects and literature studies. Chapter 14 by Gerald Heidegger and Graham Attwell, studies

the development of the idea of 'social shaping' within social innovations in working life and vocational curriculum development. Chapter 15, by Barry Nyhan, presents case studies of patterns of organisational learning and vocational training in different European countries.

The key questions for chapter 13 are:

- what visions of learning opportunities within organisational contexts have been presented in the debates on learning organisations?
- what views about learning have been highlighted in these contributions?
- what links and contradictions between individual and organisational interests on learning within organisational contexts have been brought into the discussion?

The key questions for chapter 14 are:

- what is the conceptual background to the idea of 'social shaping' in the context of social innovations in working life?
- what role can be played by 'social shaping' in proactive curriculum development and in educating future-oriented vocational education and training professionals?
- what type of bridging role is possible for 'social shaping' between innovative learning models and innovative practice in working life?

The key questions for chapter 15 are:

- to what extent can key qualifications be used as a framework for interpreting competence development through models for organisational learning analysed in the case studies?
- in what way can the case studies illustrate patterns for implementing the general principles of learning organisations and 'social shaping'?
- what measures have been taken to consolidate learning in organisational contexts and to ensure a better capitalisation of the outcomes?

CHAPTER 2

Exploring key qualifications: context, theory and practice in Europe

Pekka Kämäräinen

2.1. Key qualifications in context

2.1.1. Introduction

With its origins in the 1960s, the idea of key qualifications is to promote flexibility to respond to new technical and organisational challenges – both in the renewal of vocational qualifications themselves and in promoting the individual capacity to acquire new skills and competences. The capacity for acquiring new skills and competences has been central to the lifelong learning debate of the last decade.

Discussion on flexibility has taken place across Europe, with key qualifications featuring highly, yet the approaches to key qualifications have diverged. In some countries key qualifications have been incorporated into formal qualification frameworks, while in others they are seen as a tool for analysis or curriculum design. Key qualifications have been used as a catalyst to promote greater flexibility in curricula and in education and training systems. Paradoxically, as new patterns of organisation and learning have emerged, the issue of key qualifications might seem to be redundant. Yet recent high profile debates over skill shortages for the computer industry and skills gaps in the use of information and communication technologies has promoted a new wave of discussions over what ‘key’ skills are required today and how they should be acquired. These skills and competences were named by European leaders at the Lisbon Summit in 2000 as the ‘new basic skills’ needed for work and life in 21st century Europe. However, the task of defining new basic skills and of developing curriculum frameworks for their acquisition has proved as problematic as were earlier European efforts to agree on key qualifications. Given these developments, consideration of the issues involved in key qualifications development may be both timely and informative.

This book does not attempt to define key qualifications or to set out best practice exemplars for their acquisition. Neither is it my intention to attempt to introduce a European model to integrate the current national approaches. Instead I look at the different approaches – and their potential and limitations – to find a basis for discourse and mutual learning.

There are four major focuses for this study. The first is to try to understand the contexts in which key qualifications are being developed. This means examining the dynamics of change – both within education and training – and more critically between education and training and the wider social and cultural contexts with which education and training interacts. Key qualifications play a central role in mediating the areas of work, technology and education. The second focus is the relationship of key qualifications to curriculum design and development in the reform and renewal of vocational education and training, examining the potential for creating social space for innovation in educational planning and practice. The third is an examination of key qualifications in a European context to find ways of establishing mutual understandings and meanings as a context for discourse and exchange. Such platforms are needed to enable and promote mutual learning and cross-cultural exchange. The fourth focus is upon the development of new models that locate key qualifications within different cultural and educational settings. This will set and define tools and a working agenda for the future development of key qualifications and the reform and modernisation of education and training in Europe.

This is not an easy undertaking. It involves an examination both of the historical development of education and training and of the dynamics and pressures for change over time. It also requires a more theoretical examination of the underpinning ideas and concepts that have led to the development of key qualifications. It is not the intention of the study to answer the questions and contradictions that face educational policy makers and planners in developing new frameworks for skills and competence. Rather it is my hope that we can create a shared working and learning environment to deal with these questions and facilitate researchers and practitioners alike in gaining new insights and understandings in the European debates around key qualifications.

2.1.2. **Work, technology and education**

In the post second world war period, the acquisition of skills and knowledge was a reasonably stable and unproblematic process from a societal point of view. In most countries university provided an elite education for administrators, researchers and managers. Apprenticeship and other forms of vocational education and training provided a route to skilled work in crafts and industry whilst basic education was regarded as adequate for the needs of the semi-skilled and unskilled work force. Given the relative stability of production processes and the slower rates of technical change, processes of knowledge updating could be absorbed within the workplace. Vocational qualifications were underpinned by a technical rationality (Edwards, 1993) based on the idea of a fixed and determinate body of knowledge to provide the basis for skilled technical work. The major debates in education and training were related to providing enhanced opportunities for social mobility through the extension of basic education rather than in providing new skills and competences.

The starting point for analyses of changing assumptions on the changing role of work and the consequences for education and training can be traced to the debates on automation in the late 1960s and on changing skill requirements in the 1970s. This debate was taken on by Kern and Schumann (1970), in particular, who drew attention to the polarisation of qualifications and opportunities between privileged, skilled workers and lower or unskilled workers. The more highly qualified workers would benefit from increasing complexity, autonomy and creativity in their work while the low skilled and unqualified would be faced with limited opportunities and poorly paid, unstable work. This opened up the prospect of a polarisation of educational opportunity with more resources being diverted to educating the new elite. At the same time other researchers pointed to the possibilities for enriching the content of work and for empowering skilled workers as key actors who control the work process (e.g. *Projektgruppe Automation und Qualifikation*, 1978). Such a scenario was based on new approaches to organisational development and education and training to benefit and exploit the potential for human-machine interfaces.

As well as industrial sociologists (like Kern and Schumann, 1984) labour market economists (like Piore and Sabel, 1984) put the emphasis on 'systemic rationalisation' and on 'flexible specialisation' as factors contributing to the pursuit of competitiveness. Thus, earlier debates that had focused on task-related rationalisation strategies (and task-related skill requirements or qualification requirements) gave way to new approaches that focused on the systemic functioning of production units and of organisational units. By this stage, the global notion of 'automation' had paved the way for a more differentiated perception of the implementation of new technologies and production processes. In addition, businesses began to divide work between those involved in central activities, based on a core workforce, and other activities out-sourced to contractors. In different training cultures, the idea of 'flexible specialisation' was interpreted either as an argument to strengthen the provision of modern apprenticeship or as an argument for company-specific training.

From the early 1990s onwards, these analyses were enriched with new observations on the 'network-based economy' (Castells, 1989) and on 'globalising tendencies' (Giddens, 1990). Network-based economies were said to lead to systemic rationalisation whereas globalising tendencies were leading to increasing segmentation. These debates raised new questions of knowledge and knowledge management as factors in competitiveness (Attwell and Hughes, 2000). Gradually, these newer debates gave rise to efforts to formulate new synthetic frameworks (e.g. the 'information society', 'knowledge-based society', and 'learning economy'). The different assumptions around the development of technologies and work organisation have had profound consequences for the evolution of policies and strategies for education and training and for competence development. Whilst all agreed on the need for modernisation and reform, the different strategies put forward paralleled the debates over the future of work.

Initial debates on the future of work from the 1960s onwards were closely linked to proactive educational policies leading to the expansion of higher education, the upgrading of vocational higher education provision and alternative pathways for access to higher education. Education and training reforms aimed to respond to forecasts of future skills needs and the demand for new qualifications. The anticipation of future needs implied a general need to upgrade the level of qualifications and reflected specific concerns about the prospects for those with relatively few skills. Educational structures were streamlined in an attempt to promote structural responsiveness between anticipated skills needs and the level of qualifications provided by education and training. In terms of the debate over key qualifications, a strong emphasis was placed on upgrading the level of individual qualifications and on individual mobility. The reforms were generally centrally led and often supported by expert commissions, supervisory bodies and monitoring measures.

The debates in the 1970s narrowed focus to changing skill requirements at work, and training was mainly concerned with immediate workplace skills. Subsequently the debates around 'systemic rationalisation' or 'flexible specialisation' in the 1980s gave rise to new training concepts that emphasised a more central role for training and learning in organisational contexts. The increasing pace of technological and organisational change led to a focus on the interplay between the different competences needed to cope with modern forms of work organisation. Educational policies were geared towards increased flexibility and the renewal of vocational qualifications and curricula. For key qualifications this led to a new emphasis on organisational learning and organisational flexibility. Responsibility was decentralised and delegated to institutions to encourage them to become responsive to societal and economic needs. While the first phase of reforms had been characterised by central planning and forecasting of skills requirements – linked to long-term reform measures – the second phase emphasised responsiveness to immediate needs, resulting in more focused short term reform measures and pilot programmes and projects

The most recent debates in the 1990s on the 'information society' and the 'knowledge-based society' have shifted the training agenda from particular organisational contexts to general social contexts. In this respect there are several concepts such as 'employability', 'lifelong learning', 'continuing professional development' and 'entrepreneurship' that are linked to the need for workers to maintain an updated competence-base. At the same time there has been growing concern over a new skills gap in skills for information and communications technologies (ICT), both for work in the computer and ICT-related industries, and in terms of the general skills required to use new technologies in the work place. While the ideas of lifelong learning and employability might provide a conceptual framework for countering such a skills gap, the question of responsiveness of education and training provision to new skills need has arisen again. Present reform

initiatives are targeted with meeting particular requirements of individuals and industry, yet appear inadequate to deal with the dynamic of societal change. New basic skills – or key qualifications in a modern guise – are being proposed as a means to meet this new challenge. However, before examining these more recent developments, the next section will look in more detail at the origins and evolution of key qualification debates.

2.2. Development of key qualifications in Europe

2.2.1. Different approaches to key qualifications

Key qualifications emerged as an integral part of the movement towards greater responsiveness and flexibility in education and training. They were intended to facilitate the process of modernising and updating qualifications and to enable individuals to learn new skills and competences. Despite pressures for reform and a general recognition of the need for a greater responsiveness and flexibility of provision, key qualifications developed in different ways in different social, political, historical and cultural contexts. Even the terminology varied between different countries and contexts – with the terms key skills, key qualifications and key competences all having similar origins and conceptual underpinnings but with different emphasises and meanings. In looking at the development of key qualifications in Europe I will first look at the original ideas behind key qualifications, developed by the German labour market researcher, Dieter Mertens. This is followed by an examination of the different approaches subsequently taken to key qualifications ⁽¹⁾. The analysis attempts to address three main issues. The first is to look at the educational context for key qualifications in providing enhanced learning opportunities. The second is the approach to curriculum development and the support for lifelong learning. The third is change in education and training cultures.

2.2.2. The origins of key qualifications: the work of Dieter Mertens

Dieter Mertens initial (1974) publication was designed to provoke a debate between labour market researchers, education policy makers and curriculum developers, and to stimulate critical rethinking of how education polices and curriculum processes should relate to developments in the labour market. His starting point was the limitations of labour market forecasts as a basis for education policy development and a critique of linear approaches that viewed education and training

(1) The three main approaches in the European debate are presented here in a highly summarised and condensed manner without providing detailed references. However, readers who wish more information on the background sources are recommended to consult two earlier documents in which the author has developed the European group picture (Kämäräinen 1998, Kämäräinen and Streumer 1998). Some additional references can also be found in the contributions of Oates et al. and Onstenk and Brown in this volume (see Chapters 5 and 6).

as dependent support structures for the labour market. Key qualifications were intended to enhance the proactive role of educational planning and curriculum development. Mertens advanced two main arguments for this position. The first was that labour market forecasts provided an increasingly unreliable basis for curriculum planning. They tended to project existing patterns of employment into the future, failing to take into account such factors as job substitution, mobility and the renewal of competence bases and qualifications. The second was that on utilitarian and humanistic grounds there was a need to overcome the divide between education and training routes that acted as a barrier to social mobility. A fundamental revision of curricula was needed at all levels of education to prepare learners for ongoing learning, and to allow learners to acquire new knowledge and new competences to allow qualitative renewal of vocational expertise, flexibility in working life and mobility in the labour market.

Mertens concluded that qualification requirements for the labour market should not be tied so rigidly to existing training provision. Instead, education and training should allow alternative routes for acquiring qualifications. Secondly, curricula should not be dependent on particular institutional forms of provision. Neither should curriculum development be entirely based on existing subject-based content that might become quickly obsolete. He noted that skills derived from practice-based training tended to become obsolete more quickly than the learning of theoretical knowledge applied in modern work organisations. Mertens key qualifications framework was intended to provide a core structure for the rapid renewal of qualification needs and knowledge bases, as well as providing the basis for educational mobility and lifelong learning. Rather than look for a catalogue of individual key qualifications he sought to develop a framework of complementary qualification areas. The framework was based on four central core components.

The first was 'basic qualifications' (*Basisqualifikationen*) which facilitate the vertical transfer of skills and knowledge to different contexts and uses. The second was 'horizontal qualifications' (*Horizontalqualifikationen*) which enhance the ability to process information to broaden the knowledge bases and to facilitate the transfer of knowledge between different knowledge domains. The third was 'transversal knowledge elements' (*Breitelemente*), the components of knowledge and qualifications which form the elements of a shared knowledge basis between different contexts. The final component was 'vintage factors' (*Vintage-Faktoren*) which referred to new knowledge and abilities needed to deal with qualification gaps and changes in the requirements for skills and knowledge over time.

Key qualifications were intended to link knowledge, abilities and skills in an immediate context, to allow learners to access different opportunities for learning and working in their careers and to provide them with the capacity to respond to changing requirements for knowledge, abilities and skills. Mertens proposed that key qualifications should be considered as the dynamic core of a new model of general education that was applicable to different levels of education and training.

The core should be linked to subject content areas by 'integrative modules' (*Baukastensystem*), providing different options and opportunities for specialisation and deeper learning.

That Mertens' ideas have proved so influential stands testimony to his perception. However, it has proved difficult to transform his vision into a working methodology for planning and shaping education and training provision. Key qualifications were an intermediate construct designed to act as a reflective tool to analyse different knowledge structures, learning environments and knowledge applications, but subsequent key qualification development has struggled to combine an analysis of the different social interactions with the further development of tools for planning programmes and curricula. Furthermore, whilst Mertens had envisaged key qualifications as a common core curriculum for all education sectors and learning environments, subsequent debates led to different approaches for different sectors and learning environments. Another problem in Mertens' work is more fundamental. Mertens developed a set of coordinates or categories of key qualifications and identified learning programmes (or contents) which could carry the key qualifications needed to respond to changing knowledge requirements and applications and allow learners to gain an awareness of their own learning. However, the examples he provided were very general and were disconnected from the existing subject based curriculum. Later efforts to develop his framework led to difficulties in relating his general examples to the shaping of wider curricular and learning environments. Furthermore, the initial ideas that Mertens developed were taken up and integrated in different cultural approaches in different European countries.

2.2.3. The key skills approach

Most English speaking countries use the term core skills or key skills. Key skills (somewhat confusingly then known as core skills) were first introduced on a national basis in the UK on vocational training programmes for the unemployed in the 1980s with their use later being extended to national vocational qualifications (NVQ) and general national vocational qualifications (GNVQ) in the 1990s. Both NVQs and GNVQs were based on outcomes-oriented assessment, and the role for key skills was to provide a general learning capability that supported the acquisition of more specific vocation or technical skills. The conceptual starting point was the identification of a set of key skills that were assumed to have a generic and facilitating nature. These were included as specific qualifications, complementing vocational qualifications within the different qualification frameworks. There were six areas of key skill development – communication, application of number, application of ICTs, decision-making, teamwork and improving own learning. However, given the difficulties of definition and assessment, only the first three were actually included in the initial assessment frameworks. Key skills were seen as independent of context and were designed to broaden the potential for individual flexibility and for skill accumulation and transfer. For curriculum development purposes, key skills

are specified in a similar way to other vocational qualifications in terms of units and elements of competence. They form a compulsory part of the curriculum. Although it was originally intended that key skills would form part of integrated teaching and learning assignments, in reality they are often taught as stand-alone modules (Attwell, 1997).

The key skills approach emphasises the development of competence over time, as a basis for flexible lifelong learning and for individual mobility. The key skills approach was initially introduced to broaden the narrow focus of vocational learning associated with the introduction of NVQs. The aim was to shift the emphasis from purely work-related skills – meeting the immediate needs of the labour market – to broader developmental learning goals. Key skills were designed as curriculum components in their own right, and their contribution to the renewal of a vocational learning culture was circumscribed since they were specifically designed to be context free and to stand independent from the vocational curriculum.

2.2.4. The key competences approach

The idea of key competences is not associated with any one particular country or system. Rather, it underpins a cluster of approaches in different countries and contexts, even though the terminology of key competences is not always used. The common denominator is that they draw on learning and competence development in organisational contexts, bringing together training and development partnerships between training providers and workplace organisations. The main focus is upon organisational learning as opposed to individual learners or education frameworks. In initial education and training the emphasis is on shaping the learning environment in organisational settings.

The conceptual starting point is the application of competences in the workplace. This may involve sharing knowledge and developing new skills and competences outside traditional occupational profiles and job descriptions. Given the introduction of new patterns of work organisation there is a need to create a cultural basis for learning in teams and work-based social settings. Previously there has often been a distinction between such social competences and more technically specific vocational competences. The terminology deployed in the key competences approach has emphasised support for working and learning in organisational settings – e.g. ‘broadly applicable competences’ or ‘transversal competences’.

Key competences develop an integrative approach to link different individual competences within organisational learning environments. These have generally been developed in the context of organisational learning initiatives and within partnership-based training and development. In the organisational context such initiatives may be the result of new forms of work organisation or the introduction of a more service-oriented culture. Key competences can be used to promote an organisational learning culture and organisational innovation.

This approach contributes to the shaping of integrative learning environments

linking continuing vocational training to particular organisational contexts, especially for problem solving. Thus, the approach focuses more on curriculum implementation and redesign than on basic curriculum development. From a perspective of lifelong learning the approach emphasises the need to develop and maintain an organisational learning culture that promotes continuing professional development. It also draws attention to the need to make non-formal learning visible and to relate it to the acquisition and recognition of formal competences.

The key competences approach shifts the emphasis from the acquisition of formal qualifications to the utilisation of competences in organisational contexts. Moreover, rather than focusing upon individual learning, this approach shifts the emphasis to the development of organisational patterns of using competences and to linking different competences. Therefore, there is a need to develop pedagogic concepts that take into account the transformation of learning within organisational settings. These pedagogic concepts may serve as bridges between general frameworks for continuing vocational training and company-specific needs for organisational learning, and therefore act as another variant of 'integrated delivery'.

2.2.5. The key qualifications approach

The third approach comes out of debates in the German speaking countries on key qualifications (*Schlüsselqualifikationen*). While originally the idea was to initiate a broader international discussion, it has become a culturally specific concept linked to the modernisation of vocational qualifications and learning cultures in these countries.

Given the different interpretations and change over time, it is worth re-examining the original ideas behind key qualifications. The ideas emerged from the debate over the relationship between technological change, labour market flexibility and the modernisation of education systems. The original vision was to link flexible curriculum development, flexible learning patterns and frameworks for flexible competence accumulation. As the debate progressed the main focus became the modernisation of vocational qualifications and the renewal of vocational curricula. Within this debate key qualifications have been interpreted in different ways. The initial visionary debates gave way to more pragmatic pilot projects that then led to the incorporation of key qualifications within vocational education and training systems. These developments in turn led to a new period of discourse, critique and reflection on the ideas underpinning key qualifications. Three main strands or interpretations can be distinguished in these discussions.

First, the reductionist interpretation links key qualifications to individual learning and the acquisition of personal competences. Originating from studies of the psychology of work or the psychology of learning, key competences have become associated with generic skills such as communication and social competences. In many ways this parallels the approach to key skills in the English speaking countries. Second, the official interpretation was developed through pilot projects

and saw key qualifications as promoting self-organised learning in carrying out work-based assignments. The idea became associated with competences for self-organisation in information retrieval, planning of work, carrying out tasks and self-assessment. Third, contextual interpretation took a broader view, seeking the renewal of vocational qualifications through interaction between the different structures and contexts for acquiring competence. In the German language this interaction leading to a holistic qualification was characterised as integrated micro-structures of action-oriented competences (*integrierte Handlungskompetenzen*). The command of specialised vocational knowledge (*Fachkompetenzen*) was to be linked to social competences (*Sozialkompetenzen*) and the capacity to respond to changing work requirements (*Methodenkompetenzen*).

From the perspective of curriculum development the reductionist interpretation has placed the main emphasis on assessment, the official interpretation on a series of pragmatic approaches to implementation. The contextual approach has focused on curriculum redesign and complex teaching and learning designs that promote the acquisition of integrated action-oriented competences. In the context of lifelong learning, key qualifications have provided support for self-organised learning and the recognition and use of prior learning while stressing the importance of routes and pathways for progression.

Throughout the debate in the German speaking countries key qualifications have always been linked to a vision of cultural change. In the first phase of debate this vision was more radical, challenging the structures and divide between academic, vocational and adult education. It then became more narrowly focused on the modernisation of vocational qualifications and curricula within the dual system. However, even in these terms, the debate has given rise to new thinking on the parity of esteem between general and vocational education, the development of dual qualifications (recognised for progression to both academic and vocational higher education) and to links between education institutions and work-based learning providers.

2.3. Curriculum design and development

2.3.1. Different responses to similar challenges

Given the common origins of all three main approaches – key skills, key competences and key qualifications – in changes in work organisation and technologies, it is worthwhile considering how far they have met these challenges. Have they led to the renewal of skill bases and competence structures within vocational learning? What support do the different approaches provide for organisational learning and individual mobility? What is their contribution to curriculum development and pedagogic innovation? All three approaches to key qualifications offer fundamentally different pictures.

The key skills approach creates a specific qualification and learning area within initial vocational education with the assumption that it will have an impact on all other areas of vocational learning. However, given that key skills are a specifically separate area of learning, they are not necessarily linked to the renewal of vocational qualifications. Neither does the development of curricula and pedagogies for the acquisition of key skills necessarily affect vocational content areas. Key skills themselves are expected to provide the curriculum for flexibility and mobility, given the lack of interfaces between the key skills curriculum and the wider vocational curriculum.

Key competences promote the renewal of vocational competence bases within organisational contexts and through continuing vocational training. Curriculum development initiatives involve the development of client-centred customised learning programmes. This approach is not necessarily generalised throughout the education and training systems. Neither has the approach been formulated as pedagogic principles for education and training as a whole. Instead, the main emphasis is on support for flexible learning for, and through, organisational contexts

Key qualifications promote the general renewal of vocational education and training as a contribution to individual mobility and organisational flexibility. Work-based learning in organisations is seen as a laboratory or test bed for broader system-wide change. Key qualifications can also be seen as a construct for interpreting cultural changes in work-related learning and developing complex teaching and learning arrangements as a response to the challenges from new technologies and work organisation. Thus, key qualifications are seen as an integral element in the renewal of vocational qualifications and curricula.

2.3.2. Analysing the conceptual diversity

Given the very different approaches to key qualifications it might be thought that opportunities for cooperation and mutual learning in Europe are limited. In order to explore the potential further we need to look in more depth at different approaches to qualifications, competences and curricula. In particular the next section will examine different ways of constructing qualification frameworks and different ways of presenting qualification goals as well as different formats for curriculum frameworks and curriculum codes. The analysis highlights the differences (or polarities) between systems and aims to identify opportunities for interaction and mutual enrichment.

It is possible to distinguish between atomistic and holistic approaches to developing qualification frameworks and between fragmented and cohesive approaches to presenting qualification goals. Atomistic qualification formats are based on the idea that vocational qualifications can be acquired, accumulated and applied as separate competence units. This idea is generally related to a fragmented approach to formulating qualification goals. Following this logic, key skills are defined as separate qualifications. Qualification goals are conceived as

context-independent and specified as 'learning outcomes'.

Holistic qualification formats start from the assumption that vocational qualifications are not merely based on separate skills but contain integrative knowledge and contextual abilities that cannot be interpreted in terms of separate units. Consequently, the specification of qualification goals tends to integrate qualification goals, learning environments and requirements for the coordination of learning programmes.

It is also important to look at the relationship between different curriculum structures and their related curriculum design principles (or curriculum codes). The underlying curriculum structures can be divided into four basic models:

- (a) The diversified curriculum structure, based on holistic educational subjects with – from a structural point of view – a similar status in the curriculum;
- (b) The modular curriculum structure, based on units that may be accumulated over time;
- (c) The open curriculum structure, leaving the shape of the curriculum components open in a process-oriented setting with an emphasis on learner outcomes;
- (d) The network curriculum structure, giving different curriculum components different roles in curriculum implementation (e.g. core, optional and supplementary components).

These structures provide only the starting points for the actual development of curricula, yet they provide boundaries for shaping and connecting social spaces for learning. Curriculum codes provide the pedagogic guiding principles for the shaping of learning environments and the design of actual curricula. They link designs for the grouping of learning contents with designs for content frameworks (e.g. the relative weight of different components, optional choices and links between different content areas). In the following section three basic curriculum codes will be outlined: the collection code, the integrative code and the transformative code.

The collection code emphasises diversification. The grouping of learning content highlights established knowledge structures, domains of expertise and achievement standards. Consequently, framing the content provides a menu of options for successive specialisation. Curriculum components and content are selected and structured by curriculum designers or by learners (within set boundaries). The collection code provides a basis for the regulatory shaping of curricula and for curriculum implementation by managers and administrators.

The integrative code emphasises meaningful interaction between curriculum elements and focuses upon the prospects for knowledge utilisation. The grouping of the learning content highlights the links between curriculum components and the potential for utilisation of the learning outcomes. Likewise, the framing of the content provides spaces for combined teaching and learning assignments or shared working and learning interfaces. These can bring together students that have chosen different options for specialisation and promote synergy between complementary fields of expertise in actual learning processes. The integrative

code provides a basis for pedagogic redesign of curricula and for alternative designs within regulatory frameworks.

The transformative code emphasises connective specialisation. The design of curricula takes into account the transparency of knowledge structures and expertise and their links to contexts for knowledge utilisation. The grouping of the learning content should reflect underlying knowledge structures and processes of knowledge utilisation. The framing of content should be progressive and foundation components should support knowledge transfer towards implementation in action contexts. The transformative code provides a basis for the flexible design of curricula and for continuing interaction between regulatory and pedagogic curriculum development.

The underlying curriculum structures and codes provide markedly different conditions for incorporating key qualifications into curricula. The key skills approach uses a collection code and modular structures in which key skills units appear as separate curricular entities. The key competences approach is based on the integrative code and open curriculum structures, while the key qualifications approaches are based on either the integrative or transformative codes alongside holistic curriculum structures.

However, curriculum structures provide only the starting points for actual curriculum implementation. The different curriculum codes can be considered as complementary principles that emphasise different aspects of curriculum design and curriculum implementation. A cross-cultural dialogue could develop parallel uses of different codes in the design and implementation of new curricula.

2.3.3. Developing common understandings

Different ideas and models of key qualifications can be interpreted as parallel strands of discourses on educational flexibility. The analysis of the main approaches and the underlying educational assumptions reveal differences but also the potential for mutual learning and cross-cultural cooperation. For a wider debate to take place, a common understanding of the purpose and meaning of key qualifications is necessary. The final part of this section sets out the essentials of such an understanding.

The different concepts for key qualifications are essentially social and educational constructs, as they do not refer to any skills, competences or qualifications that by themselves could be defined as key skills, key competences or key qualifications. Each definition includes a set of embedded educational and societal assumptions as to why the respective skills, competences or qualifications should be given a special status. Each of the concepts is linked to assumptions on how these skills, competences and qualifications can be promoted within education and training and how they can contribute to flexibility and mobility in different contexts.

Ideas on key qualifications have been introduced to complement traditional subject-based learning and functional categorisations of vocational skills,

competences and qualifications. Key qualifications concepts are interventionist constructs that enrich vocational learning culture. In addition, they are mediating constructs introducing connections and links between traditional learning contents. None of the concepts for key qualifications can be satisfactorily expressed with a static list of behavioural characteristics. Instead they are expressed as dynamic constructs to equip learners for continuous change. Additionally they are reflexive constructs that require the actors to relate themselves to change within societal competence structures and develop their own strategic orientation. Key qualifications concepts develop the learners' capacity to interpret dynamic changes within competence structures and to assess their own learning capability as a strategy for their own individual development. The next section builds on these cornerstones by developing a model that can move beyond the goals of flexibility and mobility to deal with new challenges for modernisation and reform confronting vocational education and training in Europe.

2.4. From key qualification to new basic skills?

2.4.1. The Lisbon declaration on new basic skills

The European Council summit in Lisbon in March 2000 launched a discussion on new basic skills. In name – and indeed in substance – the new basic skills discussion has much in common with earlier debates over key qualifications. Two points are notable though – the document was launched explicitly as a response to the issue of the use of information and communication technologies in Europe and it was approved by policy makers from every European country. Given the importance of such a move, it is worth considering in more depth the contents and implication of the policy proposal and whether new basic skills are really only key qualifications dressed up in new terminology or whether they represent a genuine step forward?

I will use the key qualifications framework to examine the origins, nature and dynamic of policy development to consider its implications in terms of renewal of curriculum and qualifications frameworks. Given that I have advocated the use of open frameworks for shaping policy and pilot initiatives, I will look at possible initiatives which could arise from the discussion and different scenarios for the development and implementation of new basic skills. I am also interested in ways of preventing the divergence of different approaches that characterised the key qualifications debate.

The European Council declaration called on Member States, the Council and the Commission to develop and implement a new framework: ‘.. a European framework should define the new basic skills to be provided through lifelong learning: IT skills, foreign languages, technological culture, entrepreneurship and social skills; a European diploma for basic IT skills, with decentralised certification procedures,

should be established in order to promote digital literacy throughout the Union...’ (Presidency Conclusions, p. 9).

The subsequent ‘Memorandum on lifelong learning’ aimed to promote public debate on the implications and implementation of the new framework. It also sought to define further the contents of new basic skills:

‘This is not necessarily an exhaustive list, but it certainly covers key areas. Nor does the list imply that the traditional basic skills of literacy and numeracy are no longer important. But it is important to note that this is not a list of subjects or disciplines as we know them from our schooldays and beyond. It specifies broadly defined areas of knowledge and competence, all of which are interdisciplinary: learning foreign languages, for example, involves acquiring technical, cultural and aesthetic capacities for communication, performance and appreciation. General, vocational and social skills hence increasingly overlap in content and function’. (Memorandum on lifelong learning 2000, p.11).

In a follow-up report to the Lisbon summit - ‘Concrete future objectives of education systems’ (Council of the European Union, 2001) - the list of the ‘new basic skills’ has been divided into sets of competences. ICT-related skills were linked to vocational competences and personal competences, while a second group of new basic skills was linked to mobility, employability and entrepreneurship.

All three reports supported a method of ‘open coordination’. They recognised the primacy of national educational cultures and left Member States to come up with ways of implementing policy. The joint European initiative was to have the role of providing support and monitoring. The policy documents sought to provide general starting points for common policy development while remaining open to different contributions from national perspectives and cultures. What is important is to consider how such a general political consensus at policy level can be transposed into working concepts and agendas in educational terms. This requires a more detailed examination of the origins and starting points for the declaration. In order to do this I will pose three key questions.

The first concerns the underlying educational assumptions behind new basic skills. What led to the choice of the particular subjects within the framework and do the different subject areas represent new basic skills in themselves or are they intended as an indication of the types of subjects which might be included in a new basic skills framework? The second question relates to the development of curricula for new basic skills. Are the skills intended to generate separate curricula and qualifications or are they intended as linked components to be integrated into existing curricula and learning programmes? The third question concerns the European dimension. Is the role of European support to set common standards or to construct networks for knowledge transfer and shared learning?

Given these questions it is possible to construct two alternative scenarios for the development and implementation of new basic skills in national education and training cultures. The first – linear – approach would be to develop new basic skills

as separate content areas with related achievement standards and modes of delivery. European support could be in setting common standards and common performance indicators and tools for policy monitoring. The second – interactive – approach would be to integrate new basic skills through the creation of mutually reinforcing learning environments. European support could provide common platforms for knowledge sharing among parallel projects and networks and provide monitoring tools to capitalise on, and make transparent learning from, different initiatives and pilots.

Of course, these scenarios are only ‘ideal types’ and do not represent stated policy positions. However, they illustrate the problems in different interpretations of common policy leading to divergence in just the same way that earlier key qualifications debates polarised into different positions and frameworks. One way of overcoming this problem is to promote a cross-cultural dialogue to stimulate collaboration between the different approaches. The following section will illustrate how such a dialogue might be organised in the context of promoting ICT-related new basic skills.

2.4.2. A new model for cross-cultural dialogue on ICT and new basic skills

The promotion of competences for new basic skills in the use of ICTs has been linked to both the development of new vocational qualifications and to personal competences. The dualism inherent in this approach allows different interpretations in terms of implementing educational change. Equally, it provides a basis for linking different education approaches to each other. The two approaches mirror recent debates on skills gaps for ICT and initiatives to promote ICT skills to overcome these skills shortages. In this debate two basic approaches have been put forward.

The first, linear approach is to promote the acquisition of basic skills in the use of ICT and on programmes to educate ICT specialists. In curriculum terms this provides a focus on common standards and competences for the use of ICT, with emphasis on ensuring programmes (or courses) to acquire these competences are included within broader education programmes.

The second, interactive approach places the main emphasis on promoting interaction between ICT-related learning and context specific vocational learning and on the capability for the self-assessment of learning. This involves the development of integrated teaching and learning arrangements for initial vocational education and context-specific continuing vocational training or similar initiatives to promote self-organised learning and community based learning.

The initiatives and projects to promote the two different approaches are not necessarily in competition. There is potential to create a common working agenda which can enhance both approaches. The following model for such a working agenda is based on four clusters of measures. The clusters provide the basis for a dialogue between the different approaches and give a picture of the different needs and contexts for competence development:

- (a) measures to support the acquisition of basic ICT skills as 'everyday life skills'. This cluster includes programmes like the European computer driving licence (ECDL) and life-skills programmes;
- (b) measures to promote the curricular integration of ICT-related learning and context related learning. This cluster could include specific initiatives for integrated teaching and learning assignments but it could also include the development of an overall framework for the acquisition of ICT skills within the context of occupational and vocational learning. The framework would make transparent the opportunities for teaching and learning ICT-related skills within different subjects and vocational curricula and opportunities for occupational learning within ICT-related courses and programmes;
- (c) measures to promote career progression to specialised ICT occupations. There are two main approaches to training new specialists in ICT. The first is to provide new curricula and programmes in initial education and training in ICT. The second is to develop 'conversion programmes' for those with skills and knowledge in other occupational areas. Measures will include the accreditation of prior learning and the development of e-learning programmes;
- (d) measures to promote continuing professional development in ICT. These can link programmes of continuing professional development together with initiatives for broadening access to ICT based learning for dispersed adult learners using e-learning.

2.5. Beyond key qualifications – new perspectives for educational flexibility?

Given the cultural changes in education it must be asked whether the idea of key qualifications has lost its relevance as a catalyst for flexibility? An associated question is whether or not the new emerging ideas and programmes can play a similar role as a catalyst for educational flexibility and reform without being overshadowed by the cultural diversity and terminological problems which beset key qualifications?

Our analysis would suggest there is nothing which can be seen as a dramatic paradigm shift in ideas or in patterns of education and training. Instead we have seen dynamic cultural change but at an uneven rate and with often fragmented and contradictory effects. The analysis also suggests that the present challenges to education and training are intensifying, posing new challenges for flexibility. In this respect, many of the contradictions underlying the different approaches to key qualifications as a specific response to the need for flexibility have become obsolete. Patterns of renewal in education systems and institutions have absorbed much of the earlier discourse on educational flexibility. Yet the role of key

qualifications in coordinating responses and initiatives for flexibility (especially at a curriculum level) remain valid and need to be related to the new challenges. Cultural diversity and cultural barriers have prevented a genuine discourse and interchange between the different approaches to key qualifications and inhibited the identification of complementary activities which could build on different strengths in practice. This has given rise to scepticism over the potential of key qualifications for educational innovation and reform. However, recent European discussion of new basic skills and the attempts to overcome the shortage of skills in ICTs have run into similar barriers in creating a common European framework. These initiatives are open to different analysis and interpretation. The approach to a dialogue we have introduced could overcome these differences by allowing them to interact as different contributions to a common working agenda.

Bibliography

- Attwell, G. School to work transition in England and Wales. *International Journal of Vocational Training*, Vol 5, No 1, 1997 pp 45-69.
- Attwell, G.; Hughes, J. *Capitalising on achievement: Leonardo da Vinci programme in the UK*. Department for Education and Employment, Sheffield, 2000.
- Castells, M. *The informational city: information technology, economic restructuring and the urban-regional process*. Oxford: Blackwell, 1989.
- Council of the European Union: *The concrete future objectives of education systems*. Report from the Education Council to the European Council/Council of the European Union, Brussels: Council of the European Union, 2001.
- Edwards, R. Multi-skilling the flexible workforce in post-compulsory education and training. *Journal of Further and Higher Education*, 17, (1), 1993.
- Giddens, A. *Consequences of modernity*, Cambridge: Polity Press, 1990.
- Kern, H.; Schumann, M. *Industriearbeit und Arbeiterbewusstsein*. Eine empirische Untersuchung über den Einfluss der aktuellen technischen Entwicklung auf die industrielle Arbeit und das Arbeiterbewusstsein. [Industrial work and workers' consciousness. An empirical study on the impact of technological development on the industrial work and workers' consciousness] Teil I und II. Rationalisierungskuratorium der deutschen Wirtschaft. Band 8. Frankfurt, 1970.
- Kern, H.; Schumann, M., *Das Ende der Arbeitsteilung?* [The end of the division of work?], München: Beck, 1984.
- Kämäräinen, P. What kind of key qualifications should be integrated to curricula in the near future according to a "horizontal approach"? In Bundesministerium für Unterricht und kulturelle Angelegenheiten (1998): *Europäische Berufsbildungskonferenz: Entwicklung beruflicher Qualifikationen und Kompetenzen. BMUK Grundlagendokumente*. [European conference on vocational education and training: Development of vocational qualifications and competences. The

- Austrian Ministry of Education. Conference proceedings.] (pp. 5 - 14). Vienna, 1998.
- Kämäräinen, P.; Streumer, J. Curriculum development, new learning environments and transfer of innovations in Europe. In Cedefop, *Vocational education and training - the European research field. Background report. Volume 2.* (pp. 155 - 182). Luxembourg: Office for Official Publications of the European Communities, 1998.
- Memorandum on lifelong learning 2000*, Commission Staff Working Paper, Brussels, 31.10.2001, SEC (2000) 1832.
- Mertens, D. *Schlüsselqualifikationen*. Thesen zur Schulung für eine moderne Gesellschaft. [Key qualifications. Theses on schooling for modern society] *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 1974, Vol. 7, No 1.
- Piore, M.; Sabel, C. *The second industrial divide: possibilities for prosperity*, New York: Basic Books, 1984.
- Presidency Conclusions*. Lisbon European Council. 23 and 24 March, 2000.
<http://www.europa.eu.int/council/off/conclu/mar2000/index.htm>
- Projektgruppe Automation und Qualifikation: *Theorien über Automationsarbeit*. [Theories on automated work] Argument-Sonderband 31. Berlin (West): Argument-Verlag, 1978.

CHAPTER 3

Rethinking key qualifications: towards a new framework

Pekka Kämäräinen

3.1. A common framework for dialogue

The conclusions of the previous section set common cornerstones for European debate on the meanings of key qualifications. However, in themselves, these fail to provide a sufficient platform for a common approach to the incorporation of key qualifications into curricular frameworks and learning cultures in different countries. There are three different ways in which this issue could be approached.

The first, linear approach would be to attempt to develop a common pattern or model for educational planning based on the anticipation of future skills needs and the prescription of key qualification targets. Pedagogic implementation could be left to education and training institutions. This approach would run the risk of reducing key qualifications to a set of complementary functional qualifications and lose the mediating, dynamic and reflexive features that could prepare learners for renewal and change.

A second, interactive approach would be to attempt to bring the different curriculum elements and actors into creative interaction with each other in a search for solutions that relate new skills, competence and qualification needs to new educational and organisational spaces for innovation and pedagogic design. Although such an approach offers opportunities for mutual learning and transfer of ideas between different contexts and cultures, it risks reducing key qualification development to pilot initiatives and innovations in limited curricular and organisational contexts. The key qualifications debate would be in danger of losing its connection to mainstream developments and of missing opportunities to shape educational policy.

The third approach, and the one favoured by the author, is a dialogue-oriented approach. It acknowledges that, in most countries in Europe, educational planning takes place in a linear way and that interactive approaches are generally confined to pilot activities but seeks to create platforms between the two. Before this can be done it is necessary to define more clearly the boundaries and focus of discussion and to develop an interpretative framework to overcome the fragmentation of different approaches and address the contradictions in previous work on key qualifications. These contradictions come from the use of key qualifications to

debate the tensions between education and training and wider societal pressures while discussing processes of renewal, change and reorientation within curriculum development and learning cultures. The discourse around key qualifications has also tried to embrace innovation in curriculum development and the shaping of new learning environments. New debate must be focused on the present and future challenges facing education and training in Europe and move beyond issues of flexibility and mobility. It has to address the issue of skills shortages for ICT and views of new basic qualifications. An interpretative framework must be capable of analysing the renewal of education and training cultures and of relating such a renewal to broader societal contexts. It does not have to resolve previous contradictions but must be capable of pointing towards common initiatives and platforms which can be developed within existing frameworks and cultures of education and training if key qualifications are to retain their relevance.

The consideration of Mertens' original work on key qualifications and the subsequent problems in developing the concept provides the critical starting point for the development of a new platform and framework. First the framework needs to be capable of dealing with complexity and needs to be able to integrate and shape different societal pressures. Equally, it must be capable of coordinating the development of key qualifications as bridges within and between different learning environments. It also needs to provide structures for curricular interfaces between general education and occupational learning, and, above all, it must be capable of developing and implementing key qualifications in different contexts. Previous frameworks have struggled to gain recognition and status for key qualifications; as long as they remain stand-alone qualifications this problem will be unresolved. If, however, the framework is considered as a tool for coordinating the delivery of key qualifications through contextualised learning – in terms of contents, qualifications and environments – then this issue can be overcome. This represents a major shift in perspective for key qualification development. Rather than attempting to identify qualifications we are attempting to develop tools which can recontextualise and refocus learning programmes and environments and shape new qualifications.

The key qualifications framework has to deal with two parallel tasks. The first is to relate the renewal of education, training and learning cultures through key qualifications to societal change. The second is developing key qualifications to structure learning programmes and curricula within learning cultures.

3.2. Coordinates for analysing the general renewal of education, training and learning

3.2.1. Starting points

In the introduction I traced the changing patterns of demand for skills and knowledge and showed how education and training structures and qualifications had changed in response to these requirements. The impact of new technologies and changing patterns of work organisations led to demands for new forms of knowledge and new ways of applying knowledge in the work process, and key qualifications emerged in an attempt to address these challenges. One outcome was the development of more flexible systems and programmes designed to promote the responsiveness of education and training provision to changing societal requirements. Yet this responsiveness and flexibility on their own were insufficient. What is needed is proactive shaping – the development of education and training systems and qualifications which can help shape future societal development. For this to take place, key qualifications have to act as a bridge between education and training programmes and learning and the different contexts in which knowledge is used in work and wider society.

The framework for renewal of education training and learning is based on that bridging role by identifying a series of ‘curriculum coordinates’. The coordinates arise from the tensions (or polarities) between education and training and the contexts for the application of knowledge. Through identifying those tensions it is possible to identify spaces for policy development and for the development of curricular initiatives and pilots. These pilots and initiatives can mediate between the different polarities. This moves education policy-making away from a reactive agenda to a process of proactive choice and planning and allows the evaluation of reform initiatives.

3.2.2. S-learning

Traditionally, vocational education and training has focused on functional specialisation in particular occupations though the provision of subject based learning. Students learn to become an engineer or a technician through the acquisition of formal subject based knowledge, structured into programmes. Programmes are updated in response to the introduction of new technologies and their application. However, these new and changing technologies and new forms of work organisation have demanded wider systems-based learning and flexibility rather than stressing performance in an individual occupation. Equally, as occupational profiles change the emphasis is not so much on initial specialisation but on the ability to acquire new knowledge. There is a general tendency for broader and merged occupational profiles (for example, mechatronics being introduced to bring together the traditional jobs of mechanics and electronic technicians). In other cases there is substitution of the traditionally qualified workforce by a new workforce with

new qualifications. From the educational viewpoint these developments are leading to a new role for systems based learning rather than traditional vocational subjects.

It is this tension between educational provision of subject based learning and the application of knowledge in flexible systems-based environments that forms the first curriculum coordinate: 's-learning'. 'S-learning' reveals the need for a balance in curriculum development between responsiveness to the specific needs for subject based learning and proactive preparation for substitution, flexibility and mobility. The associated intermediary idea is that of 'didactic space' – of the need to develop balanced teaching and learning arrangements that combine subject and systems based learning.

3.2.3. P-learning

Vocational education and training has placed emphasis on the possession of specialised knowledge and skills as the expected outcomes of vocational learning. This knowledge is later applied in practice based on patterns developed within specialised communities of practice (e.g. of engineers or mechanics). In contrast, new ideas on organisational learning and teamwork have promoted a collaborative and multi-disciplinary approach to applying knowledge in the workplace and of knowledge sharing between different specialists. The introduction of ICT based systems for knowledge development and management is enhancing this approach.

This has led to a tension between learning for a specialised occupation - and specialised knowledge bases - and learning how to access and apply knowledge in a shared and multi-disciplinary environment. This tension encompasses 'p-learning'. Curriculum development needs to take account of these two different approaches and focus on the changing significance of the ownership of knowledge, access to knowledge and command of knowledge. This leads to the idea of 'didactic knowledge processing' as an intermediary construct, emphasising a holistic approach to the development of knowledge within vocational learning, taking account of both the acquisition of knowledge and of the ability to access and use knowledge in a shared environment.

3.2.4. E-learning

E-learning has become a major issue in education and employment policy in recent years with measures being discussed to overcome the skills shortages in information and communication technology (ICT) related jobs. This discussion, and the introduction of measures to support the use of ICT for learning, has tended to marginalise the discussion on competences for the use of ICT within vocational education and training. There are two different trends in the use of ICT in learning cultures. The first is the introduction of stand-alone programmes on the use of ICT – and in particular the European computer driving licence – as additional elements to traditional VET programmes. The second is to link the use of ICT to the particular needs of the work environment and to provide contextual learning programmes

through existing curricula. In curriculum development terms a consideration of the didactic potential and complementarity between the two different approaches is needed, and that can be achieved through 'e-learning'. This then leads to the intermediary idea of 'didactic enculturation' referring to the interfaces between context independent learning about ICTs and context specific learning about ICTs in particular environments.

3.2.5. C-learning

Curriculum development for vocational education and training has generally been based on the idea of unified frameworks, taking the form of vocational subjects or contents (sometimes in units or modules) or performance requirements and associated assessment criteria. Education and training systems have implemented curricular frameworks through school-based education, through training organisations or through dual systems combining school based education and workplace training. Whilst these different frameworks are internally unified, they lack mutual transparency. More recently there have been moves towards pluralism of curricular formats and the development of interfaces and pathways between the different learning environments. New partnerships have been formed between education and training organisations and enterprises allowing the development of integrated curricula and learning environments that cross traditional institutional and organisational boundaries. One of the aims of these partnerships has been to promote the convergence of different curriculum approaches and to provide new opportunities for knowledge application. In terms of curriculum development it is useful to consider whether these developments are merely providing new ways of implementing internally consistent curriculum frameworks or whether they represent a move to new forms of curricula and curricular control. 'C-learning' can be used as a construct to consider this issue together with the intermediary idea of 'didactic conversion' as a tool to analyse the potential curricular and didactic implications of new partnerships.

3.3. The new framework for key qualifications – polarities between renewal and change

3.3.1. Starting points

Underpinning this new approach is the idea that the role of key qualifications cannot be seen in isolation from the dynamics of renewal and change in vocational learning as a whole. These processes of renewal are based on traditional core qualifications, which provide consistency and focus for learning and qualifications, and on the changes in technology and work-related learning environments that are opening up opportunities for the acquisition of new qualifications. These new qualifications may be complementary to the traditional core qualifications or they may represent a

significant change leading to the renewal of the traditional core qualification.

Existing approaches to key qualifications have focused on the modernisation of vocational qualifications through renewal of competence bases, and changes in resources for the acquisition of knowledge, in learning practices, social responsibilities and structures of work organisation. The limitation of these approaches has been in the tendency to introduce key qualifications as complementary and often stand-alone qualifications, whereas the aim of the new framework for key qualifications is to contextualise the process of renewal and thus to link new qualifications to the traditional qualification core. In this way key qualifications can be seen as a set of 'didactic coordinates' which mediate the tensions between traditional curricular cores and new qualifications and allow the development and evaluation of new scenarios in different contexts for vocational learning. The new framework should also allow the process of renewal of particular qualifications to relate to changes in society and in learning cultures as a whole.

The basis for such a framework for key qualifications as a set of didactic coordinates can be traced to the original work of Mertens. However, rather than use Mertens' basic qualifications, horizontal qualifications, transversal qualifications and vintage factors as separate curriculum elements, these categories are used to develop didactic coordinates that can respond to the tensions between traditional core curriculum structures and the new qualification needs. In this way key qualifications can once more be seen as an intermediary construct and tool for curriculum development. This may also overcome some of the ambiguities that led to the difficulties in implementing Mertens' original ideas.

3.3.2. Basic qualifications

Mertens saw basic qualifications as an 'intellectual reservoir' to support the renewal and updating of knowledge and skills. The learning content he proposed was very general in nature but promoted the capacity to understand knowledge structures and cope with change in the contents of knowledge, although he failed to show how basic qualifications were related to context specific vocational and occupational learning. This ambiguity led to a subsequent divide between two different approaches: generalist and vocationalist. The generalist approaches developed lists of particular key qualifications for updating knowledge and skills as separate curricular entities. The vocationalist approach transformed the idea of basic qualifications into a tool for the internal modernisation of the delivery of education and training through the acquisition of integrated action-based competences in specific contexts in the work process. Within the new framework key qualifications are defined as didactic coordinates that make transparent the social challenges for renewal within vocational learning cultures. They also form the basis of higher level learning that equips learners with the capacity to analyse their own competence base and relate their competences to the challenges of flexibility, mobility and knowledge updating and ongoing learning.

3.3.3. Horizontal qualifications

Mertens believed horizontal qualifications were required to deal with the need for the rapid renewal of knowledge bases and of new ways to access information, although his concept of horizontal qualifications was somewhat static, focusing on the acquisition of information and the ability to learn to learn. Later discussion was divided between approaches to learning to learn, learning to do and learning to be and the development of self-organised learning and self-directed learning. In the new framework the didactic coordinates incorporate the intention of horizontal qualifications by referring to the higher level learning that equips learners with the ability to analyse changing requirements concerning their command of their own knowledge and access to knowledge resources in their occupational field. They also link to didactic measures to promote the capacity of learners to extend and update the command of their knowledge bases.

3.3.4. Contextual factors

Mertens believed that some learning contents, such as environmental learning and labour protection, had a general and integrative character in responding to societal needs. He characterised these contents as 'transversal knowledge elements'. However, he struggled to find criteria to identify such contents or show how they contributed to the modernisation of vocational learning, and he did not anticipate the impact of new contextual developments such as globalisation and organisational learning on working life and vocational learning. It is these developments that give rise to the use of the didactic coordinate 'contextual factors' to replace Mertens' idea of transversal knowledge elements. This coordinate refers to the higher level learning that equips learners to relate to the different organisational settings in which they apply skills and knowledge. It also refers to the need to integrate their knowledge and competence bases within different organisational cultures and to the didactic measures that promote readiness to contribute to organisational learning cultures and social innovation.

3.3.5. Vintage factors

Mertens' idea was that vintage factors could bridge content related knowledge gaps between different generations. The idea has been discussed further in the context of adult education and lifelong learning but has made little impact. Once more the uses of ICT have radically changed access to knowledge and the availability of knowledge resources. In the new framework the didactic coordinate of vintage factors refers to the higher level learning that equips learners with the capacity to understand the dynamic development of means of access to knowledge and the availability of knowledge resources. This learning relates to that required for their specialised occupational area and for wider knowledge bases. It also links to the didactic measures which promote readiness to explore and extend the competences of learners to use different means to access knowledge and to develop an awareness of emerging developments in knowledge resources in their own field.

3.4. Towards a dialogical discourse on the renewal of national frameworks for qualifications and curricula

In previous chapter I called for a dialogical discourse on the renewal of national frameworks for qualifications and curricula, and subsequently I presented a framework for key qualifications as a tool for undertaking that discourse. The tool, however, should not be applied in a strict technical or linear way. Rather, the framework relates the processes of broader societal change to the potential for new development in education and training and allows links to be made between policy processes and pilot initiatives and programmes. Neither should the framework be used to develop a European model for education and training, but rather to put in place processes of mutual learning and exchange that can lead to mutual enrichment of systems and curricula between different countries. At a policy level the main role of the framework is to identify the potential for enriching national policies and provision through transnational cooperation. This includes the possibility of broadening vocational qualification frameworks to provide new opportunities for contextual learning for key qualifications in new learning environments.

New initiatives at policy level will not, on their own, develop proactive education and training programmes and cultures. In parallel, there is the need to build on the many decentralised curricular and qualification initiatives and projects. Evaluation reports at national and European level have repeatedly drawn attention to the lack of systems for disseminating and capitalising on these developments. The key qualifications framework can be developed as a support structure for initiatives to promote the continuing professional development of teachers, trainers and planners in developing and capitalising on initiatives for curriculum redesign. A further role for the new key qualifications framework is in networking research and development approaches in Europe. The diversity of national policies and curricular approaches to key qualifications has formed a barrier to research cooperation and mutual learning in the area. Cooperation is needed to make transparent the assumptions underpinning the role of qualifications, curricula and research and development, embedded in different national education and training frameworks and systems.

A dialogical discourse can also open a number of further issues. What opportunities are there for the enrichment of national approaches to qualification frameworks, curricula and learning environments? How can we develop dialogue and mutual learning between different cultures? How can we develop a common understanding of quality criteria for shaping new curricula and learning environments? What should the role of research and development be at national and transnational level? What support is needed to link individual initiatives to national and European policy debate and curriculum and systems renewal? The key qualifications framework can play a central role through linking individual initiatives and projects to policy processes for reshaping education and training

systems and curricula. It is equally important to network the projects and initiatives themselves in a common development culture. Research and development has a critical role in producing methodologies and processes for intercultural exchange and mutual learning.

3.5. Key qualifications - challenges for future research and development

3.5.1. Perspectives for research and development

In this section I will build on the new approach by outlining a series of key challenges for future research and development activities. Our aim is not to develop key qualifications as stand-alone measures. Instead, the aim is to link the ideas to different contexts for action as a contribution to action-oriented research and reflective policy development.

There are three complementary perspectives which underpin the approach to future challenges for research and development in key qualifications. The first is support for cross-cultural learning linking inputs from different cultures and providing platforms for knowledge sharing and the development of new project designs for collaborative research in Europe. The second is support for mutual learning linking research-based analyses, new policy contexts and research and development activities. The third is the promotion of platforms for open coordination to link networks between new initiatives, accompanying and monitoring measures and allow reflection on policy implications.

3.5.2. Rethinking the idea of key qualifications and its contribution to educational flexibility

The first challenge is to reorientate the idea of key qualifications. Instead of setting key qualifications as learning objects or learning goals in themselves, they should be developed as frameworks for open coordination and for studying the frontiers and interfaces between existing qualifications, between new qualifications and between the learning processes that are needed to facilitate renewal and change.

Analysis of cultural changes in education and training has shown that the challenges for flexibility have changed radically since the initial key qualifications debates. Education and training systems have developed more flexible patterns of renewal and, at the same time, there are new demands for curricular and pedagogic innovation and coordination.

The different approaches to 'key skills', 'key competences' and 'key qualifications' can be seen as different curricular starting points. The outcome of the analysis is not a new 'European synthesis' or 'European path' but a new open framework for promoting renewal and change. While new curricular and didactic initiatives may have different starting points, they can provide similar social spaces for innovation and provide similar support for curriculum development and new

learning environments. The European dimension in these developments comes through cross-cultural cooperation and mutual learning.

The new framework for key qualifications provides a common starting point for cross-cultural learning, for dialogue between researchers, developers and policy makers and planners and for open coordination at European level.

3.5.3. Promoting innovation, interaction and mutual enrichment within educational programmes and frameworks

The second challenge is to promote innovation within new programme frameworks based on interaction and mutual shaping.

Traditionally, education frameworks have been designed as a hierarchy between qualifications, curricula and learning environments leading to a linear process in setting qualifications standards and developing curricular and learning processes. The identification of skill needs and occupational profiles – together with associated attainment targets and assessment regimes – has often been the prime activity. Consequently, curriculum processes have been considered a secondary focus and the role of new curriculum initiatives has been sidelined. Traditional thinking has led to a structural gap between the long-term renewal of qualification frameworks and short-term development of new curriculum processes and redesign of learning environments.

The new key qualification framework develops an interactive approach that emphasises the mutual shaping of such frameworks and curriculum processes. The framework brings together the need to renew core qualifications and develop new qualifications and the role of key qualifications in shaping curricula. It points to the importance of innovation programmes in providing an intermediate link between the short cycle development of successive curriculum initiatives and the accompanying, parallel revision of main qualification frameworks.

3.5.4. Rethinking the role of new curriculum initiatives

The third challenge is to develop a new role for curriculum initiatives in promoting reflective learning, renewal and change in the context both of individual learning and within the education and training cultures.

In Europe, there has tended to be a distinction between the definition and use of curriculum as a regulatory instrument and the development of curriculum as a pedagogic concept and tool. There is also a general divide between 'whole curriculum' approaches and modular development.

In a similar way, innovative curriculum initiatives – and new approaches to curriculum design - have been seen as separate experiments for modifying main frameworks of education and training. This has led to new models of education and training – flexible delivery across institutional boundaries, self-learning, open and distance learning, the accreditation of non-formal learning – being counterposed. Equally, new curricular constructs - such as complex teaching and learning

arrangements, shared didactic spaces, network-based cooperative models, individualised learning programmes – are often seen as competing rather than as complementary solutions which can strengthen each other.

The key qualifications framework provides a dynamic and proactive role for knowledge sharing between new curriculum initiatives. The framework reinterprets key qualifications as coordinates for shaping learning processes to equip learners for renewal and change, and for promoting reflective learning processes that deal with the transformation between knowledge structures and knowledge utilisation. The framework facilitates the analysis of different curriculum initiatives as contributions to the development of ‘new curriculum architecture’.

3.5.5. Rethinking the role of educational partnerships

The fourth challenge is to develop the potential of new educational partnerships between educational institutions and education and work organisations.

In the past, partnerships have mainly been seen as a way of coordinating parallel education and training curricula and provision. Education was delivered through schools, while training took place in the workplace. Currently, at least at policy level, there is a greater openness to collaboration and mutual enrichment between partners. Partnerships between different education institutions – sometimes involving institutions at different levels in the systems – are becoming more widespread as a means to guarantee broad curriculum provision and programmes and to develop progression routes and pathways. Partnerships between educational institutions and enterprises are developing new ways of integrating work-related learning in vocational curricula.

The new key qualifications framework develops the role of education partnerships in providing interactive contexts for shared curricular spaces, for processing knowledge within these spaces, and for converting knowledge from a learning context to an action context.

3.5.6. Integrating the debates on ICT-related competences and new basic skills

The fifth challenge is to use the new key qualification framework to support the integration of the currently separate debates in ICT-related competences and new basic skills into a common working agenda and to extend the methodology to integrate other subjects included in the new basic skills – foreign languages, social skills, entrepreneurship, mobility – to a parallel working agenda focused on the central themes of employability, mobility and entrepreneurship.

While current policy debates have emphasised the importance of new basic skills and ICT-related competences as themes for innovation in education and training, in practice this has tended to result in attempts to define lists of new basic skills or to promote ICT competence outside existing curricula. Consequently, curricula designs have tended to ignore the links between ICT-related learning and the

broader context of the use of ICT in occupational practice and to ignore individual and organisational learning as resources for promoting new basic skills.

The new integrative key qualifications framework provides a model for developing mutual complementarities and connectivity between learning about ICT and using ICT in practice and between developing competence in new basic skills and developing vocational and occupational skills.

3.5.7. Developing new patterns of European cooperation

The sixth challenge is to promote knowledge development, capitalisation and collaboration between and across projects. The new key qualifications framework provides the basis for an infrastructure for research cooperation for projects and networks.

European cooperation has tended to be based on individual projects, exchanges and individual networks. Each activity has had its own theme and its own life cycle. There have been attempts to develop information exchange between projects and promote cluster groups but with limited impact. It has become apparent that the capitalisation of transnational projects requires more attention to cross-cultural comparisons and to creating the pre-conditions for mutual learning and exchange.

The key qualifications framework provides a structure for linking the work of national and transnational projects. Analysis of different national approaches to key qualifications provides a starting point for relating cross-cultural comparisons to a collaborative research culture and the framework provides a structure for analysing and understanding the contribution of different projects to educational renewal and change and reflective learning. By analysing the different systemic assumptions and approaches and cultural determinants the framework provides a basis for assessing the potential for cross-cultural knowledge transfer.

3.6. Key qualifications and shaping future-oriented research capacities

3.6.1. New working perspectives arising from the key qualifications framework

There have been a number of initiatives to link research to development activities as accompanying research. However, these activities have tended to be developed on an ad hoc basis and to be limited to individual pilot projects within national boundaries. The recent focus on programme monitoring, evaluation and capitalisation has led to a renewed interest in methodological designs for accompanying research.

A number of different methodologies for accompanying research can be used within the key qualifications framework:

- a) the development of monitoring tools which reflect the complexity of new curriculum initiatives and analyse the relationship between innovative activities and systems development;
- b) the use of discourse and dialogue between change agents responsible for development activities and external evaluators (or accompanying researchers) to analyse the outcomes of monitoring;
- c) the aggregation of findings and outcomes from discourse and dialogue in order to link project and pilot activities to sustainable programme and system development;
- d) the development of ICT based tools to support monitoring, dialogue and evaluation in a transparent manner.

The key qualifications framework supports the linking of self-evaluation to external criteria for monitoring and accompaniment. At a European level, the key qualifications framework provides a basis for analysing and understanding the results and outcomes of new projects and programmes.

3.6.2. Linking the key qualifications framework to new curriculum architectures

The linking of the key qualifications framework to accompanying research methodologies provides the basis for analysing the development of new curriculum architectures. It allows assessment of the potential of different curriculum and pilot projects and initiatives for developing new patterns for vocational education and training in Europe.

It also provides a platform for collaboration in developing quality criteria for curriculum redesign and for new learning environments. At the level of national and European programmes it can promote networking to develop common approaches to quality criteria.

3.6.3. Linking the key qualifications framework to cross-cultural comparisons

The key qualifications framework provides an open platform for analysing renewal and change in qualifications, curricula and learning cultures. Accompanying research can render new curriculum initiatives transparent within their cultural contexts. Linking the key qualifications framework with accompanying research methodologies provides the basis for support for comparative studies of systemic and cultural factors and influences within new curriculum initiatives. This, in turn, provides a new basis for strengthening the links between national initiatives and European programmes and helps to provide an analysis of the way in which different education and training cultures can capitalise on the outcomes and experiences of European cooperation.

3.6.4. Linking the key qualifications framework to emerging sectoral issues

The key qualifications framework provides a platform for analysing processes of renewal within existing qualifications and the development of new qualifications and pedagogies. Accompanying research methodologies allow the articulation of emerging sectoral issues and challenges for vocational education and training. Linking the two provides the potential for analysing the role of vocational education and training in responding to emerging sectoral needs and the transition to new occupations. This, in turn, can support a dialogue between researchers, educational planners and social partners and link the findings and outcomes of individual case studies and projects to the shaping of strategies for educational renewal and change in particular sectors.

3.6.5. Linking the key qualifications framework to actions to promote ICT-related competences and new basic skills

Linking the key qualifications framework to accompanying research methodologies provides a heuristic model for European action on these issues through:

- (a) identification of emerging ICT-related competences and respective training needs;
- (b) monitoring of the potential of education and training systems to develop new curriculum designs;
- (c) support for measures to promote ICT-related learning in different contexts – for example through new partnership agreements, alternative modes of delivery and through self-organised learning.

3.6.6. Linking the key qualifications framework to knowledge development through case studies

Linking the key qualifications framework to accompanying research methodologies provides the basis for knowledge development through undertaking and analysing case studies. Case study methodologies have been problematic in providing evidence for policy development. However, the linking of accompanying research and the key qualifications framework allows the accumulation, reinterpretation and refocusing of case study materials in wider contexts and with the help of structured dialogue it is possible to link knowledge development and the use of knowledge to each other.

The creation of an environment for knowledge sharing between and across individual case studies would not only support research cooperation, but also would contribute to mutual learning between different initiatives, projects and programmes and support reflective policy development.

CHAPTER 4

Regulation and deregulation: the development and modernisation of the German dual system

Günter Kutscha

4.1. Introduction and keynote themes

The German form of vocational training, known as the 'dual system', enjoys universal respect. However, the term is somewhat misleading. Today we are faced with a 'plurality' of learning locations, including workplaces and training workshops, group training centres and vocational schools. The system is no longer regulated only by the government and the market, schools and enterprises; regulations cover the diversity of interests of employers' organisations, trade unions and professional associations through a complex process of negotiation. In the past, the 'regulated plurality' of the dual system was an essential factor in the relatively flexible adaptation of vocational training to the continually changing demands of the labour market, while maintaining the combination of occupational theory and practice through 'regulated training courses'.

This paper focuses on one particular aspect of modernising the dual system: the organisation of diversity and plurality in the training system (see also Kutscha, 1999). This emphasis should not be misunderstood. It is not a question of diversity and plurality as an alternative to the dual system, but of developing the potential for the modernisation of its diversity and plurality and, at the same time, ensuring the system is accessible to all who wish to take advantage of initial vocational training. Putting this into effect is the test of the effectiveness and quality of the dual system as the 'German system' of initial vocational training, which should be accessible to more than just a privileged cohort of young people. Public responsibility for the occupational training of the next generation is a key principle. On this basis the key features of the dual system are examined and compared with the innovative practices of selected EU Member States. The approach to modernisation advanced in this chapter is based on the five keynote themes outlined in the following section.

According to the Vocational training act (1969), vocational training should prepare young people for the 'practice of a qualified occupation'. The future of the dual system depends directly on, among other things, the future of skilled employment as a basis for absorbing trained skilled workers into the labour market.

If vocational training within the dual system is to remain oriented towards the demands of qualified employment, new potential skilled occupations must be created, especially in the service sector requiring a sufficiently large and differentiated supply of qualified skilled workers. This leads to the first keynote theme concerning the interdependence of active training and employment policies.

Secondly, as part of the 'social market economy', the dual system is founded on principles of market efficiency, equal opportunities, competition and solidarity. A continuous process of negotiation between the social partners and government bodies is necessary to maintain the balance between these competing principles and to make them concrete, and to meet the demand for public responsibility for vocational training. This aligns with the second keynote theme: public responsibility for vocational training within the framework of a social market economy.

Thirdly, the potential for innovation within the dual system is far from exhausted. This includes the possibility of creating new training occupations and training places (for example, within cooperatives), as well as improving the quality and flexibility of training. A comparison with other European training systems shows no reason to depart from the dual system. However, great efforts are needed to modernise the dual system in such a way that in future all young people who desire vocational training and who are suitable candidates can be offered a skilled training place. The experience of other EU countries could be profitably exploited to develop the dual system without adopting the structures of their systems. The transfer of systems is not under discussion, but rather the exchange of experience on 'learning systems' and their adaptation to changing environments, because, for example, of economic globalisation, the dynamic of information and communication technologies trends and demographic changes. The third keynote theme therefore recognises the importance of the dual system as a 'development model'.

Fourth, it is important to base modernisation of the dual training system on the principles of occupation, duality, and consensus. If these are to remain the defining principles in the future, they must be examined for ways of adapting them to changed conditions in employment. This includes the development of a modular system, while maintaining the system of regulated occupations, and moving from a dual to a plural system of learning environments. It also includes reinforcing regional responsibilities and infrastructures as a complement to the principle of consensus at the centralised, national level. Those in positions of public responsibility for the vocational training of young people must pay particular attention to avoiding unpredictable risks and disadvantages for young people as a result of making the dual system more flexible. The fourth keynote theme concerns the need for increased flexibility of the dual system as a modernisation strategy.

Finally, young people with learning difficulties or other disadvantages in the employment market need extra support and, if necessary, special protection in vocational training institutions which can guarantee social counselling and teaching, psychological support and specialist supervision. The eventual aim should be for

these young people to join the dual system. The combination of theory and practice in training and the occupational principle is a medium for developing skills and a personal and social identity. The fifth keynote highlights the value of the dual system as the main system of vocational training for the qualification of disadvantaged groups.

4.2. The dual system – developing future employment in the information and service society

4.2.1. Occupational concept, dual learning locations, principle of consensus – structural features of the dual system in a structural crisis?

In the past the attractiveness and stability of the dual system of vocational training in the Federal Republic of Germany were associated with three main structural features: the concept of occupation (*Beruf*), dual learning locations and consensual decision making (Kutscha, 1997).

Occupational training (*Berufsbildung*) was regarded as crucial to, if not actually guaranteeing, a relatively stable working life. It offered employees and employers a system of occupational guidance for the labour market; it reduced the cost of recruiting skilled workers and provided workers with a secure income based on collective wage agreements and social protection of their status. Access to vocational training was a prerequisite, guaranteeing the individual an economic and social 'subsistence level' in a social order which centred on his or her occupation, quite apart from its importance for personal identity and character development.

In addition, the duality of on-the-job practical experience and school-based learning was a major achievement of the German system of training. The combination of working and learning in an enterprise and school is an outstanding feature of the dual vocational training system compared with mono-structured systems, both in terms of qualification and social integration through occupations. Although the duality of learning locations has not satisfied the needs of training regulations in many areas since the Vocational training act came into effect, and external workshops and training centres are also needed, nevertheless the argument remains valid.

Finally, the regulation of the dual system on the basis of consensus between the social partners, in the form of tripartite corporate arrangements (state, employer associations and trade unions), played a significant part in limiting polarisation between employer associations and trade unions. It also limited the risks of market and government errors, and facilitated networking of information resources, overcoming barriers to implementing decisions on vocational training policy in-company training. The system of state-corporate vocational training planning sets the framework for the involvement of enterprises in training, for example by establishing national training regulations, and providing structures for training

contracts. In the past, it has contributed significantly to balancing advantages to individual enterprises with the needs of the economy as a whole, through the influence of employer associations, trade unions and the chambers on policy makers and planners in the public and private sector. Without this complex arrangement of state, corporate and market-economy players in its regulation, the system of training, organised through occupations and financed to a considerable extent by private enterprise, would probably have long ago run aground.

However, the key structural features of occupational concept, duality of learning locations and corporate regulatory organisation have been subject to a process of erosion for some years (Baethge, Baethge-Kinsky and Henrich, 1996). The present state of the dual system is worrying, not because of the threat to any single component but because the system itself in a number of regions and economic sectors is threatened with collapse, affecting the system as a whole. In many fields, the concept of training occupations can no longer keep pace with the dynamics of change in qualifications and qualification structures. The duality of learning locations is jeopardised by a continuing lack of training places, and the stabilising function of industrial relations in vocational training policies is declining with the loss of negotiating strength of the employer associations and trade unions.

Appeals to the goodwill of those concerned are not a way out, any more than transitional or emergency measures, useful and indispensable as the latter may be. Transitional measures designed to compensate for market forces are a typical way for the welfare state to deal with structural change. However, this demands the ability and the willingness of the private sector to deal with problems in the economic system. If we do not regard this as a socially acceptable solution to structural problems, but recognise the advantages of decentralised regulation of economic decisions by market forces, we have to look for regulatory instruments which allow us to combine regulation and flexibility with the demands of a social market economy (Kutscha, 1996).

In a social market economy, vocational training is necessarily dependent on market and social compatibility and thus on the balance of economic and social interests between public and private interests and responsibilities. Any attempt to use flexibility against the interests of employees is as short sighted and risky as ignoring the need for flexibility in an export based economy, strongly affected by internationalisation of industry and trade. The relationship between regulation and individual responsibility must be reconsidered and renegotiated for vocational training. Problem-solving approaches must be regrouped into 'negotiation packages' capable of facilitating compromise and permitting options which transcend traditional barriers, for example both by increasing the flexibility of initial vocational training and by providing a stronger regulation of continuing training.

The question is not whether the dual system has a future, but rather, which features it needs to develop in view of the current and future demands of the labour market, the influence of international economic relations and competition with

European vocational training systems. The discussion must take into consideration not only economic interests, but also social and cultural challenges in view of the transformation of the employment landscape and changing attitudes, inclinations and individual interests of participants with regard to their own professional and personal plans.

Throughout Europe, developing national qualifications strategies are typified by the attempt to balance competing regulatory principles while pluralising institutional, organisational and curricular structures. Previously full-time school training systems, for example in France, are being supplemented and enriched by forms of alternating learning. A diversified range of alternative training paths (Koch and Reuling, 1997) confront market-oriented forms of enterprise training, for example in the UK. All countries of the EU are, to a greater or lesser extent, differentiating and restructuring VET systems and teaching and learning provision. The centralisation and decentralisation of policy making, the regulation and deregulation of training processes, the differentiation and integration of learning locations, and the development of systematic learning and practical experience are all part of a complex relationship which cannot be reduced to a one-dimensional, technologically determinist pattern.

4.2.2. What is to be done? Tasks for the modernisation of the dual system

The social model put forward by the European Union as a key objective for 'Living and working in the information society' is based on both competition and solidarity. This key objective demands effective vocational training and opportunities for all young people to develop their skills for working life, irrespective of the economic cycle and regional peculiarities. The framework of the German dual system is laid down by training standards in the form of open occupational profiles centrally agreed by the state in cooperation with the unions and management. Within this framework, standards are implemented on a decentralised basis with the support of all training stakeholders in a region.

Opting for the right to certified occupational skills 'for everyone' demands sustained activities at different levels. First of all there must be a consensus within society on the undeniable right to vocational education and training, irrespective of prevailing economic conditions or regional circumstances. However, there remain a number of issues open for discussion.

The first concerns the development of a new occupational concept of 'occupational categories' (*Beruflichkeit*), founded on broad-based core occupations, with modular structures for developing occupational skills and the option of acquiring additional qualifications. The second relates to the reduction of central VET planning and policies and the development of a framework to promote training, with increased regional responsibility for guaranteeing adequate provision of learning places and environments, increased cooperation between regional actors and the development of new forms of quality assurance and control at grass-roots level.

The third issue is the extension of the dual system into a plural system of linked learning locations combined with the promotion of independent learning and improved regional infrastructures for guidance, information, etc. The fourth involves the promotion of continuing vocational training, linked to initial vocational training, and the certification of informal learning and work experience within the employment system. The fifth is the development of appropriate, user-friendly systems for financing initial and continuing vocational training, with both supply and demand sides incentives. The final issue concerns the opening up of VET provision for new employment opportunities in Europe.

In dealing with these problems, the experiences of other EU Member States should be considered and examined for their applicability to VET reform in Germany. However, vocational training systems cannot be imported or exported wholesale. Rather it is useful to follow and learn from developments in other countries. The 1992 Maastricht Treaty assigns the European Union a subordinate function for supporting and supplementing national VET policies. Harmonisation of legal and administrative regulations for initial and continuing vocational training in the Member States is explicitly ruled out. European Commission initiatives, the main driving force for stronger integration of national vocational training systems, have met with resistance and often been unsuccessful. The historical diversity of national vocational training systems to a large extent remains. However, the EU Commission has helped to broaden the political and academic discourse on guidelines and principles for structuring VET institutions and training; in this way it has contributed to transnational cooperation. The dynamic of integration generated 'from the bottom up' (Koch, 1998) points to a sensible 'middle way' among the diverse national VET paths within the framework of European unity (Cedefop, 1999). Learning processes between the systems can be further developed and exploited constructively for the development of each country's own system.

4.3. Learning from Europe: alternative structures for modernisation

4.3.1. Modularisation within the framework of occupation – the German way

The dual system in Germany can point to considerable success in comparison with other European countries, both with regard to guaranteeing a high level of qualification for the employment system and in providing comprehensive training places for the next generation. The unifying social force of an occupation as part of socialisation *par excellence* still has considerable weight (Konietzka and Lempert, 1998). Critics of the dual system of training see a danger that it may not be able to adapt to the challenges of the labour market, given the pressure of internationalisation. However, we should not rush to draw too hasty, scientifically unfounded conclusions as to any loss of professionalism due to modularisation of

training. The potentially negative consequences of moving away from the occupational principle are much more serious for the individual than the putative benefits. Nevertheless, searching for a sensible way to handle 'modularisation within the framework of the occupational concept' should not be taboo.

The fundamental starting points for defining modules within the framework of the occupational concept are as follows:

- (a) an occupational qualification consists of a combination of partial competences (modules) which are essential to overall occupational competence; in this context, modules can be regarded as parts of a whole;
- (b) modules describe the (desired) result of the learning process in the form of competences or outcomes;
- (c) modules require national standards (for example through training regulations), ensuring transparency and comparability (Kloas, 1998).

The definition of modules formulated by Kloas does not allow approaches which, whilst describing partial qualifications at the level of outcome or competence, examine and certify them individually, without assessing the overall qualification. Such an approach, which is based on the English modular concept, would render ineffective national standards for occupations. Vocational training should provide a broad range of activities and include interdisciplinary social and methodological skills, transcending the restricted needs of a particular enterprise. Because the overall aim of training (occupational competence) is more than the sum of the individual parts (modules), a final examination is indispensable and a fragmentary modular design is unacceptable.

Modules should be developed to provide standardised partial competences, suitable for use in different areas at both horizontal and vertical levels, thus reinforcing the links between initial and continuing training. In this way training can be organised more flexibly and the tangle of continuing training reduced by 'mid-level systematisation' (Faulstich, 1995). Each module can be used in multiple ways for different training courses and provides a chance to utilise abilities developed elsewhere, for example during initial training or spare time, for continuing training purposes. Kloas (1998) justly emphasises that continuing training modules should be regarded as assisting innovative restructuring processes in training and provide a regulatory policy link between initial and continuing training. Modules in demand in the continuing training sector provide valuable directions for new occupational fields not yet covered by initial training or, at the very least, offer a valid indicator for their early recognition.

In conclusion to this section, modularisation of initial vocational training could make an important contribution to developing differentiated training for different groups, especially supporting the exceptionally able and disadvantaged trainees. Modules, as defined in this context, provide a high level of standardised quality, not limited to a particular provider, while at the same time offering an extended range of options and avoiding arbitrary provision or a reduction in the standard of training.

Secondly, modularisation of continuing training could contribute significantly to improving the quality and transparency of provision, without abandoning the flexibility indispensable to this sector and without developing excessively taxing legal regulatory instruments. Furthermore, modularisation is a necessary prerequisite for linking initial and continuing training. Modules contributing to multiple occupational profiles could also promote horizontal permeability between occupations and help integrate previously separate training paths, for example in the engineering trade and in the commercial sector. Finally, the potential of modularisation for recovering missed formal occupational qualifications is hardly controversial (Davids, 1998).

This shows that several objectives are pursued by means of modularisation within the occupational framework, with modularisation and the occupational concept regarded not as opposites, but as a form of internal differentiation that encourages learning and increases efficiency. How, and to what extent, a moderate form of 'modularisation within the framework of the occupational concept' will prove politically acceptable remains to be seen. There is a clear consensus between the social partners and government representatives in the 'Alliance for labour, training and competitiveness' that the occupational concept will continue to form the basis of future structural development in dual vocational training (*Presse- und Informationsamt der Bundesregierung 2000*, pp. 47 ff.). The alternative of transforming initial vocational training into partial qualifications, acquired step by step, was rejected decisively. The term 'module' was consistently avoided in connection with the structuring of training regulations. 'Compulsory option elements' and 'additional qualifications' were favoured as the way to make training more flexible. Compulsory options remain an obligatory part of training in a recognised training occupation; they are intended for internal differentiation according to the requirements of different training occupations and form part of the final examination.

Additional qualifications supplement occupational training and, as additional achievements, are not included in the final examination. Additional qualifications can include elements of continuing vocational training, forming bridges between the two stages of training. Additional qualifications in the form of certified elements are - in the international meaning of the term - 'modules'. However, they are not an integral part of initial vocational training, but supplement it. With regard to initial vocational training itself, the trade unions and employers and the regulatory authorities (the federal ministry) believe that 'occupational competence' (*Berufsfähigkeit*) should be accredited by public final examinations at the end of the period of training. Modularisation has no place within the framework of this understanding of the occupational concept. The publications of the 'Initial and continuing training' working group of the 'Alliance for labour, training and competitiveness' state categorically: 'Comprehensive competence can only be established in total and not in gradual steps' (*Presse- und Informationsamt der Bundesregierung 2000*, p. 52).

Modularisation as part of the preparation for training has a special role. During preparation for training, adolescents and young adults in difficult personal circumstances receive the assistance they need to enter initial vocational training. In the proposals of the working group, preparation for training is intended to facilitate the transition to enterprise-based vocational training, and should not, in principle, exceed 12 months. The concept of ‘training-related qualification elements’ is recommended for training preparation. Behind this cumbersome expression is nothing more or less than what is internationally known as a ‘module’. Qualification elements are defined as learning units comprising separate sequences of pre-determined content and length, and are certified as partial qualifications. Or, to be more accurate, the certifying training provider must document what qualifications have been acquired as part of a recognised vocational training course and how this has been established. The working group has asked the Board of the federal institute for vocational training to draft recommendations for the certification of qualifications acquired during vocational preparation, during incomplete training courses or on-the-job. These recommendations will form the basis for the certification of qualification modules.

Since ‘occupation-related qualification modules’ are related in principle to activities which are part of recognised vocational training, it is quite justifiable to speak of ‘modularisation within the framework of the occupational concept’. However, this concept is intended exclusively for the support of disadvantaged young people and not as an alternative to the occupational concept. The occupational concept remains the frame of reference for the identification of partial qualifications, which are accredited in subsequent training in state-recognised, training occupations. Viewed in this way, ‘modularisation within the framework of the occupational concept’ will serve to strengthen the occupational concept of the dual system in Germany rather than undermining it. On the one hand, the potential for flexibility of the dual system should be exploited to the full while, on the other, occupational quality standards should be enforced in those areas where the system – as in the case of vocational and training preparation – is still comparatively unregulated.

This applies particularly to key qualifications as a focus for the modernisation of the dual system. The labour market expressly demands key qualifications. Disadvantaged young people, in particular, can hardly afford to ignore these demands so it makes sense to relate vocational and training preparation to qualifications which are the object of initial vocational training. At the same time, the existing resources of the young people concerned should be taken into account by ensuring that the acquisition of these qualifications in the form of occupation-related qualification modules remains transparent for the trainees themselves and is experienced as motivating and achievable. ‘The existing resources of the young people must not be adversely compared with the ideal of key qualifications. The methods applied must take the resources of the target group as their starting point,

then proceed to develop the young people's competence in a holistic approach' (Kunert, 1999, p. 9).

4.3.2. Modularisation in the UK and the Netherlands - a comparison

In comparing European systems of vocational education and training, the German occupational concept is often seen as the opposite of the English modular national vocational qualifications (NVQ) in terms of regulation and policy. In the Netherlands a third way is emerging between the two extremes. This has modularisation within the framework of a new qualification structure, similarly to Germany and based on national occupational profiles, but differentiated by stages to which occupational qualifications and partial qualifications are assigned.

In the modular English NVQ system only the desired outcomes are specified and certified. They are achieved through standardised modules and qualifications (Deissinger, 1996; Reuling, 1996; 1998). The proponents of this concept claim that one of the particular advantages of modular qualifications is that a person can acquire partial or full modules separately and prove competence in different institutions of learning in different situations. However, the potential theoretical flexibility in acquiring modules and qualifications is often restricted in practice (Reuling, 1996). For example, workplaces where the learning opportunities needed for NVQ certification can be acquired may be relatively restricted and the candidate may not have access to the full range of work situations. This impedes the flexible accumulation of higher-level modules and restricts access. There have been some positive results with skilled workers without formal qualifications, whose work experience could be certified through the NVQ system. The qualifications acquired are comparable with German training occupations.

A constructive alternative to the English modular NVQ system and the inflexibility of the occupationally oriented dual system in Germany is emerging in the Netherlands. The Adult education and vocational training act (*Wet Educatie en Beroepsoponderwijs – WEB*) (Frommberger, 1999; van Lieshout, 1997) came into effect in early 1996. It aims to give coherence to the different forms of vocational and adult education. *WEB* is conceived as a self-regulating system, in which the different actors counter-balance each other, and is supported by an outcomes based financing system from 2000.

There are three main political objectives. They are the provision of initial training for everyone (at European Level 2), customised vocational education and training meeting the needs of the individual trainee and the state and industry, and transparency. In addition to the standardised, national qualifications structure, the 'Regional training centres' (ROCs) have a particularly important place in the new *WEB*. The objective is to integrate institutions and actors in regional development networks for learning and to coordinate the content and organisation of training at grass roots level. A national, standard qualification structure for vocational education and training was developed as a framework for these activities, with four

levels of qualifications, each with two progression routes. Both progression routes provide dual forms of education and training, with either 60% or more, or 20% to 60% of training being on-the-job.

Level 1 is based on the performance of simple activities, requiring 0.5 to 1 year's training as an assistant. Level 2 is based on the performance of activities requiring 2 to 3 years' basic training. Level 3 is based on self-supervised, skilled work and requires 2 to 4 years' specialised training. Level 4 is based on middle management activities with a broad range of possible applications requiring 3 to 4 years' training, or specialisation requiring 1 to 2 years' training. The state views it as a public responsibility to ensure that the principle of 'occupational categories' (*Beruflichkeit*) prevails over the requirements of individual enterprises and that general developments throughout the economy are taken into consideration with the aid of national, sector-based occupational profiles.

4.3.3. Promoting vocational learning in diverse and varied learning environments

The principle of duality (the combination of theory and practice in learning locations in schools and enterprises), as well as the occupational principle, will continue to be of fundamental importance for identity formation through training and work in the future. However, the search for one's own identity has become more difficult (Baethge, Hantsche, Pelull and Voskamp, 1988). In many fields 'recognised training occupations' can no longer keep up with the dynamic changes in skill and qualification structures. The duality of learning locations, faced with overall decline and a dramatic loss of training opportunities in some regions and sectors, is being tested to the limit. In these circumstances it is important to exploit all possibilities, to make the fullest possible use of regional training resources and to seek innovative forms and combinations of learning environments.

This is particularly true for the changing qualification requirements in the emerging information and service society. More than ever, it is essential that young people learn to live with a variety of learning locations, instead of being trained in a single educational institution. The dual system in Germany already has a number of potential learning environments and combinations of learning locations. This approach is in keeping with the findings of research in learning that diverse and varied learning environments have a beneficial effect on development. The supportive potential of different learning contexts does, however, depend on the quality of social contact between the different spheres of living, in particular on joint participation, communication and the extent of information on the other relevant fields of activity. Findings from older research on learning locations (Münch, Müller, Oesterle and Scholz, 1981) and more recent studies on cooperation between learning locations in the dual system (Pätzold and Walden, 1995) demonstrate empirically that the potential of combinations of existing learning locations could and should be utilised more efficiently and flexibly than has been the case up to

now. This applies both to development of new training places and piloting new forms of combined learning locations with the objective of promoting self-regulation and self-reliance in trainees.

Smaller EU Member States are experimenting with new forms and processes for developing and structuring learning. 'Open learning situations' and 'free choice' form the mission statement for of an 'Upper secondary education experiment' in Finland, aimed at empowering young people to choose and use autonomously the potential for different learning locations in the region for their own training programme (Arnman, Kutscha and Young, 1995). High school students, for example, join courses at vocational schools. As part of their training, pupils from vocational schools attend high school (e.g. for language classes) or other vocational education institutions (e.g. to acquire additional or specialised knowledge in information and communications technology not offered by their own school). High school pupils and vocational school trainees can utilise the courses at institutes of higher education. However, it has not proved possible to include on-the-job experience. In this area, Germany's dual training system has advantages that should not be underestimated. However, this privilege should not be closed to majority of young people, or dependant on aspects such as their social and educational background, where they live, their sex, nationality or disabilities. In-company training places are a rare commodity that must be shared efficiently and fairly if they are to fulfil their unique function in the plural system of learning locations and in the social market economy.

4.3.4. **Integrated employment and vocational training policies and the 'learning regions' in Denmark**

In contrast to general education, vocational training in the dual system, for structural reasons, is highly susceptible to regional and sectoral influences and the economic cycle. In past decades, a broad spectrum of special measures was initiated using federal, *Länder* and EU funds to compensate for regional disparities. These efforts had little impact, however. On the contrary, the North-South divide in training provision in the old federal *Länder* was eclipsed by the East-West divide after German unification. The new government's emergency programme and the measures proposed by the Alliance for labour and training demand new strategic alliances, not only at the central level, but particularly at grass-roots level. The one does not exclude the other. Only coordinated problem-solving strategies at centralised and regional levels promise sustained success. Horizontal and vertical networking between decision-making bodies must be strengthened and made more effective and include all the important training providers in the regions.

Denmark provides a useful case study in this context, especially in the development of structures for local management and regional consultancy and support. Since 1993, when the 'Training for everyone' action plan was launched, the main objective of Danish education policies has been to give all young people

access to general education and training. Close cooperation between the social partners at local level is a characteristic of the Danish system. The social partners define teaching standards, at the same time acting as counsellors to vocational schools. This overcomes the rigid German division of responsibility between enterprises and schools. Structural and organisational flexibility is encouraged by the open cooperation between local actors, and by the use of new quality procedures. Denmark was the first country in the EU to introduce a national programme for quality control for initial and further training. While quality control is mainly the responsibility of individual vocational schools, from 1999 it has been increasingly supplemented by external experts and benchmarking processes.

Denmark has obviously realised that education strategies and funding based on the economic cycle are no longer appropriate to meet the demands of the information and service society for efficiency and equal opportunities. Initial vocational training is financed partly from public funds, which cover in-school training, and partly by employers, who pay training remuneration. A collective fund administered by unions and employers' associations ensures that costs are shared equally among training and non-training enterprises. The fund also covers expenditure for training workshops. Schools offering initial vocational training are allowed to supplement their budget by local, market-based service provision.

Here, too, it must be emphasised that experience gained in Denmark cannot be transferred automatically to the German VET system, because the two countries are different in many respects, not least in size and population. Learning from Europe means learning to recognise one's own strengths and weaknesses through comparing different systems and then drawing conclusions for further development of existing potential.

Modernising the training system requires reform and the opening up of current processes and procedures for negotiation. New partnerships and new negotiation structures are needed, based on decentralised networks to provide a new impetus to policy development at national, regional and local levels. Federal and *Länder* vocational education policies must take an active part in the development of regional structures for cooperation and should be open to new regulatory forms at regional level, such as those being tested in Denmark and the Netherlands.

The experience of different *Länder* shows that regional structural policies open up new possibilities for the active promotion of VET based on the potential strengths of a region. The recognition of the region as a new arena for policy development and implementation requires developmental activities (Heinze and Voelzkow, 1997). Cooperation should not be limited to labour and management organisations but should also – as in Denmark – include all actors involved in vocational education and training. This also applies to vocational schools developing regional 'service centres', as well as to organisations and agencies providing training for young people. Integrated regional vocational training and innovation management policies designed to link up with the dual system, combined with efficient regional

information and support structures (Kutscha, 1998), could provide an effective strategy to combat the fragmentation of local responsibilities and assist the development of cooperative regulatory structures within the framework of regional structural policies. They could also help open up new avenues to a 'society at a standstill' (Heinze, 1998).

4.4. Developing a comprehensive system of vocational education and training: flexibility and modernisation

One view all comparative VET researchers share, despite their differences of opinion regarding the benefits and drawbacks of VET systems, is that the structure and function of national qualification systems have an inherently systemic character and cannot be transported from one country to another, even if it was desirable. The reform of the German dual system cannot abandon structures that have evolved over a long period of time. The discussion must focus on development paths, which provide direction for reform measures (*Senatsverwaltung für Arbeit, Berufliche Bildung und Frauen*, 1999). There are a number of options for extending the dual system.

First, when applied to the 'occupational principle' and the modular concept, pluralisation means linking the advantages of a high degree of freedom at micro and meso levels with the social protection afforded by 'occupational categories' (*Beruflichkeit*) at the macro-level of our society. Modularisation should not be a taboo subject when employers (in some sectors of the labour market) demand a high degree of flexibility. However, modularisation must be protected against abuse - for example by a compulsory waiting period before undertaking further modules in continuing training. In recognising and promoting the 'occupational category' system of labour, politicians and policy makers have chosen a 'third way' for socially integrating market participants with a weak negotiating position. The conditions of labour have changed, providing a new starting point for reform based on 'socially acceptable pragmatism'. It should be possible to achieve a regulated, flexible qualification system, under public control. The regulation of continuing training would be a prerequisite for establishing the equivalence of general education and vocational training within an overall system of initial and continuing vocational training and would allow the expansion of access to higher education in a responsible manner (Dybowski, Pütz, Sauter and Schmidt, 1994).

Second, we should not forget that the dual system has already been developing plural learning locations for decades in schools, enterprises and training workshops. Overall there is a plurality of learning locations. The 'duality of learning venues' dogma often impedes thinking about the system as a whole. We need an innovative theory and – even more important – innovative practice of diversified learning-

location structures, combinations and cooperation. Educational organisations throughout the world are developing different and varied learning systems with resources, such as multimedia, available simultaneously for different target groups. Pluralism and the simultaneous networking of various systems provide the information infrastructure for flexible and open educational systems. The preservation of existing educational systems is important, but they must be relevant for the education of people living in a world where institutions are undergoing rapid and often radical change. If workers are to become more flexible, institutions shaping skills and employment must also be made more flexible.

Finally, the modernisation of the training system means reforming and opening up existing negotiating systems. In addition to present structures for cooperation, they require new partnerships and new negotiating based on decentralised networks in order to give new impetus to policy development at national level. Centralisation and decentralisation are two sides of the same coin, as are regulation and deregulation, in developing strategies and policies for innovation, vocational education and training and employment. VET and employment policies are inter-linked, and are integral to social policy. The discussion over reform of the dual system affects not only recognised training occupations but also initial and continuing training as a whole and the development of employment policy.

Bibliography

- Arnman, G; Kutscha, G; Young, M. The experimental reform of upper secondary reform in Finland. In Numminen, U.; Virolainen, M. (eds). *Open school for the youth. Three European views of developing youth education in Finland*. Report 5. Experimental Reform of Upper Secondary Education of Finland. Helsinki, 1995, pp. 1-9.
- Baethge, M; Baethge-Kinsky, V; Henrich, R. *Erosion oder Reform. Kurzgutachten zu aktuellen politischen und wissenschaftlichen Analysen zu Situation und Reformbedarf des dualen Systems*, Eine Studie des Soziologischen Forschungsinstituts. Göttingen. Göttingen: SOFI, 1996.
- Baethge, M. et al. *Jugend Arbeit und Identität. Lebensperspektiven und Interessenorientierungen von Jugendlichen*. Opladen, 1988.
- Cedefop, *Ausbildung im gesellschaftlichen Wandel. Ein Bericht zum aktuellen Stand der Berufsbildungsforschung in Europa 1998*. Luxemburg: Amt für amtliche Veröffentlichungen der europäischen Gemeinschaften, 1999.
- Cleve, van B. Neues im Westen Flexibilisierung und Europäisierung der Weiterbildung in den Niederlanden. In Davids, S. (ed.) *Modul für Modul. Berufsbegleitende Nachqualifizierung zwischen Flexibilität und Qualitätssicherung*. Berlin - Bonn, 1998, pp. 249-264.

- Davids, S. (ed.) *Modul für Modul zum Berufsabschluß. Berufsbegleitende Nachqualifizierung zwischen Flexibilität und Qualitätssicherung*. Berlin – Bonn, 1998
- Deißinger, T. Modularisierung der Berufsausbildung - Eine didaktisch-curriculare Alternative zum Berufsprinzip? In Beck, Klaus et al. (eds). *Berufserziehung im Umbruch*. Weinheim, 1996, pp. 189-207.
- Dybowski, G et al. Ein Weg aus der Sackgasse - Plädoyer für ein eigenständiges und gleichwertiges Berufsbildungssystem. *Berufsbildung in Wissenschaft und Praxis*, 1994, Vol. 23, No 6.
- Faulstich, P. Öffentliche Verantwortung für die Weiterbildung. In Dobischat, R; Husemann, R. (eds). *Berufliche Weiterbildung als freier Markt? Regulationsanforderungen der beruflichen Weiterbildung*. Berlin, 1995, pp. 53-70.
- Frommberger, D. *Zur Anbindung beruflicher Weiterbildung an den tertiären Bereich des nationalen Bildungssystems*. Ein Beitrag zur Berufsbildungsforschung in deutsch-niederländischer Perspektive. Markt Schwaben, 1999.
- Heinze, R. G. *Die blockierte Gesellschaft. Sozioökonomischer Wandel und die Krise des Modell Deutschland*. Opladen – Wiesbaden, 1998.
- Heinze, R. G; Voelzkow, H. *Regionalisierung der Strukturpolitik in Nordrhein-Westfalen*. Opladen: 1997.
- Kloas, P.W. *Modularisierung in der beruflichen Bildung - Modebegriff, Streitthema oder konstruktiver Ansatz zur Lösung von Zukunftsproblemen?* Bielefeld: 1997.
- Koch, R. Harmonisierung oder Wettbewerb der Berufsbildungssysteme. *Zeitschrift für Berufs- und Wirtschaftspädagogik* , 1998, Vol. 94, No 4.
- Koch, R; Reuling, J. *Institutional framework conditions and regulation of initial vocational training using Germany, France and Great Britain as examples*. Paper for the European Training Report. Subject Statutory, institutional and political foundations of vocational training. Final report. Berlin – Bonn: Federal Institute for Vocational Training, 1997.
- Konietzka, D; Lempert, W. Mythos und Realität der Krise der beruflichen Bildung. *Zeitschrift für Berufs- und Wirtschaftspädagogik*, 1998, Vol. 94, No 3.
- Kunert, C. Schlüsselqualifikation. *Jugendsozialarbeit inform*, 1999, No 3.
- Kutscha, G. Markt- und sozialverträgliche Entwicklungspfade der beruflichen Aus- und Weiterbildung im Spannungsfeld von Flexibilisierung und Regulierung. In Ruhr-Universität Bochum; Industriegewerkschaft Metall (eds.). *Workshop discussion 'Bildung' in the IG-Metall Bildungszentrum Sprockhövel*. Bochum – Frankfurt am Main: 1996, pp. 87-101.
- Kutscha, G. Berufsbildungspolitik. In Kahsnitz, D; Ropohl, G; Schmid, A. (eds). *Handbuch zur Arbeitslehre*. Munich - Vienna, pp. 1997, 667-686.
- Kutscha, G. (ed.). *Regionale Berufsbildungs-Informationssysteme*. Duisburg: 1998
- Kutscha, G. Gestaltung von Vielfalt und Pluralität als Modernisierungsaufgabe der beruflichen Aus- und Weiterbildung in Deutschland und im Hinblick auf die Entwicklungen in der Europäischen Union. In Senatsverwaltung für Arbeit, Berufliche Bildung und Frauen (ed.). *Expertisen für ein Berliner Memorandum*

- zur *Modernisierung der Beruflichen Bildung*. Schriftenreihe der Senatsverwaltung für Arbeit, Berufliche Bildung und Frauen 38. Berlin: Senatsverwaltung für Arbeit, Berufliche Bildung und Frauen, 1999.
- Lieshout, H. van Strukturierung beruflicher Qualifikationen - ein niederländisch-deutscher Vergleich. *Berufsbildung in Wissenschaft und Praxis*, 1997, Vol. 26, No 3.
- Münch, J et al. *Interdependenz von Lernort-Kombinationen und Outputqualitäten betrieblicher Berufsausbildung in ausgewählten Berufen*. Berlin: 1981.
- Pätzold, G; Walden, G. (eds). *Lernorte im dualen System der Berufsbildung*. Berlin – Bonn: 1995.
- Presse- und Informationsamt der Bundesregierung (ed.). *Bündnis für Arbeit, Ausbildung und Wettbewerbsfähigkeit*. Ergebnisse der Arbeitsgruppe 'Aus- und Weiterbildung'. Berlin: Arbeitsgruppe 'Aus- und Weiterbildung', 2000.
- Reuling, J. Modularisierung in der englischen Berufsbildung. *Berufsbildung in Wissenschaft und Praxis*, 1996, Vol. 25, No 2.
- Reuling, J. Zum Flexibilitätspotential modularer Systeme - Englische Konzepte, Erfahrungen und Entwicklungen. In *Berufsbildung in Wissenschaft und Praxis*, 1998, Vol. 27, No 2.
- Senatsverwaltung für Arbeit, Berufliche Bildung und Frauen (ed.). *Modernisierung der Beruflichen Bildung. Leitlinien zum Ausbau und zur Weiterentwicklung des Dualen Systems*. Berlin: Senatsverwaltung für Arbeit, Berufliche Bildung und Frauen, 1999.

CHAPTER 5

Qualifications, competences and learning environments for the future: analyses of the development of three parallel approaches

Tim Oates, Pier Giovanni Bresciani and Bruno Clematide

5.1. Key skills/Key qualifications: a common policy response

'Education and training are now high on the policy agendas of governments in all the advanced nations, both within and outside the European Union. This is not only because people have ever-rising aspirations for learning and qualifications and because governments devote more resources to meeting these demands; it is also because education and training systems face a range of complex, and historically novel, challenges. Knowledge and skill are now fundamental to economic performance and crucial to survival in the increasingly competitive global economy. Education and training systems not only shoulder the major responsibility for engendering the maximum diffusion of knowledge and skills in the economy; they also have to meet the increasingly diverse demands of society generally...'

(Green, Wolf and Leney, 1999, p1).

Key skills have emerged across the EU as a common policy response to these challenges. In England there are key skills; in Denmark, *procesuafhængige kvalifikationer* or *bløde kvalifikationer* ('process independent qualifications' or 'soft skills'); in Germany, *Schlüsselqualifikationen* (key qualifications); in France, *competences transversales* (transversal competences); and in Italy, *competenze trasversale* (transversal competence). ⁽²⁾

Key skills are deeply symptomatic of current policy makers' responses to the challenges outlined above. Education systems have become more inclusive, with

⁽²⁾ In this chapter the term "key skills" is used by the authors to refer to a general concept that embraces different European traditions. Therefore, it should not be considered to refer exclusively to one culture-specific variant of the three main strands of European debates outlined in Chapter 2. - *The Editors*.

an accompanying recognition that an increasingly diverse population is now staying in education and training to a later stage and studying to higher levels. This has introduced pressures to make available an increasing diversity of provision, aimed at motivating learners and ensuring that they remain in education and training rather than drop out. An accompanying pressure for diversity in programmes and qualifications derives from the continuing growth of knowledge in all discipline areas (for example, new theory in physics, new historical research), the emergence of new disciplines (such as information technology) and increasing refinement of sub disciplines (for example, genetics, biochemistry).

These have led to pressures to increase the scope of existing qualifications and introduce new ones. Indeed, qualifications systems have not only coped with increasing diversification of existing fields, but have been expanded to cover areas of knowledge and skill often not included within the scope of national certification, particularly in respect of vocational and occupational qualifications. These have been introduced and elaborated in areas previously not covered by formal certification. For instance, in England, in the mid 1980s, the Youth certification board and the review of vocational qualifications (RVQ, 1985) identified the problem of occupational sectors not covered by nationally recognised qualifications, such as in the retail, travel and tourism sectors. They also highlighted that there were segments of the workforce without appropriate qualifications, such as lower level care workers. Modernisation of qualifications during the early 1990s - particularly the development of competence-based qualifications - increased the number of qualifications in the English system. This was mirrored in other EU nations with, for example, Portugal developing a wide range of new vocational qualifications, and France extending the *Baccalaureate technologique* and *Baccalaureate professionnelle* provision.

5.1.1. Curriculum development and core skills

In England, a number of factors began to affect curriculum development in provision for the post-16 age group:

- (a) the significant increase during the mid 1980s in overall unemployment (Nickell and Bell, 1995; Department for Education, 1994);
- (b) social unrest amongst unemployed youth (Cross and Smith, 1987);
- (c) adverse comparisons with other EU nations regarding participation and achievement rates amongst the 16-19 group (Dearing, 1995; Raffe, 1994; Ryan 1991);
- (d) recognition that career routes were unpredictable, and that workers would experience a greater number of job changes in the course of their working lives (Levy, 1986), that work was becoming increasingly informed (Boreham and Samurcay, 1998) and that unskilled work would be less and less available in labour markets (Nickell and Bell, 1995).

The first three factors were more significant in England than in other EU nations (Green et al., 1999). However, the challenge posed by the latter structural changes in industry and labour markets were - and continue to be - significant. Failure to adopt appropriate measures in skilling and upgrading the labour force clearly held the potential for consequent social problems - in particular, the threat of increased unemployment, skill shortages and poor labour flow, acting adversely on industrial competitiveness and responsiveness.

Core skills - the name transformed into 'key skills' after Dearing's recommended reforms to qualifications for the 16-19 age group (1996) and the use of the term '*Schlüsselqualifikationen*' (key qualifications) in Germany - fitted neatly into this set of concerns. They were expected to address the need for increasing diversification of programmes and qualifications, requirements for increased participation, the recognition of the need for elevated skills, and the need for workers capable of sustaining constant updating and change. Early development work on core skills in Canada (Smith, 1978) and England (Hayes et al., 1982) during the late 1970s and early 1980s was underpinned by a notion that it was possible to identify 'generic skills' - skills relevant to a wide range of settings. As core skills moved into more mature development projects (Levy, 1986) developers began to develop further the theoretical base of core skills by association with work on 'skill transfer' (Annett, 1989). This provided a link to the aspirations of policy makers to base initial vocational training on skills which would help trainees to operate in a wide range of settings, through the provision of more general training leading to a wide range of specific occupational destinations. Policy makers also hoped that possession of these skills would encourage adaptability in experienced workers. But this does not explain fully the attractiveness of core skills to policy makers. There are further links to policy concerns over the increasing diversification of qualifications.

Core skills held a potential in finding 'essential skills' which might lie at the heart of education and training programmes. It is important to note that, in England, key skills have been promoted for all learners in academic, vocational and occupational post-16 provision - including undergraduate provision - not just for those in vocational and occupational provision.

5.1.2. Diversification and rationalisation

An early example of the role of concepts of 'core' content - expressed as 'core curriculum' - can be found in successive phases of curriculum development at Harvard University. Since the middle of the last century, the Harvard undergraduate curriculum underwent diversification and escalation in the types of course units making up the undergraduate degree. As the number of course options increased, academic standards committees grew concerned that the diversity of eligible courses were simply too great to ensure the coherence of the undergraduate learning experience. They took steps to reduce the range of combinations of courses by establishing the concept of an essential 'core' (Keller, 1982). Each

attempt at rationalisation was a temporary success. However, diversification in course options was insidious, as tutors developed new courses to interest and motivate students and to respond to developments in disciplines. In consequence, a cycle of diversification and rationalisation was set up. Although set in the confines of a single institution, this is an analogue of tensions emerging in qualifications systems in developed nations.

Faced with increasing diversification in the scope, content, the number and type of qualifications, the idea of identifying a set of skills that ran like a common thread through them was compelling to policy makers. Key skills were seen to hold the potential for including common components in all education and training programmes. These components would be capable of being transferred from one setting to another, allowing competence to be 'redeployed' (Hayes, 1982; Levy 1986), and thereby allowing individuals to respond effectively to seemingly inevitable changes in the content and context of work.

5.2. Key skills / Key qualifications in the EU Member States

5.2.1. Key skills in the UK

Since the mid-1980s, key skills have assumed an increasingly prominent role in development work on qualifications in England. Initial work by vocational qualification awarding bodies (the BTEC Common skills, the City and Guilds 365 award and the Certificate of pre-vocational education common skills units) was accompanied by joint EU- and state-sponsored development of a set of core skills for Manpower services commission (MSC) Youth training scheme (YTS) programmes. Under Government instruction, in 1990 the National council for vocational qualifications (NCVQ) worked with the National curriculum council (NCC) and the Schools curriculum and assessment authority (SCAA) to develop core skills units for inclusion in National vocational qualifications (NVQs) and General certificate of education (GCE) A-levels. Although the principle of core skills had been built into the original specification for the national curriculum for 5-16 education (NCC 1989), scant attention was paid in schools or by policy makers to the implementation of core skills in the school curriculum. This was set to change with the inception of General national vocational qualifications (GNVQs) in 1992, since core skills units were included as a formal requirement of these awards. By this time, the role of key skills in promoting skill transfer had shifted towards an emphasis on key skills as a crucial broadening component of academic and vocational programmes (Oates, 1996). Though these are linked - i.e. the value of general skills components is dependent on a notion of these skills being valuable in a broad range of settings - the shift in emphasis has had a significant effect on the implementation strategy for key skills.

The political and public interest in vocational qualifications stimulated by GNVQs (Oates, 1996) ensured that core skills remained prominent in national debates on the education and training curriculum for the post-16 age group. Further consolidation of the role of core skills - undergoing a change of name to 'key skills' without any substantive change in form or content - has been effected by the development of a national qualifications framework promising alignment of academic, vocational and occupational qualifications (Oates, 1999). This follows the implementation of the recommendations of the 1996 *Dearing Review of qualifications for 16-19 year olds* (Dearing, 1996) and the subsequent *Qualifying for success* consultation (QCA, 1999). Extending the impact of key skills, recent policy on qualifications approval by the national regulatory body (the Qualifications and Curriculum Authority) has brought key skills into curriculum development and qualifications approval issues associated with provision for the 14+ age group.

The prominence of key skills in the English system has been matched by continued interest in other EU nation states. Belgium is giving key skills a prominent role in the modernisation of its qualifications system (De Clerk, 2000). Germany continues with the development of 'key qualifications'. Italy is developing provision for various groups using key skills as a crucial part of the curriculum framework. Denmark is using principles of adaptability as a significant part of curriculum development in a range of programmes.

The NCVQ (in 1997 merged with SCAA to form the Qualifications and curriculum authority) participated in an EU Leonardo project from 1995 to 1997 with partners from Italy, Denmark, Germany, Belgium, Spain and Wales. This brought an important comparative dimension to the work of NCVQ in developing the strategy for implementing and further developing key skills. The project yielded powerful insights into the distinctive foci of the different nation states' development and implementation effort on key skills. Similarities and contrasts quickly became evident. The broad policy aims in the different countries appeared congruent and convergent in certain respects. Core skills (later key skills) were considered to be an important modernising element for occupational and vocational learning programmes, encouraging the development of skills which were essential to a broad range of settings, thus helping workers to cope with the inevitable change which was anticipated in work systems and in career paths. However, the comparative perspective of the project highlighted strong distinctions between countries in respect of three sets of issues.

5.2.2. Underpinning theory

The first concerned the nature of underpinning theory, affecting issues such as the descriptors for key skills. While each nation had a listing of key skills these included common elements - such as communication - and distinctive elements - such as information technology. Even where the general terms were similar, such as problem-solving, the underlying definitions of the skill area derived from different

sources, models or assumptions, giving important differences of focus. In the area of numeracy, some states' systems emphasised mastery of formal mathematical operations, while other systems emphasised application of number techniques strongly in the definition and consequent listing of key skills. The comparative analysis highlighted very different positions on the extent to which key skills should be contextualised in learning and assessment. For example, in Germany, the development of occupational standards for the specific professional routes involved the use of a set of common skills (communication, mathematics etc.) as a framework for the identification of content in each route. However, each set of standards, which are formally adopted in the system, is specific to the language and contexts of that route. The formal specifications for learning and assessment in each sector thus may have been developed using generic skills specifications, but the specifications which reach tutors, trainers and learners have been fully contextualised.

In contrast, the assessment specifications for key skills that are used by tutors, trainers and learners in England and Wales remained highly generic. The same general specifications of communication, application of number, etc. were used in all occupational sectors, and across education and training. Any contextualisation (beyond illustrative examples) was left to tutors, trainers and learners in individual learning settings. By 1998, this position had changed in England, with qualifications in different academic subject areas or vocational areas being 'signposted' for specific key skills. The qualification specification showed where the skills could be learned and demonstrated in respect of specific elements of each academic subject or vocational area. This occurred partly as a result of feeding the results of the comparative project into the national development work, and partly as a result of national developers confronting the practical issues of contextualisation, which was increasingly being emphasised by practitioners as a fundamental problem in the system.

5.2.3. Political, social and economic factors

The second set of issues related to the political, social and economic factors affecting the orientation of development and implementation effort, as the level of integration of key skills into education and training systems contrasted strongly across the participating countries. In Germany, key skills were intrinsic to the development of occupational standards, and thus built formally into all occupational sectors. However, a single framework was not in place across education and training. In England and Wales, from roots in training programmes for young unemployed people, key skills had grown to be a set of qualification units, which were required across all government-funded vocational/occupational training and, increasingly, in full-time education for people from 14 years of age. By contrast, programmes in Denmark, Belgium, Spain and Italy were focused on specific groups. In Italy and Spain, this corresponded to the earlier work in North America

and England - interest in key skills had been stimulated by increasing concerns about devising more effective programmes for unemployed groups or those vulnerable to fundamental changes in the domestic labour market.

5.2.4. Curriculum control

The third set of issues on which there were distinct differences related to the degree of curriculum control, where very clear contrasts emerged. The first of these concerned underpinning theory: the extent to which key skills should be contextualised; the extent to which learners should be responsible for defining their own specific meaning of key skills; and the extent to which learners should be deliberately aware of key skills in order to promote adaptability. The second set of differences related to the state or phase of development of the education/training system: the direction of government strategy with respect to centralising or decentralising key functions; specific concerns such as maintenance of standards in qualifications, raising achievement etc.; the focus of reform or control, such as an emphasis on qualifications reform, the use of qualifications as an instrument of change etc.

A distinction emerged between England and Wales on the one hand, and approaches in Denmark and Belgium, on the other. Following the dominant tradition in England and Wales for using qualifications as a principal instrument of curriculum reform, key skills had been essentially an assessment-driven innovation. They existed as highly detailed specifications of the outcomes to be attained. The main effort had been to develop, disseminate and promote the use of key skills units in communication, application of number, information technology, problem-solving, improving own learning and performance, and working with others (QCA, 1998). The emphasis in the support for tutors, trainers and learners had been in respect of assessment. This led to certain strengths: precise descriptors and, through central requirements relating to approved qualifications, promotion of mass implementation. However, there were evident weaknesses in the consistency of the curriculum development activity on the ground, lack of consensus about principal aims, and more attention paid by tutors and trainers to meeting assessment requirements than actually securing skill transfer, or adaptability, in learners. Developers from other countries saw the clarity and degree of theoretical underpinning of the definitions of the key skill areas as strengths, and the scale of implementation as a major achievement. They expressed concerns in respect of the dominance of assessment over learning, and a clear pre-occupation of tutors and teachers in meeting externally-set requirements, rather than monitoring and developing learners' ability to adapt skills and knowledge to the requirements of new, unfamiliar contexts.

In contrast, innovation in Denmark and Belgium was focused on curriculum development at a local level, with a strong emphasis on the quality and nature of the learning process (Andersen, 1994; Illeris et al., 1995; Illeris 1999). The principal

aim was not seen as securing consistency of assessment but securing learners' understanding of and ability to adapt skills and knowledge to the requirements of new, unfamiliar contexts. The innovations in these countries therefore possessed many contrasts with the English and Welsh innovations. They were considered by the project team to be strong on relating learning processes closely to the requirements and contexts of specific learners and learner groups, but weak on consistency and precision in definitions of key skill areas.

The original work for core skills in Youth training schemes (YTS) drew eclectically on international work on key skills, and while the mass implementation phase took a direction very characteristic of the English context - an emphasis on assessment-led change - an international comparative element and concern with global trends has remained deep at the heart of the innovation. The consolidation phase (1983-86) in underpinning theory linked key skills very closely with the concept of 'skill transfer'. The government emphasis on implementing key skills in NVQs and in A levels emphasised broadening the concept in the face of adverse comparisons with the breadth of post-16 provision in other nations - notably France and Germany.

5.3. Developing and implementing key skills / key qualifications

5.3.1. Problems in the implementation of key skills in the UK

Key skills have undergone sustained development in the EU. In England, the first work linking key skills with skills transfer occurred over 15 years ago, and has moved from medium scale development (work with 400 trainees in four national project centres) to mass implementation (over 300 000 learners working towards key skills at any one time). However, despite the sustained interest in key skills - moving to a position in the late 1990's where they have assumed an increasingly important position in the national framework - they remain hampered by significant problems. The Leonardo project provided a platform for exploration of problems specific to particular countries, such as the polarised strengths and weaknesses outlined above, but also deeper problems.

There were fundamental problems of the concept of skill transfer, with this concept showing deficiencies when evaluated using mainstream learning theory. Adaptability has been advanced as a more robust concept (Oates and Fettes, 1998). The 'rush to develop and implement' in the English setting has also compromised the drive to provide adequate theoretical underpinning for key skills.

There was also the need to develop learning programmes with very specific characteristics: an explicit emphasis on adaptability and on sequencing theory and practice. An emphasis on assessment is not likely to lead without fail to learners developing the ability to adapt skills to unfamiliar settings. Only with attention to the precise nature of the learning process and the way in which individuals are

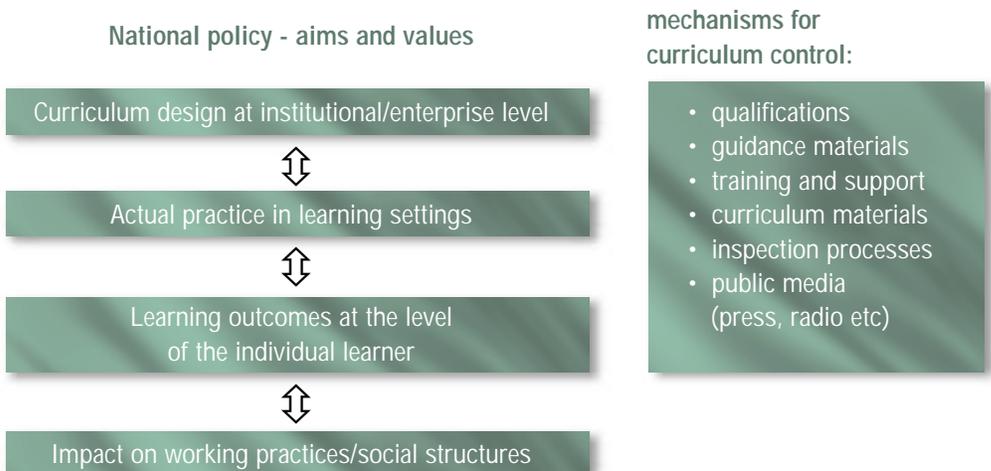
developing the ability to adapt their skills is there the possibility of mass programmes which meet the original aims of core/key skills (Brown, 1999; Oates and Fettes, 1998).

5.3.2. Curriculum design and development: a comparative framework

It is important not to be simplistic in labelling national approaches as 'assessment-led' or 'learning-led'. These are crude labels that highlight the dominant emphasis within specific nations' systems, but do not explain with any precision the patterns of curriculum control in specific national settings. A more elaborated view of the curriculum development process, as outlined in the following figure, shows there are a variety of ways in which systems can be compared.

This is highly relevant to key skills developments across the EU. Key skills are highly theoretical in character, being those skills which underpin effective performance in a wide range of settings, thus enabling workers to respond to changing demands of work. Programmes aimed at promoting the development of key skills in workers are not easily devised or managed (Oates and Fettes, 1998). Thus, the mechanisms used to transmit aims and values through the system, and down to practice at the level of learning programmes are crucial. Some nations (such as England and Wales) have relied heavily on qualifications as the means by which policy intentions are implemented at ground level, while others (Denmark, Belgium) have relied on more flexible qualification structures, but with more carefully-directed learning approaches. In the former settings, assessment is seen as the guarantee that key skills are implemented; in the latter, sensitivity to the precise contexts in which learners are operating is seen as securing a greater certainty that learners will genuinely develop key skills.

Figure 1. **Curriculum development - action contexts and mechanisms for policy control**



5.3.3. Precision and prescription in key skills policy and implementation

The degree of precision – or prescription – aimed at in key skills policy and implementation is revealed clearly in the lists of key skills specific to each nation state. In England and Wales, the list of key skills was deliberately restricted to those aspects of performance which policy-makers felt would be amenable to competence-based, criterion-referenced assessment (Oates, 1992). The listing in England included communication, application of number and information technology. Also developed were specifications in working with others, improving own learning and performance, and problem-solving. Interestingly, the first three were prioritised by government policy-makers and the latter three pushed onto the sidelines, principally on the basis that consistent assessment of the latter three was far more problematic than the first three.

In contrast, in Denmark far less attention has been paid to producing a nationally-agreed listing of key skills, with policy makers being less concerned about consensus at the level of definitions of skill areas and more concerned about high quality learning aimed at promoting adaptability. Similarly, in Italy, the emphasis on consistent assessment remains far less prominent, with the listing of key skills including modules such as ‘diagnosing’, ‘relating’ and ‘coping’. In the Danish context, in vocational education programmes such as those dedicated to industrial operators, personal skills such as ‘self dependence’, ‘cooperation with others’, and ‘flexibility’ are explicit goals (Clematide and Agø Hansen, 1996; Clematide, 1997). These are seen as broad aims to inform curriculum development and delivery rather than specific assessment objectives (where the learners and trainers need to assess performance against specific, laid down criteria).

5.3.4. Transfer and adaptability

While the concept of ‘transfer’ or more latterly ‘adaptability’ is a common theme lying at the heart of different nations’ approaches to and definitions of key skills, the view of the role of key skills in the education and training curriculum varies in different EU nations. This gives rise to important differences in the listings of skills and the way in which they feature in curriculum development.

For example, in England, the concept of transfer originally used suggests that skills are developed in one context and then ‘redeployed’ in others (Oates and Fettes, 1998). The distinction was made in early development work (Levy, 1986) between ‘transferable skills’ – the things which learners learn and redeploy in new settings – and ‘skills of transfer’ – the capacity in individuals to use strategies and approaches which enable skill transfer to take place. Within this conception of transfer lay a notion of ‘identical elements’ – that different tasks have elements in common. If new settings involved substantial overlapping elements with situations in which the individual has already performed effectively, the term ‘near transfer’ was used. If few elements were shared, then the term ‘far transfer’ was deemed appropriate. But this mechanistic conceptualisation falls far short of emerging

recognition of the interaction between the individual and (changing) work contexts:

'The theory of situated cognition gives due recognition to the dependence of intellectual competences on context, representing concepts and procedures as being constructed during activity in the workplace, and drawing on the culture of the workplace. However, it gives insufficient recognition to the development of competences in the individual...understanding work in complex, dynamic and informed environments depends on analysing the worker's orientation, and the way in which he or she makes sense of the situation. The approach to orientation stresses that the work activity is not only functionally oriented but also aims both to satisfy the subjective needs and the conditions of cooperative work. The approach to sense-making stresses that in many flexible working situations, staff generate their own practices for dealing with crises and breakdowns in standard procedures...'
(Boreham and Samurcay, 1998, p1)

This is reinforced by Piagetian notions of 'cognitive conflict' – where it is suggested that every instance of effective performance – even in seemingly routine settings - gives rise to learning, since our skills and strategies are based on partial, imperfect views of the world. When we use our existing skills and strategies we will find that they don't work in their entirety; they don't always correspond exactly to the demands of the tasks or situation. If we want to perform effectively we need to modify – often very subtly – the strategy or the skill which we use. This gives a quite different view to the 'common sense' view of transfer, centred on the idea of 'transferring' something (a skill) from an old situation to a new one. This approach considers that every situation involves changes or *adaptation* of our existing skills and constructs. The ideas of 'near/far transfer' and 'identical elements' turn the focus away from the individual and onto the situation they are in. This more sophisticated understanding of adaptation is increasingly attached to key skills in England and is resulting in increasing interest in the experience of the learner in adapting skills and the quality and characteristics of learning programmes.

5.3.5. Transversal competences and curriculum control

In Italy, the concept of 'transversal competences' includes two distinct components, looking in one direction towards the characteristics of tasks and in another direction towards the characteristics of the individual – a 'work-based' perspective and a 'worker-based' perspective (Bresciani, 1998a; Rey 1996). In the first ('work-based') perspective, transversal competences are defined as those things that recur in a similar way in different sectors or work environments. This is a version of the 'identical elements' theory. Transversal competences are defined as job requirements, to be uncovered by job analysis and similar techniques. In the second ('worker-based') perspective, transversal competences are those relating to the specific individual's 'operating strategies', and link to appropriate strategies which underpin that individual's effective performance in a specific context

(Bresciani, 1998b; Di Francesco, undated). In the Italian context, the co-existence of these different perspectives is considered vital. This is seen as essential to understand the relationship between notions of tightly defined requirements of a job role and the individual's behaviour, skills and strategies, and to move beyond mechanistic concepts of competence.

This impacts heavily on curriculum design and development. Rather than seeing curriculum design and development as a process of implementing centrally determined programmes in a rigid fashion, the focus on the way in which an individual's skills and strategies are constructed shifts also the locus of curriculum control. The importance of engaging the learner and adapting learning content and learning processes to the context in which the learner is operating becomes more critical (Bresciani, 1997).

5.3.6. Integrated delivery

The meaning of 'integrated delivery' reflects also these shifting perspectives on curriculum control. In England, the concept of 'integrated delivery of key skills' refers to the extent to which the key skills units are built into programmes of learning and assessment dedicated to specific work operations. 'Non-integrated approaches' are those where the skills are learned or assessed in a 'stand-alone' fashion, with little or no reference to the specific settings in which the learner will be using the skills. At the heart of this lies a delicate balance (Oates and Fettes, 1998), where in non-integrated approaches learners fail to make links between key skills such as communication and the specific settings in which they communicate within work. Conversely, in other programmes key skills may be 'so integrated that they vanish without trace'. That is, trainers simply assume that the skills are embedded in work activities and will automatically be acquired if the work activity is completed satisfactorily. The curriculum development and delivery issues here focus on the trainer or tutor. They become responsible for analysing ('mapping') the extent to which certain work/learning activities include key skills, how they will make the learners aware of key skills, and what evidence from the work activities will be used in assessment process.

5.3.7. Adaptability and curriculum control

By contrast, in Denmark, integrated delivery of continuing vocational training (CVT) within the national *AMU* system refers to something rather different. In the late 1980s and early 1990s, the concept of 'soft qualification' gained currency. The intention of researchers and developers was to turn away from technical qualifications with tightly defined criteria. This trend became dominant within the national system. Supported by social partners and authorities in continuing vocational training, and furthered by cooperative transnational research work with Cedefop, some common understandings of the role of key skills and these 'soft qualifications' became established (Clematide and Agør Hansen, 1996):

- (a) 'qualifying' in personal skills is highly dependent on context;
- (b) qualifying in personal skills is an intrinsic, but under-recognised part of qualifying in technical skills;
- (c) assessing to fixed standards is highly problematic;
- (d) historical circumstances affect which of the personal skills are considered important at a given point in time.

Stimulated by this new tendency, the objective of curriculum development within the *AMU* system is now to analyse and meet the training needs of learners through continuous negotiation and dialogue with the learners (*Arbejdsmarkedssryrelsen*, 1998). In England, the aim is to determine how best to assess individuals' key skills against national criteria, with assessment remaining the most prominent issue amongst learners, trainers, regulatory agencies and policy makers. In contrast, in Denmark concern about the linkages between learners' needs, the context they are in and the application of the learning has come to dominate. Within the *AMU* system, training institutions have to function as consultants to learners and to enterprises, fixing not only on the quality of the courses and learning which are supplied, but also on the preparation and follow-up from training/learning. Within this, the application of learning to new work contexts is crucial – the concept of adaptability which is at the heart of policy and theory relating to key skills.

It is essential to recognise the extent to which this represents a shift of control regarding curriculum development. Policy makers and developers in England and Denmark share the same aim: to develop adaptability – the capacity to perform more effectively in new settings. The approach to date in England has emphasised the importance of assessing tightly defined skills with precision, with assumptions that the precise methods of learning the skills are of secondary importance. However, the Danish approach highlights more the importance of encouraging learners and trainers to link learning to the specific contexts in which learners are currently operating and the new contexts in which they need to apply key skills. The focus on the learner is crucial – particularly the emphasis on being sensitive to the way in which each person understands the context in which they are operating, the skills required, the skills they have and the skills they need to develop in order to perform effectively. This brings the learner to the centre of the curriculum development process. This is not to say that the learners control the totality of the development and implementation of the curriculum, since trainers, tutors and enterprises remain fully engaged with the development and implementation of learning.

The shift in control can best be understood by example (Bottrup et al., 1994):

In a small paint manufacturing plant the management became concerned about the lack of flexibility in production, when faced with changes in markets and technology. This concern was discussed openly between management and workers, who agreed that some workers would be vulnerable if they were not able to adapt to new technology and production methods. Management expressed an aim of achieving total flexibility in operations, necessitating all workers being able to

perform all work functions. Initially, workers expressed concern about such a radical change from existing work practices, and while recognising the importance of modernising processes, were not able to propose viable alternative solutions. Management and workers therefore agreed to adopt the ‘total flexibility’ approach, and to use provision within the Danish CVT system to support the learning/training required. Provision in ‘quality awareness’ appeared broadly suitable. As an officially recognised course, it was necessary for the learning and outcomes to meet the laid-down aims of the course. However, the aims were stated in very broad terms, allowing some flexibility in the specifics of the learning programme. The training providers worked with the workers from the enterprise to ensure that the specifics of the course engaged directly with the re-skilling requirements needed to effect the organisational change.

The linking between the course and the work context did not end there. After the course was completed, a working group was established to follow up the learning in the course. This was dedicated to ensuring that the intended outcomes regarding flexibility were actually being realised in the workplace, and that the learning was relating effectively to the changing work context. Production groups were set up, using guidelines essentially devised by the workers themselves, devoted to securing full flexibility in the workers and work teams. This was accompanied by regular meetings between management and workers, where a routine audit was undertaken, monitoring the progress of the transformation of work practices and making any necessary adjustments to the strategy.

The course content – key skills focusing on problem-solving techniques, quality awareness, etc. – was vital to the skill profile that the workers had to develop to cope with the switch to new working arrangements. But also vital to the success of the process was linking the learning on adaptability to the precise context in which the learners were operating. This was achieved through the work on curriculum development done prior to the start of the course and effort after the course on stimulating and monitoring the change process. At the heart of the initiative lay highly collaborative and supportive relations between all the actors in the process, agreement about aims, and a willingness to fine tune approaches in the light of feedback. This was not a process of implementing rigidly an externally specified set of key skills, it was a process of negotiated curriculum design around common aims.

5.4. Common concerns and future development

Among the variations across the approaches to key skills in different nations in respect of underpinning theory – language, definition and implementation strategy – there have emerged crucial common concerns:

- (a) the importance of secure, well theorised aims in relation to key skills;
- (b) a shift in the role of trainers/tutors to being not merely ‘delivery agents’ for

national programmes, but responsible for managing learning processes which are sensitive to the contexts in which learners/workers are operating and the way in which adaptability can best be promoted in each individual;

- (c) an emphasis on the way in which a learner's competence is constructed.

International comparative work has played an important part in refining approaches to key skills in member states. In the English policy setting, the Leonardo project worker was also a key member of the national development team, responsible for advice to government and for refinement of specifications and assessment arrangements. Insights from the project were fed systematically into critique and further policy work on key skills. The comparative work on contextualisation of key skills (see above) was of particular significance, alongside the importance of effective curriculum development and delivery. Acknowledging the preoccupation with assessment-led innovation, policy critique, informed by the study of other EU nations' systems, focused on the need to address the quality and characteristics of learning processes. This has been realised in the launch of a £5m initiative to develop high quality programme support and learning materials, and in the quality criteria now being developed for key skills provision:

- (a) careful sequencing of theory and practice components to help learners learn the basic skills and knowledge (the 'know how') underpinning key skills and see the relevance of what they are learning through practical experience;
- (b) explicit tuition and practice in using learning strategies within a wide range of contexts;
- (c) careful structuring of tasks that promote the ability to think by creating problems of sufficient challenge to stretch, but not deter, the learner;
- (d) systematic variation of tasks in order that learners can see how, and to what extent, existing skills can be applied to good effect in less familiar tasks and identify when new learning is required;
- (e) working with others (e.g. through collaborative use of ICT, coaching, reciprocal teaching, pair problem solving) so that learners are encouraged to articulate their reasoning for adopting particular approaches and learn from each other about what works and what doesn't work;
- (f) providing learners with precise feedback, not only on how they are doing, but also on what they need to do to improve;
- (g) encouraging self-assessment and reflection by the learner (to think about their own thinking).

In summary, key skills remain persistent but problematic, under-theorised yet compelling to policy makers. What is apparent from the Leonardo project is that international comparative work has a clear role to play in refining national approaches to key skills, in critical areas. These include the understanding of adaptability; the definition of key skills; approaches to assessment; approaches to learning; contextualisation; and placing of key skills in national qualification and curriculum frameworks. In the drive to encourage mass uptake of key skills, it must

not be forgotten that *adaptability* should lie at the heart of key skills:

‘...to thrive in an economy defined by the innovative application of knowledge, we must do more than absorb and feedback information. Learners and workers must draw on their entire spectrum of learning experiences to apply what they have learned in new and creative ways...’
(Seltzer and Bentley, 1999)

Bibliography

- Andersen, V. *Qualifications and living people*. Roskilde: Adult education research group, Roskilde University, 1994.
- Annett, J. *Training in transferable skills*. Sheffield: Training Agency, 1989.
- Arbejdsmarkedsstyrelsen. *Personlige og Alment-faglige kvalifikationer i Arbejds-markedsuddannelserne*. Copenhagen: AMS, 1998.
- Boreham, N; Samurcay, R. Models for the analysis of work competence: a critical review. Paper for the 3rd *WHOLE conference*. Siena, Italy, December 1998.
- Bottrup, P; Andersen, K. B; Clematide, B. *From vocational training to development*. 1994.
- Bresciani, P.G. Le competenze. Approcci e modelli di intervento. *Professionalità*, No 38, 1997.
- Bresciani, P.G. *Competenze e comportamento organizzativo*. Sinform, 1998a.
- Bresciani, P.G. *Glossario minimo. Psicologia de lavoro e comportamento organizzativo*. Sinform, 1998b.
- Brown, A. Designing learning programmes in vocational education and training to promote transferability. Paper presented at meeting of *Working Group 4 of COST A11 Framework for European Collaboration on research in vocational education*, University of Twente, Netherlands, June, 1998.
- de Clerk, R. Modularisation in Belgium. Conference paper to *Qualifications and Curriculum Authority*. London, February, 2000.
- Clematide, B. *A joint platform regarding key qualifications in Denmark*. Copenhagen: DTI Human Resources Development, 1997.
- Clematide, B; Agø Hansen, C. *Et fælles begreb om kvalifikationer?* Copenhagen: DTI Human Resources Development, 1996.
- Cross, M; Smith, D. (eds). *Black youth futures – ethnic minorities and the youth training scheme*. Leicester: National Youth Bureau, 1987.
- Dearing, R. *Review of qualifications for 16-19 year olds*. London: Schools Curriculum and Assessment Authority, 1996.
- Department for Education *Participation in education by 16-18 year olds in England 1983/84*. Statistical Bulletin 10/94, 1994.
- Di Francesco, G. *Competenze trasversali e comportamento organizzativo*. Agnelli, undated.

- Green, A; Wolf, A; Leney T. *Convergence and divergence in European education and training systems*. London: Institute of Education, University of London, 1999.
- Hayes, C. et al. *Foundation training issues*. Falmer: Institute of Manpower Studies, 1982.
- Illeris, K. et al. *Almenkvalificering*. Roskilde: Roskilde University, 1995.
- Illeris, K. *Læring – aktuel læringsteori mellem Piaget, Freud og Marx*. Roskilde: Roskilde Universitets Forlag, 1999.
- Keller, P. *Getting at the core*. Harvard University Press, 1982.
- Levy, M. *Work based learning – tools for transition*. Blagdon: Further Education Staff College, 1986.
- Nickell, S; Bell, B. The collapse in demand for the unskilled and unemployed across the OECD. *Oxford review of economic policy*, 1995, Vol. 11, No 1.
- NCC. *The national curriculum – guidance for schools*. York: National Curriculum Council, 1989.
- Rey, B. *Les competences transversales en question*. ESF, 1996
- Ryan, P. (ed.). *International comparisons of vocational education and training for intermediate skills*. London: Falmer Press, 1991.
- Oates, T. *Developing and piloting the NCVQ core skills units – an outline of method and a summary of findings*. London: National Council for Vocational Qualifications, 1992.
- Oates, T. *The development of key skills in England*. EU Leonardo project report. London: NCVQ, 1996.
- Oates, T. Towards coherence. Paper presented at *British Education Research Association annual conference*, University of Sussex, Brighton, September 1999.
- Oates, T; Fettes, P. *Key skills strategy paper*. London: Qualifications and Curriculum Authority, 1998.
- QCA. *Key skill specifications*. London: Qualifications and Curriculum Authority, 1998.
- QCA. *Qualifications 16-19*. London: Qualifications and Curriculum Authority, 1999.
- RVQ. *Review of vocational qualifications in England and Wales*. Sheffield: Manpower Services Commission and Department of Education and Science, 1985.
- Seltzer, K; Bentley, T. *The creative age*. London: Demos, 1999.
- Smith, A de W. *Generic skills – keys to job performance*. Canada Employment and Immigration Commission, 1978.

CHAPTER 6

A Dutch approach to promoting key qualifications: reflections on 'core problems' as a support for curriculum development

Jeroen Onstenk and Alan Brown

6.1. Introduction

This chapter focuses on the incorporation of the notion of 'key qualifications' in the Dutch national qualification structure and on the 'core problems' approach as a means to bridge between qualification needs analysis and curriculum development. One of the recurrent debates about key qualifications or core skills focuses upon the extent to which they need to be contextualised and connected to specific vocational problems. Can they be taught separately or can they only be developed in particular contexts? This chapter takes the second view, though it proposes a two-way relationship. Modern occupations and jobs need to be conceptualised in a broader way in order to take into account the continuing changes in technology, markets and organisational design. Only in this way can they be considered as a relevant context for developing key qualifications and core skills. Analysis of recent developments in the Dutch qualification structure show a new, and very promising, way of operationalising key competences and of developing tools to include them in qualification frameworks and curricula.

This chapter addresses four related themes. First, the Dutch reaction to the European key qualifications debate is examined, particularly the most recent development which focuses on the concept of key competences. Second, the concept of core assignments and core problems is introduced. The third theme considers how these have been developed in new formats in order to fit the Dutch qualification structure. Fourth, the consequences of core problems for curriculum development in Dutch VET are discussed. In the conclusions some 'lessons for Europe' are drawn.

Key qualifications have been discussed in the Netherlands since at least 1986 (Nijhof and Mulder) or even 1980 (van Hoof and Dronkers) with no engagement with the debate about structural attempts to strengthen the relationship between vocational education and the work process. Indeed, until the end of the 1990s

(following the publication of the 1997 report by the Social economic council) these remained separate trajectories. In the procedures developed to produce several 'generations' of attainment norms (*eindtermen*) key qualifications were conspicuously absent as a theme (Moerkamp and Onstenk, 1991). The Social economic council as a consequence recommended inclusion of key qualifications (as defined by van Zolingen, 1995; van Zolingen, Blokhuis, Streumer and Nijhof, 1999) in the qualification structure. The Organisation of national bodies for vocational education (*COLO*) and the Council of vocational colleges (*BVE Raad*) made some attempts to show that key qualifications were already included as an element in existing structures. However, it was felt that this aspect could be strengthened and in 1998 a programme of research and policies (*Regieplan versterking kwalificatiestructuur*) was launched in order to improve the quality and effectiveness of the qualification structure and vocational education. As part of this, in 1999 the Advisory committee on vocational education (ACOA) drafted a report for the Ministry of education, culture and sciences, which proposed to make core competences the central theme in strengthening the qualification structure. This report continues and advances the discussion started by earlier reports of the Social economic council (1997), the National education council (1998) and policy papers by the Council of vocational schools (*BVE Raad*) and by the Organisation of national bodies for vocational education (*COLO*). It also takes into account the European discussion on key qualifications and core skills.

A vision of core competences is developed in the ACOA report (1999), mainly based on the work of Onstenk (1997b) and Blokhuis and van Zolingen (1997). A framework is developed for securing transparency, durability and breadth by building profiles around core competences, core activities and core assignments and problems⁽³⁾. Reinforcement of the qualification structure is expected from this 'turn to core competences'⁽⁴⁾. Some consequences of this are detailed below. Concrete models for new formats for occupational competence profiles, as well as learning and civic competences profiles and qualification profiles, are also developed and will briefly be presented here.

⁽³⁾ Although the concept of core problems as used by Onstenk (1997) and Blokhuis and van Zolingen (1997) was largely taken over by ACOA, the actual phrase core 'problems' was rejected because of the connotations of the word problem. Learning how to deal with problems as opposed to just the routine tasks in the job are evidently also part of the objectives of vocational education. So, instead of using the phrase core problems the Dutch term '*kernopgave*' was used, with connotations both to core question or problem and to core task or assignment. In this paper we use the term core problems as shorthand for this concept.

⁽⁴⁾ In the UK and USA 'core competences' have been associated more as a characteristic of organisations rather than individuals. Problems concerning different understanding of terms is one reason why the analysis begins with an attempt to unpack their meanings in different countries.

6.2. Core skills, key qualifications and broad occupational competences

The Dutch and German discussions on key qualifications emphasise the importance of broadening occupational requirements, in order to take greater cognisance of the need to promote the ability to solve problems. There is a clear tendency in both sets of discussions that this should lead to a multi-dimensional analysis of skills needed in the work place. These analyses are not restricted to the identification of 'technical' job-specific skills. A lot of approaches and definitions can be distinguished with regard to the need for a broader concept of skill, including both more complex and information skills, organisational skills and social-communicative skills. Two main streams of this debate in the Netherlands can be distinguished (compare Kämäräinen and Streumer, 1998). The first drew on ideas about core skills and the second focused on key qualifications.

6.2.1. Core skills

The first stream links to the mainly Anglo-Saxon discussion, dealing with basic, generic or core skills (Carnevale et al., 1990; Levy, 1987; Stasz, 1998; Stevenson, 1996). According to Brown (1999) the genesis of a national approach to core skills in the UK was in the idea that they could be used as a developmental tool to give structure and direction to learning in the workplace (particularly on Youth training schemes) (Evans et al., 1987). In practice, however, core skills were used mainly within education programmes, primarily for 16-19 year olds. As a consequence core skills became identified with 'the more remedial function of equipping significant numbers of young people in each age cohort with basic skills and understanding that they have not acquired through the compulsory phases of education' (Young et al., 1997, p. 5). Additionally the association of core skills with the skills necessary for employment was interpreted as part of a wider attack, in which an emphasis upon skills was seen as undermining the traditional model of education, with its emphasis upon knowledge, understanding and cognitive development (Jessup, 1991; Hyland, 1994).

In other countries a comparable emphasis can be discerned. The SCANS-list, developed in the USA, can be seen as an elaborated version of this approach (Stasz, 1998). Skills listed in this way do not refer to specific tasks or clusters of tasks employees should be able to perform, but to general skills that employees are supposed to need to be able to work in a whole series of jobs or even any job at all. They are, in a way, considered as entry-skills for employment. These include both elementary skills like arithmetic, reading or writing skill, general cognitive skills (problem solving) and social-communicative or interpersonal skills. These skills are supposed to be fundamental to many tasks and a whole range of occupations and to ground specific occupational skills. In the Netherlands, Nijhof and Streumer

(1994) work within this tradition. They distinguish eight dimensions that should be part of broad vocational education: occupational specific skills; methodical-procedural knowledge; social-normative qualifications (such as discipline or tidiness); personal, social and interactive skills; learning skills; societal and cultural qualifications; transfer ability; and formal and informal work place experience.

6.2.2. Key qualifications

The second theme of Dutch discussions draws upon the earlier German discussion of key qualifications (see, for example, de Jong et al., 1990; Hövels, 1998; van Zolingen, 1995). Brown (1998) stresses that in the debate on 'key qualifications' in Germany and the Netherlands, a completely different concept has been formulated from that underpinning 'core skills' in the UK. 'Key qualifications' were associated with the need to broaden and deepen vocational education and training, in relation to development of an underpinning knowledge base and an increased emphasis upon logical, analytical and critical thinking. As such, 'key qualifications' raised intellectual demands within vocational education and training, rather than being viewed in any sense as remedial. Insofar as these related to skills for employment, they could be seen as proposals for the type of education and training required to maintain an economy at a 'high skills' equilibrium (Finegold and Soskice, 1988). 'Key qualifications' does not imply any primacy being accorded to a narrow skills-based approach. Indeed, van Zolingen (1995), in her comprehensive review, identified 'key qualifications' in terms of knowledge, insight, skills and attitudes. In fact, the German and Dutch discussion refers to cognitive, organisational-strategic and social-communicative skills connected to changing patterns of work organisation.

The concept of key qualifications builds on an older sociological distinction, originally made by Dahrendorf (1956), between functional and extra-functional qualifications, later elaborated by Kern and Schumann (1970) in a distinction between process dependent and process independent qualifications. The term key qualifications (*Schlüsselqualifikationen*) was first used by Mertens (1974), when studying the increasing requirements for flexibility in skilled work in Germany. He proposed that vocational education and training should focus upon the development of key qualifications, as this would have a dual function. First, it would improve students' labour market prospects, as they would be able to apply for a wider range of jobs. Second, it would equip them to be better able to react to future developments that are not wholly predictable, as, for example, when there are changes within a job (van Zolingen et al., 1999).

Key qualifications were conceptualised as a number of broad qualification dimensions that were needed by workers in the modern labour market in addition to those required for a much more limited and closely defined occupation. Mertens (1974) argued there were four sets of key qualifications. First, there were those aimed at giving depth to fundamental skills: for example, logical, analytical,

structured, associative and contextual thinking; critical thinking using argumentation and discussion; cooperative behaviour by employing social rules and techniques (van Zolingen et al., 1999). Second, there were qualifications with an extensive horizontal transfer value: for example, being able to gather, understand, process and use information. The third set of qualifications provided breadth: for example, knowledge of technology that underpinned broad occupational groups. The fourth set related to the need to be able to continue learning, so that experienced workers would be able to update their skills and knowledge through access to adult education and training.

The whole thrust of Mertens' argument was that there was a need to broaden and deepen vocational education and training, and this entailed paying greater attention to cognitive and meta-cognitive skills. From 1974 onwards, however, the meaning of 'key qualifications' was extended in various ways. The concept has been elaborated in two directions. On the one hand it is integrated in new descriptions of occupations in the German dual system and in that sense led to much broader definitions of occupational contents (Reetz, 1989). From this perspective emphasis is laid on how specific tasks and jobs are embedded in the labour process as a whole and upon the situated social, organisational and strategic dimensions of occupational practices. A distinction is made between task competence, methodical competence and social competence (Laur-Ernst, 1989; 1990). On the other hand there are many attempts to draw up lists of key qualifications as qualifications linked to specific occupational content (Wilsdorf, 1991).

In the Netherlands van Zolingen (1995) sought to provide a new coordinating interpretation of 'key qualifications', based on European experience, mainly in Germany and the Netherlands. She attempts to combine both perspectives by defining key qualifications as the broad, common core of occupations. She distinguishes six dimensions of key qualifications: general-instrumental; cognitive; strategic; social-communicative; social-normative; and personality. By this time, key qualifications were not limited to the cognitive dimension and were more closely tied to an occupational context, whereby key qualifications specifically involved qualifications that are necessary to practise an occupation (van Zolingen, 1995). Van Zolingen et al. (1999) provided a comprehensive definition of key qualifications as 'the knowledge, insight, skills and attitudes that are part of the durable core of an occupation or a group of related jobs, with the possibility of transfer to other, new jobs within that occupation and of innovations within that occupation, which contribute to the development of a person's occupational competence and facilitate transitions within the career' (van Zolingen et al., 1999). Van Zolingen et al. (1999) produced an extensive specification of the knowledge, insight, skills and attitudes that make up key qualifications:

- technical knowledge;
- general knowledge of languages and computing;
- inter-disciplinary knowledge;

- cognitive and meta-cognitive skills (identifying and solving problems; abstract thinking; intellectual flexibility; learning to learn; tacit skills);
- communication skills;
- ability to work with others;
- ability to plan and organise work;
- personal attributes such as self-reliance, perseverance and creativity; ability to adapt oneself to the corporate culture;
- acting as a modern citizen;
- showing a critical attitude to work and one's own interests.

It is apparent that this type of listing is not a restricted set of skills that should be incorporated into programmes of vocational education and training, but rather it is a challenge to the way VET is organised and delivered. One response to this challenge has been to make use of 'core problems', those problems and dilemmas that are central to the practice of an occupation (Onstenk et al., 1990; Onstenk, 1997a,b), as a way to broaden and deepen VET in practice.

6.2.3. Broad professional competence

In the Netherlands the concept of broadly applicable skills (De Jong et al., 1990; Onstenk, 1992) combined both traditions. It concentrated on strategic effectiveness and social and communicative performance skills. Strategic effectiveness involves problem-solving skills, organisational skills, versatility (multi-skilling and the application of procedural knowledge) and leadership skills. Social and communicative performance relates to the social character of the work place, both as a working environment and a social context. It implies cooperative skills, social-communicative skills and cultural skills. Both strategic and social competences imply commitment and motivated activity. De Jong et al. (1990) proposed a list of situational skills that distinguished between strategic, social-communicative and motivational dimensions, related to job management and the work environment. The requirements for strategic effectiveness produce demands for problem-solving skills, organisational skills, versatility, leadership skills and methodical skills. The social dimension demands cooperative skills, social-communicative skills and cultural skills. Within the motivational dimension, Onstenk (1992) made a distinction between professional attitudes, motivation and commitment, flexibility, responsibility, and the ability to handle emotions, fear and uncertainty.

In a further elaboration of this approach Onstenk (1997b) shifts emphasis to the need for integration of so-called general skills in a coherent ability to perform. Based on a thorough analysis of different types of occupational problems, he develops a concept of broad professional competence (*brede vakbekwaamheid*), in which seven dimensions are distinguished, parallel to the kind of problems a person has to deal with in work. Broad professional competence is defined as a multi-dimensional, structured and internally connected set of occupational technical, methodical,

organisational, strategic, cooperative and socio-communicative competences, geared to an integrated approach to the core problems of the occupation. In order to respond to the need to change, to participate in and contribute to innovation and to acquire new competences, 'learning competence' is added as a necessary element in broad professional competence.

6.2.4. Core competences in the ACOA 1999 paper

In its advisory paper ACOA (1999) concludes that in the Netherlands there is a consensus on the need for and usefulness of a clear qualification structure, based on occupational profiles legitimised by social partners. There is also consensus on the need for development of broad vocational education, both with regard to occupations and with regard to threefold qualification: for an occupation, for further (vocational) education and for citizenship. But a need is diagnosed for more coherence and comparability in the qualification structure by delivering more elaborated formats for curriculum development frameworks.

A series of definitions is proposed as a conceptual basis for further policies and tools. An occupation as objective of vocational education is defined by ACOA (1999) as:

'a specific bundle of capabilities, which is recognisable on the labour market and has a specific value there. It is a more or less historically developed entity that as such is recognised and acknowledged by society. In order to practise an occupation an individual needs a number of competences in order to be able to act in an adequate manner with regard to process and product characteristics'.

Competences are defined as structured and coherent sets of skills:

'a competence can be defined as the capability of an individual to act adequately with regard to process and product characteristics in work situations, but also in learning and training situations or as a citizen'.

Qualifications are defined as:

'the recognised set of formalised and standardised competence demands as required in vocational situations, but also in learning and training situations and in citizenship situations, to act adequately with regard to process and product characteristics'.

ACOA proposes to build the further development and reinforcement of the qualification structure on the concept of core competences, whereby:

'core competences are those capabilities (knowledge, skills, attitudes) of an individual needed to deal with the core problems of an occupation in an adequate process and product oriented way. Core competences are multidimensional, structured and coherent.'

ACOA (1999) then goes on to emphasise the importance of core competences as learning objectives for vocational education. Following Onstenk (1997b) four fields of competence are distinguished:

- (a) vocational (*vakmatige*) and methodical competences refer to the vocational content and specific problems and assignments and to the development of an adequate approach to these problems;
- (b) organisational and strategic competences refer to the ability to work in specific work and organisational environments (i.e. the ability to work effectively in different organisational contexts);
- (c) social, communicative, normative and cultural competences refer to problems connected to working in groups and the participation in the community of practice at the level of a team, a company or a profession;
- (d) learning- and shaping-competences refer to the contribution to one's own learning and development and to the development and innovation of an organisation or profession.

The ACOA White paper has been accepted by government, vocational colleges and national bodies of vocational training as a reference point for further innovation. In a number of experimental projects new vocational competence profiles as well as qualification profiles will be developed. Results will be reported in a follow-up to the Cedefop key qualifications project.

6.3. Core problems: activities, problems and dilemmas of an occupation

Current Dutch vocational education documents outlining attainment norms (*eindtermen*) focus on a restricted task-oriented part of what is actually important in occupational practice. Also, attainment norms are often fragmented and decontextualised. All the norms taken together are supposed to indicate what a qualified student knows and can do, but they often fail to give a more holistic and structured image of what the occupation is about. ACOA proposed to look for ways to give an integrated description of product, process, assignments and problems. In order to determine core competences, the vocationally specific connections between processes, products and problems have to be analysed. A competent practitioner has to deliver products and outcomes that fulfil specific standards, but he or she must also have an efficient way of working, dealing with contingencies and task management as required. Competences are needed for good preparation, planning, execution, control and evaluation of the activity. However, even good preparation and planning does not exclude the possibility that an individual or group may have to deal with unforeseen contingencies. Since it is impossible to predict exactly what contingencies will arise and when they will occur, it is also impossible to prepare practitioners for all contingencies and problems. But they can be 'harnessed' with competences to deal with unexpected situations. Also it is possible by careful analysis to predict what kind of problems and dilemmas could occur or what relevant choices and deliberations have to be made, for example weighing

quality versus costs, or speed versus precision and so on (Blokhuis and van Zolingen, 1997).

The attention given to core competences implies that vocationally relevant assignments and problems, and the way a (novice) practitioner has to deal with them, should be the main focus in vocational education (ACOA, 1999). This refers to the content of assignments and problems, and to the methodical way of handling them. These vocationally relevant problems were earlier referred to as occupational core problems (Onstenk et al., 1990; van Zolingen, 1995; Onstenk, 1997a,b). This concept has won broad support in Dutch vocational education organisations, although there are some differences in actual definitions. Core problems are defined (Onstenk, 1997a,b) as the problems and dilemmas that are central to the practice of an occupation. The analysis of the complex whole of problems can, for specific occupations, be condensed into central, specific, characteristic combinations of production problems, organisational forms and social-cultural problems. These sets could be described as core problems.

Core problems, then, are problems and dilemmas that are of central importance for occupational performance. Core problems occur regularly as part of occupational practice, and they are characteristic for the profession. Professionals are expected to find efficient and effective approaches and solutions to such problems. Core problems comprise the essential characteristics of the professional task, in which decisions and choices must be made. Deliberate application of knowledge and skills, and the extent and the speed with which the appropriate set of action alternatives are selected, determines the degree of expertise. Core problems refer to recurring and central occupational situations in which complex problems are solved and in which the specific characteristics of the situation and the social context are of central importance. This implies uncertainty and the need to balance different, sometimes contradictory, considerations and interests against each other. A distinction must be made between the level of complexity and the situational dimension of core problems. Complexity refers to complexity of required activities, handling different kinds of information at the same time, recognising different dimensions of a problem, possible contradictions, differences in importance, the need for deliberate reasoning and choices as part of the job or task itself.

An analysis of an occupation or vocational field for vocational educational purposes, which is the heart of the vocational competence profile (*beroeps-competentieprofiel*) proposed by ACOA (1999), should be constructed around the characteristic core activities of the occupation. Core activities can be analysed by looking at the product or required outcomes, the central processes, including tools, concepts, knowledge and material used, the main roles and responsibilities and environmental and contextual demands of an occupation. Seen from the perspective of the practitioner this leads to a specific set of problems to be solved, taking into account the specific organisational and social communicative dimensions of the work situation.

Core problems according to ACOA:

- (a) are the central tasks and problems met on a regular basis by a practitioner, which are characteristic for the occupation;
- (b) have to be handled in one or more specific organisational and social communicative contexts;
- (c) include an expectation that the practitioner will find a solution or an effective approach.

In the analysis and elaboration of core problems there are steps and criteria to distinguish with regard to content (the task and different possible approaches) and with regard to context (typical work environment, partners, what is permissible). If relevant, specific demands and criteria have to be formulated with respect to the product or service that is to be delivered, to the expected social behaviour with respect to working with colleagues and clients and with respect to the responsibilities that have to be undertaken.

When dealing with a core problem, a practitioner has to deal with choices or dilemmas which make a core problem complex. A core activity can be characterised by specific dilemmas and choices to be made in the work process. A recurrent tension in core activities and core problems exists between effectiveness, costs and quality. The resulting choices can vary with the situation. Another tension can exist between newer and older ways of doing things. A practitioner can be expected to make situationally adequate and responsible choices, and to contribute to a further development of the profession by resolving these tensions and further expanding the work activity (Engeström, 1994). This dimension of core problems relates to the developmental aspect of competences. As the reactions to the White paper show, this seems to be the aspect most easily forgotten in further elaboration.

These concepts are used and elaborated in a series of formats to be used by social partners and other stakeholders to develop vocational competence profiles (as a new way to make occupational profiles), learning and citizenship competence profiles (in order to take into account the threefold qualification of vocational education) and qualification profiles (as a new way to define educational targets for vocational education). These profiles are supposed to be built around core assignments and core problems of the occupation, as defined above.

6.4. Core problems in the curriculum

In the 1990s a new qualification structure was developed in the Netherlands and new contents of vocational education proposed, with the objective of responding better to the needs of a changing economy and labour market. At the same time new vocational curricula were being developed, responding to the new attainment norms, and to debates on the need for self-steered learning, more attractive vocational education, lifelong learning and key qualifications. It is, however, questionable if the objective of delivering broad vocational competence has already

been achieved. Also there are tensions between new didactic forms like self-steered learning linked to problem-based learning and the more narrowly and 'technical' defined attainment norms.

It is expected that a focus on core competences and core problems will open up better possibilities for mutual support between attainment norms and pedagogical objectives, rather than the present tension. In vocational education, learners should benefit from increasing exposure to core problems of the profession, which draw upon occupationally relevant knowledge, insight, skills and attitudes in an integrated way. Such a focus upon core problems can be part of the design of powerful learning environments in vocational education, which draw upon problem-based learning, situated learning, collaboration and entry into communities of practice (Onstenk, 2000).

Core problems could offer vocational education an integrated approach. The concept of core problems connects the determination of the central issues of the profession with the importance of making decisions and choices in relation to both occupational expertise and to educational practices and learning processes. Competence can develop through solving problems, meeting challenges, taking decisions, considering different action possibilities, and weighing up alternatives (Duell and Frei, 1984; Onstenk, 1992, 1997b; Dreyfus and Dreyfus, 1986). Situated learning theory (Brown et al., 1989; Raizen 1989; Scribner 1984; 1986; Lave and Wenger, 1991), and, with some reservations, also activity theory (Laur-Ernst, 1990; Engeström, 1994), suggest that learning in and through the work process itself can be a very effective way of acquiring this kind of work-related knowledge and key qualifications. Recently in the Netherlands there has been ample discussion of whether it is possible to reach comparable objectives by simulating complex vocational practice problems in schools, by elaborating problem-centred education and by making use of the improved possibilities offered by multi-media and new technology (Onstenk, 1997a).

'Exposure' to core problems can contribute on two levels to the acquisition and development of broad professional competence. First the learner acquires competence and expertise regarding central elements of the occupation. At the same time, the learner develops more general learning, problem-solving and meta-cognitive competences in solving specific and concrete core problems, by learning to handle complexities, contradictions and uncertainties. Thus learning through core problems contributes to the development of transfer skills. Core problems can be distinguished in breadth, depth and complexity. They do not look the same for a beginner or an expert (Dreyfus and Dreyfus, 1986; Benner, 1984). Different levels of the learning process imply different levels of complexity for core problems as a didactic strategy.

A didactic approach, which focuses upon 'core problems', would highlight that it is a reflexive collaborative learning environment, making use of problem-based learning, such that:

- it provides authentic contexts for learning with a focus upon real (complex) problems;
- it is collaborative and dynamic, enabling learners to develop shared understanding and a sense of belonging to a dynamic community of practice, which they are helping to change and shape;
- it is participative and fosters active engagement as the learners determine for themselves the issues that need to be addressed when facing core problems. They can draw upon the knowledge and skills of others in facing these issues and also create their own learning agenda to fill any gaps in their knowledge and understanding;
- it supports learning which is highly relevant, because the learning is focused upon issues which are perceived as pressing by practitioners;
- it gives (possibly isolated) individuals the opportunity to think through problems as part of a team;
- it supports the development of creative and flexible approaches to problems;
- it supports the development of contextualised critical learning;
- it supports reflection on, and review of, the learning process as well as of the outcomes.

Reflection on core problems can give insight into current practice and provide learners with ideas as to how they might tackle similar problems in future. Such reflection is critical in two respects. First, it is necessary if learners are to look beyond current practice and to help shape how such problems are tackled in future. Second, it can act as a stimulus to creativity and innovation, not least because the learners have learned the value of applying a reflective approach to the development of their own practice and expertise. Such an approach not only increases the likelihood of significant learning, it also provides a framework for subsequent continuing professional development in which it is likely that processes of new knowledge creation may be facilitated. In this sense it helps those that are learning within vocational education to feel they are moving towards assuming a full position within particular 'communities of practice' (Lave 1991; Lave and Wenger, 1991). Learners are then, perhaps, more likely to exhibit a subsequent continuing commitment to explore, reflect upon and improve their professional practice (Schön, 1983; 1987).

A focus on the core problems of practitioners (Onstenk, 1997a,b) is also an interesting way to raise the intellectual demands required within vocational education. It stimulates use of problem-based learning, acknowledging the contribution theoretical concepts make to assisting individuals in understanding what they are doing and why work practices are subject to change (Engeström, 1994). Core problems in vocational education can be used as a facilitator of both practical and theoretical learning (Onstenk, 1997a; Brown, 1999). 'Theoretical learning' is also developed through applying the concepts for analysing the problems that arise for professionals at work and through making explicit the

assumptions underlying existing practice (Guile and Young, 1996). This conceptual knowledge can then be used to underpin reflection on practice at a deeper level than just 'theorising' practice. Such conceptual knowledge can have both explanatory power and be applied to (changes in) practice. It therefore complements the development of practical learning, based upon reflection on practice.

Crucially, however, the development and application of theoretical learning also facilitates a forward-looking perspective: enabling thinking about how practice might be developed in future. Indeed, a base is laid whereby the subsequent application of the processes of research, review and reflection in new contexts can lead to the creation of new forms of knowledge (Engeström, 1994). Another advantage of a focus upon core problems derives from how it highlights the way professionals working in one sphere increasingly have to deal with issues that are not necessarily within a single disciplinary compass. They have to be able to work with colleagues and with groups with different kinds of expertise (Engeström, 1994). Young and Guile (1997) argue that professionals increasingly need to possess a connective, rather than an insular, form of specialisation, which stresses the ability to look beyond traditional professional boundaries. The use of core problems within vocational education can therefore act as a springboard for the:

- exploration of, and reflection on, professional practice;
- development of skills, knowledge and understanding (of critical reflection) necessary to evaluate and review professional practice;
- need to understand processes of change (as practice increasingly takes place in complex and dynamic contexts);
- ability to create new knowledge;
- development of theoretical knowledge to underpin and complement reflection on practice;
- study of the interplay between theory and practice;
- need to be able to transfer skills, knowledge and understanding from one context to another;
- ability to handle complexity and inter-connectedness of issues (including through the formulation of mental models, schemas or networks);
- development of contextualised understanding;
- translation of understanding into action;
- further development of communication skills.

6.5. Conclusions

At the time of writing (July 2000) discussions and pilot projects are continuing. It is clear that further elaboration as well as political discussions will be needed to solve problems in using these concepts in actually designing new qualifications. There is a shared trust among the involved actors (government, schools, national bodies) that this approach can give students a better preparation for working life and lifelong learning. They also believe it can make qualification structures, educational targets and new educational practices, such as problem-based learning, more convergent, rather than the current state of tension or even contradiction that exists between them.

At this stage, however, it is already possible to draw lessons for other European countries from the Dutch use of core problems as a support for curriculum development. The precise context of use in relation to the development of qualification profiles and the historical development of discussions of key qualifications and core competences are particular to the Netherlands. However, Dutch experience could be seen as one strand within a much broader search for new understanding of the processes underpinning attempts at the enrichment and renewal of vocational education and training. From this perspective, it may be worth scrutinising the underlying principles to see if they are capable of being realised in possibly different forms in other national, regional or cultural settings.

The primary advantage of the use of core problems from this perspective would be in its support for an integrated approach to curriculum development. It is an imaginative way of linking knowledge acquisition, problem solving and key qualifications development in work-related activities, which are relevant to the workplace and meaningful for the learner. Other related benefits include support for the development of broader systems thinking and the way it supports reflection and learning from practical experience, but links also to the need to engage with theoretical learning. It also gives emphasis to the importance of being able to transfer skills, knowledge and understanding between contexts.

An additional advantage of such an integrated approach comes from the 'size and nature' of the learning task associated with a focus upon core problems. It is a mid-range task, avoiding the dangers of fragmented learning associated with too close a correspondence with over-detailed learning objectives or elements of competence. The nature of the learning task also accords well with the notion of theory-driven pedagogy. It aligns with the positive values associated with an approach that is learner centred, supports self-steered and collaborative learning, helps with socialisation into a community of practice, and highlights the value of facilitating the autonomous redeployment of skills.

More generally, the use of core problems as a support for curriculum development acts as a decisive break from the tradition of first drawing up an extensive list of key qualifications, core skills or transversal competences and then

expecting simple implementation in settings that were conceived to deliver curricula with very different intentions and emphases. From a perspective of what can be learned from the Dutch experience, the details, especially in relation to the development of qualification profiles, are not actually that important, although they show one way of achieving objectives. Rather it is the fact that this offers a coherent, integrated and theory-driven (pedagogically sound) approach to curriculum development that should be recognised as significant.

The problems associated with qualification needs (and core skills) driving curriculum development, as in the UK, show that a different model (and metaphor) may be more appropriate. Rather than a model incorporating 'key qualifications' as a driver of VET renewal, it would be more useful to see a core problems approach, incorporating key qualifications development, as a means of building a bridge between qualification needs analysis and curriculum development.

Bibliography

- Adviescommissie Onderwijs Arbeid (ACOA) *Een wending naar kerncompetenties. De betekenis van kerncompetenties voor de versterking van de kwalificatiestructuur secundair beroepsonderwijs*. [A Turn to Core competences. The importance of Core Competences for the improvement of the qualification structure for secondary vocational education]. Den Bosch: ACOA, 1999.
- Benner, P. *From novice to expert. Excellence and power in clinical nursing practice*. Menlo Park California: Addison-Wesley, 1984.
- Blokhuis, F.; Zolingen, S. van, *De kern te pakken. Sleutelkwalificaties, kernproblemen en de landelijke kwalificatiestructuur*. [Getting the core. Key qualifications, core problems and the national qualification structure]. Den Bosch/Enschede: CINOP/Universiteit Twente, 1997.
- Brown, A. The development of key skills across contexts and over time. *Capability*, 3, 2, 16-20, 1997.
- Brown, A. Going Dutch? Changing the focus from core skills to core problems in vocational higher education. In Dunne, E. (ed.) *The Learning Society: international perspectives on core skills in higher education*, London: Kogan Page, 1998.
- Brown, J.S.; Collins, A.; Duguid, P. Situated cognition and the culture of learning. *Educational researcher*, 18/1, 32-42, 1989.
- Carnevale, A.P.; Gainer, L.J.; Meltzer, A.S. *Workplace Basics. The essential skills employers want*. San Francisco: Jossey Bass, 1990.
- Dreyfus, H.L.; Dreyfus, S.E. *Mind over machine: The power of human intuition and expertise in the era of the computer*. New York: Free Press, 1986.
- Engeström, Y. *Learning for change: new approach to learning and training in companies*. Geneva: ILO, 1994.

- Frei, F.; Duell, W; Baitsch, C. *Arbeit und Kompetenzentwicklung. Theoretische Konzepte zur Psychologie arbeitsimmanenter Qualifizierung*. Bern: Verlag Hans Huber, 1984.
- Eraut, M. *Developing professional knowledge and competence*, London: Falmer, 1994.
- European Commission, *Teaching and learning: towards the learning society*, Brussels: European Commission, 1995.
- Evans, K.; Brown, A.; Oates, T. *Developing work-based learning: an evaluation of the YTS core skills project*. Sheffield: Employment Department, 1987.
- Finegold, D.; Soskice, D. The failure of training in Britain: analysis and prescription. *Oxford Review of Economic Policy*, 4, 21-53, 1988.
- Guile, D.; Young M. *Connecting work, learning and higher level qualifications: a new role for theory and practice in Masters degrees*. Unpublished paper, Post-16 Centre, Institute of Education, London: University of London, 1996.
- Hoof, J. J. van; Dronkers, J. *Onderwijs en arbeidsmarkt: een verkenning van de relaties tussen onderwijs, arbeidsmarkt en arbeidssysteem*. Deventer: Van Loghur Slaterus, 1980.
- Hyland, T. *Competence, education and NVQs: dissenting perspectives*, London: Cassell, 1994.
- Hövels, B. Qualifications and labour markets: institutionalisation and individualisation. In: Nijhof, W.J. and Streumer, J.N. (eds) *Key qualifications in work and education*. Dordrecht/Boston/London: Kluwer, pp.51-62, 1998.
- Jessup, G. *Outcomes: NVQs and the emerging model of education and training*, London: Falmer, 1991.
- Jong, M.W. de, Moerkamp, T., Onstenk, J.H.A.M. and Babeliowsky, M. *Breed toepasbare beroepskwalificaties in leerplan en beroepspraktijk*. SCO-rapport 230. Amsterdam: SCO, 1990.
- Kämäräinen, P.; Streumer, J. Curriculum development, new learning environments and transfer of innovations in Europe. In Cedefop, *Vocational education and training - The European research field*. Background report 1998. Volume 2 (pp. 155-182). Luxembourg: Office for Official Publications of the European Communities, 1998.
- Laur-Ernst, U. *Schlüsselqualifikationen - innovative Ansätze in den neugeordneten Berufen und ihre Konsequenzen für Lernen*. In Reetz, L.; Reiman, Th. (eds.) *Schlüsselqualifikationen - Fachwissen in der Krise?* Hamburg: Feldhaus, 1989.
- Laur-Ernst, U. (ed.) *Neue Fabriksstrukturen und veränderte Qualifikationen*. Berlin: BIBB, 1990.
- Lave, J. Situated learning in communities of practice. In Resnick, L.; Levine J. and Behrend S. (eds). *Perspectives on socially shared cognition*. Washington DC: American Psychological Association, 1991.
- Lave, J.; Wenger, E. *Situated learning: legitimate peripheral participation*, Cambridge: Cambridge University Press, 1991.

- Levy, M. *The core skills project and work based learning*. London/Bristol/Sheffield: FESC/MS, 1987.
- Mansfield, B. and Mitchell, L. *The competent workforce*. London: Gower Press, 1996.
- Mertens, D. *Schlüsselqualifikationen. Thesen zur Schulung für eine moderne Gesellschaft*. [Key qualifications. Theses on schooling for a modern society]. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 1974, Vol. 7, No 1.
- Nijhof, W. J.; Mulder, M. *Basisvaardigheden in het beroepsonderwijs*. Den Haag: SVO/TO, 1986.
- Onstenk, J.H.A.M. Skills needed in the workplace. In: Tuijnman, A. and Kamp, M. van de, *Learning in the lifespan: theories, research, policies*. London: Pergamon Press, pp. 137-156, 1992.
- Onstenk, J.H.A.M. *Kernproblemen, ICT en de innovatie van het beroepsonderwijs* [Core problems, information and communication technologies and innovation in vocational education and training], Amsterdam: SCO Kohnstamm Instituut, 1997a.
- Onstenk, J.H.A.M. *Lerend leren werken. Brede vakbekwaamheid en de integratie van Leren, Werken en Innoveren*. [Learning how to combine work and learning. Broad occupational competence and the integration of working, learning and innovation] Delft: Eburon, 1997b
- Onstenk, J.H.A.M. New structures and new contents in Dutch vocational education. In: Nijhof, W.J. and Streumer, J.N. (eds). *Key qualifications in work and education*. Dordrecht: Kluwer Academic Publishers, 1998.
- Onstenk, J.H.A.M. (ed.) *Op weg naar een krachtige beroepsomgeving in het beroepsonderwijs*. [Steps towards a powerful learning environment in vocational education]. Den Bosch: CINOP, 2000.
- Onstenk, J.H.A.M., Dool, P. van den, Moerkamp, T. and Voncken, E. *'Leerprocessen in stages'* [Learning processes during practical training], Amsterdam: SCO Kohnstamm Instituut, 1990.
- Onstenk, J. H.A.M. and Moerkamp, T. *De aantrekkelijkheid van beroepsonderwijs. Algemeen onderwijs en beroepsonderwijs in Nederland, Frankrijk en Noorwegen*. [Attractiveness of vocational education in the Netherlands, France and Norway]. Amsterdam: SCO Kohnstamm Instituut, 1997.
- Onstenk, J.H.A.M. and Moerkamp, T. The acquisition of broad occupational competence in vocational education. In: Nijhof, W. and Brandsma, J. (eds). *Bridging the skills gap between work and education*. Dordrecht/Boston/London: Kluwer Academic Publishers, pp. 183-203, 1999.
- Reetz, L. Zum Konzept der Schlüsselqualifikationen in Berufsbildung, *Berufsbildung in Wissenschaft und Praxis*, 1989, Vol. 18, No 5-6.
- Schön, D. *The reflective practitioner*, New York: Basic Books, 1983.
- Schön, D. *Educating the reflective practitioner*, San Francisco: Jossey-Bass, 1987.
- Stasz, C. Generic skills at work: implications for occupationally-oriented education.

- In Nijhof W.J. and Streumer J.N. (eds). *Key qualifications in work and education*. Dordrecht/London: Kluwer Academic Publishers, 1998.
- Stevenson, J. *The changing context of vocational education*. Selected papers 1987-1993. Brisbane: Centre for learning and work research, 1994.
- Wilsdorf, D. *Schlüsselqualifikationen*. Die Entwicklung selbständigen Lernens und Handelns in der Berufsausbildung. München: Lexika Verlag, 1991.
- Young, M. and Guile, D. *New possibilities for the professionalisation of UK VET professionals*, Post-16 Centre, Institute of Education, London: University of London, 1997.
- Young, M.; Hayton, A. and Leney, T. *Report on the ASDAN youth award scheme*, London: Post-16 Centre, Institute for Education, London: University of London, 1997.
- Zolingen, S. van, *Gevraagd: sleutelkwalificaties : Een studie van sleutekwalificaties voor het middelbaar beroepsonderwijs*. ['Wanted: key qualifications: a study of key qualifications for upper secondary vocational education and training'], Nijmegen: UDN, 1995.
- Zolingen, S. van; Blokhuis, F.; Streumer, J.; Nijhof, W. 'Towards a method for the formulation of key qualifications and core problems'. In Nijhof, W. and Brandsma, J. (eds). *Bridging the skills gap between work and education*. Dordrecht/Boston/London: Kluwer Academic Publishers, 1999.

CHAPTER 7

Changing perspectives on the impact of information and communication technologies and their role in the context of education and training

Graham Attwell, Nick Boreham, Pekka Kämäräinen and Norma Lammont

7.1. Introduction

This chapter is based on three main analyses that highlight the changing perspectives on the impact of information and communication technologies (ICT) and on the role of ICT in the context of education and training. The first section provides an analysis of changing assumptions on the impact of ICT on work and education and on the conclusions that have been drawn for educational planning. The second section provides an overview of recent empirical findings on the impact of ICT on work, work environment and skills development. The third section provides reflections on changing perspectives on the role of ICT in the context of education and training.

The first section starts from the more overarching anticipatory assumptions that were related to earlier stages of ‘automation’ and ‘new technologies’. It proceeds with generalisations and hypotheses that were derived from early empirical findings on the implementation of ‘new technologies’. It then follows the debates on ‘new production concepts’ and ‘network-based economy’ to current reflections on ‘information society’.

The second section presents empirical findings that have given rise to debates on the social consequences or social features of implementing ICT. The section draws attention to the concept of ‘informatisation’ and to different aspects of ‘teleworking’. It continues with new reflections on ‘skills’ and on ‘work process knowledge’ in the context of using ICT.

The third section presents reflections on the changing perspectives of ICT in the context of education and training, with a particular emphasis on vocational education and training (VET). The section starts with an analysis of the changing views on higher education and VET as providers of ICT-specialists (from polarisation towards converging and complementary developments). It then

proceeds to changing views on open distance learning (ODL) from 'teaching at a distance' towards facilitation of contextual learning. Finally, the section reflects current changes in using ICT as a support for training (from 'programmed learning' approaches to ICT-supported shaping of rich learning environments).

7.2. Changing assumptions on the impact of ICT and on the consequences for education and training

The starting point for analyses of changing assumptions on the impact of ICT (and on the consequences for education and training) can be linked to the debates on 'automatisation' in the late 1960s and early 1970s. During that period there were several speculative hypotheses on the consequences of gradually progressing automation on work, work organisation and needs for qualifications. The 'mainstream' argument was that automatisation would lead to a general redundancy of less skilled workers and to a substitution of skilled workers by more highly qualified specialists. This kind of argument led to assumptions on a growing need for higher education and for a subsequent need to open access to higher education. A corollary argument was that in the domain of skilled work there was a need to shift the emphasis from accustomed special qualifications to 'general qualifications' or to 'key qualifications'.

From the early 1970s, and even more from the middle 1970s, onward these assumptions were contrasted by first empirical analyses that drew conclusions from the introduction of 'automated production' and afterwards 'office automation'. The empirical results were mostly based on case studies or on limited samples. However, in the further debate the results were rapidly interpreted as general hypotheses on the global impact of automatisation.

The three main hypotheses that were formulated were:

- (a) degradation of skilled work as the major result of automatisation (primarily based on the analyses of Braverman (1974) and studies that followed his approach);
- (b) polarisation of the qualification spectrum between privileged skilled workers and degraded lower skilled workers (e.g. Kern and Schumann, 1984);
- (c) improvement of the possibilities to enrich the content of work and to empower skilled workers as key actors that control the work process (e.g. *Projektgruppe Automation und Qualifikation*).

The follow-up debates that tried to find evidence to confirm or to falsify the main hypotheses led gradually to more specific analyses on organisation and control of labour process (the so-called 'labour process' debate in industrial sociology). Although these debates mainly involved sociologists and other social scientists they had a broader influence on general assumptions concerning the social consequences of implementation of automatisation. In the middle of the 1980s the

debates had reached a new critical phase and the original global hypotheses were being revised by several parallel inputs that pointed in a similar direction. The newer studies of industrial sociologists (such as Kern and Schuman, 1984) and labour market economists (such as Piore and Sabel, 1984) put the emphasis on 'systemic rationalisation' and on 'flexible specialisation' as key factors in competitiveness. Thus, the earlier debates that focused on task-related rationalisation strategies (and task-related skill requirements or qualification requirements) gave way to new approaches that focused on the systemic functioning of production units and of organisational units. In this phase of the debate the global notion of 'automatisation' had paved way for a more differentiated perception of the implementation of new technologies. The debates were focusing at one extreme on global systemic solutions for production management (such as computer integrated manufacturing) and at the other end on the general introduction of PCs as ordinary office equipment.

Consequently, the old polarisation hypothesis was replaced by new results on segmentation between 'core business' activities that were carried out on the basis of the accumulated 'core competences' of personnel whereas more lowly valued support functions were externalised. In different training cultures the notion of 'flexible specialisation' was interpreted either as an argument to strengthen uses of modern apprenticeship or as an argument that favoured company-specific tailored solutions.

From the early 1990s onwards these analyses were enriched with new observations on 'network-based economy' and on 'globalisation'. The former orientation gave a new dimension for 'systemic rationalisation' whereas the latter one gave a new dimension for 'segmentation'. These debates were already taking into account the global impact of the Internet and the high degree of utilisation of Internet-based possibilities in global divisions of labour and in global markets. Equally, they raised new questions of knowledge and knowledge management as factors influencing competitiveness. Gradually, these newer debates gave rise to efforts to formulate new synthetic frameworks (e.g. 'information society', 'knowledge-based society', and 'learning economy').

It is worth paying attention to the impact that these assumptions have had on education and training policies or on actual practice. The earlier debates on 'automatisation' were closely linked to proactive educational policies that expanded higher education, upgraded vocational higher education provision and opened access to higher education via alternative pathways. The debates on conflicting generalisations coincided with the low tide of educational reforms and with a gradual trivialisation of training issues in the context of computerisation to short-term provisions to provide a minimum level of computer literacy. The debates on 'systemic rationalisation' or 'flexible specialisation' gave rise to new training concepts that emphasised training and learning in an organisational context vis-à-vis new constraints on competitiveness.

The newest debates on the 'information society' and 'knowledge-based society' have shifted the training agendas from particular organisational contexts to general social contexts. In this respect there are several parallel and contrasting issues on 'employability', 'lifelong learning', 'continuing professional development' and 'entrepreneurship' that are linked to the needs to maintain an updated competence-base in uses of information and communication technologies.

7.3. The impact of ICT on work organisation

7.3.1. New kinds of organisation

New technology has resulted in the growth of new kinds of commercial organisation that base their businesses primarily on ICT. While relatively small in terms of the numbers employed, this is a rapidly growing area of economic activity and an important source of new jobs. Moreover, as work in new kinds of organisation tends to spread across several different sectors, they present challenges to traditional ways of classifying competences and qualifications. The broad questions raised in the previous section about the education and training needs arising from the introduction of ICT into the workplace can be illuminated by a detailed analysis of these kinds of organisation.

7.3.2. Teleworking

Teleworkers are people who work from home, using a variety of ICTs including telephones and personal computers. They might be employed by an organisation or they might be self-employed. As Haddon and Silverstone (1995) point out, increasingly this is an option not only for managers and professionals, but also for those doing clerical work, such as data-entry, word processing, proof-reading and report-writing. The amount of teleworking that takes place in different European countries is difficult to assess because of variations in the definition of teleworking. However, there is evidence to suggest that the phenomenon is increasing, particularly among the self-employed (Post, 1995). Under certain kinds of individualised contracts, teleworkers are paid for a specified number of hours or days, and usually this does not include the unproductive time (e.g. coffee breaks) that the normal working day inevitably contains. Staff working at home under this kind of arrangement effectively become self-employed contractors, and there is a clear economic advantage to employers in this kind of outsourcing.

Many people are attracted to teleworking. Working at home with computers offers the satisfaction of autonomy and self-direction (Castells, 1996; p. 247) and the practical advantage of flexibility (Haddon and Silverstone, 1995). However, failure to deal adequately with quality of life issues may undermine work efficiency and impact negatively on family life (Earls, 1997). Clearly, work which spills over from the office into the home makes a difference to the culture of the latter. Teleworkers

often resent the lack of a clear separation between work and leisure, family and business, personality and function (Castells, 1996; p. 247). Difficulties in maintaining these boundaries can offset the advantages of this way of working. Increasingly, enlightened companies are developing human resource policies to improve the quality of working life for teleworkers. Restructuring work to address these issues can lead to positive results in retaining the services of valuable knowledge workers.

Reasons for the slow growth of teleworking are suggested by Wilson (1991), who gives particular attention to the problems companies have found in monitoring this kind of work. Managers have also found difficulties in rewarding the efforts of skilled professional workers who currently form the majority of teleworkers. Wilson also reports that the companies have had to invest time and effort in maintaining the involvement of teleworkers in the organisation. Taken together, these factors make telework neither as simple nor as cheap an option as many companies had envisaged. A study by Stanworth and Stanworth (1992) depicts teleworking as something that will probably develop slowly and sporadically. They reveal that the preferred working pattern among teleworkers they studied was one in which they followed a combination of both home and office working. This gave them the benefits of flexibility in their own lifestyle, while avoiding a sense of isolation from others in the world of work.

From the teleworker's point of view, training and development needs focus on reducing isolation and improving career prospects - teleworkers feel they might not get the same opportunities for promotion as office-based colleagues, because they are 'invisible', and might not be informed when vacancies occur (Blake, 1999). Clearly, there is a need to ensure that teleworkers' skills are kept up to date, and they are not left out of company training programmes. In the rapidly developing business environment in which teleworkers find themselves, re-training becomes more important than ever. Teleworkers not only need to be proficient at specific job requirements, they also need generic skills such as time management and the interpersonal skill of developing effective working relationships without face-to-face meetings. Self-employed teleworkers in particular need the skills to market themselves and organise their finances. They also need to be able to market a service to a distant client, to be able to use telecommunications economically, and to be able to select ICTs to suit the services they offer. It is also useful for them to be familiar with legal and financial regulations concerned with teleworking.

A vocational qualification in teleworking has been developed at Moorlands Telecottage in the UK under the 'Teleworking for Europe' project, part-funded under the Euroform programme. The qualification is intended to equip the candidate with a platform of generic competence, on which a more specific set of service skills can be overlaid. Course units include setting up and configuring a computer system, telecommunications and data transmission, information processing, text processing and self-management.

7.3.3. Distributed workplaces

The opportunities which ICT offers for spreading business activity geographically are encouraging many to disaggregate their operations, and distribute them to less expensive locations or to low-cost satellite organisations. This trend began with banks, insurance firms and companies which were relocating clerical functions from back offices at their headquarters in major cities to areas outside the central business district, where human and business resources were available at lower costs (Moss, 1987; Richardson, 1994). Some geographically distributed firms have decided to centralise administrative functions, such as accounting and billing, sometimes by out-sourcing the work. Leading-edge companies are seeking to use the flexibility afforded by these kinds of tele-access approaches to choose the most cost-effective places for carrying out necessary tasks, then networking them together into changing, virtual configurations. Tele-access also allows new players from anywhere in the world to enter a market place, creating increased competition for local customers (Goddard, 1994; Goddard and Richardson, 1996).

However, as tele-access becomes more important to an organisation, so does the risk of failure to manage the ICT infrastructure to support access. In a sense, the geographical distribution of functions runs counter to the aim in many organisations of developing adaptable personnel who will 'multi-task' across functional divides, and respond effectively to rapidly-changing business needs. Moreover, Peltu et al. (1996) warn that even highly skilled and trained personnel can be overloaded with information by poorly designed systems. Information overload and difficulties in comprehending complex systems, particularly in stressful environments, have been at the root of a number of ICT failures and disasters.

7.3.4. The virtual organisation

One way to define a virtual organisation is as a computer-networked social structure capable of temporarily bringing together people, capital and technologies to engage in a collaborative productive activity. As such, virtual organisations may operate where groupware overlays existing productive structures. Alternatively, they may comprise loose clusters of individuals and technologies with few formal traditional organisational ties.

Cohen (1997) points out that corporations considering adopting a virtual set-up should recognise that this strategy involves more than just acquiring the latest technology. The training and development needs include defining new forms of communication, leadership and career development. More radically, Barnatt (1997) describes virtual organisations as the ultimate form of organic organisation. He sees them as dynamic networks which pull together individuals, capital and technologies in a transitory fashion, as and when required. While the core of such a dynamic network may exist for years or even decades, as a whole a virtual organisation will have no continuous existence over time. By definition, it will have

little or no dedicated infrastructure and few (if any) employees. Instead, both capital and labour will be contracted minimally, as required. Virtual organisations may therefore be just 'boxes of contracts' - data stores or lists of business acquaintances. Their business will be routed through cyberspace and their structures most readily exhibited on a computer screen. When the demand for the product or service declines, the organisation dissolves.

The training and development needs for virtual organisations focus on the demands of computer-mediated communication (CMC). The work of Rice and Love (1987), Rice and McDaniel (1987) and Sproull and Kiesler (1991) has developed our understanding of the changes which electronic mail makes to organisations. Their main findings refer to patterns of interaction and communication through telecommuting, teleconferencing, e-mail and the like. Released from the conventional patterns of face-to-face communication, new communication skills become essential. Two aspects of CMC are critical - ICT permits almost unlimited access to data and to other people (Sproull and Kiesler, 1991; p.116), and there are far greater opportunities for management to exercise surveillance and control of access to the system and those to which it is networked.

The virtual organisation of the future will depend not just on how the technology of networking evolves, but also on how managers seize the opportunity it presents for transforming the structure of work (Sproull and Kiesler, 1991; p. 123). New competence needs will arise from the capacity of ICT to cut across boundaries and break down hierarchies. In common with teleworkers, virtual employees will need to be proactive about learning, interacting and communicating (Cohen, 1997). Consequently, the development of this kind of work is likely to place more emphasis on the virtues of self-discipline and goal orientation. Virtual employees will also need new skills, such as the ability to write effective e-mail, use groupware, and work on virtual teams. In general, 'if the old model was simple jobs for simple people, the new one is complex jobs for smart people, which raises the bar for entry into the workplace' (Hammer and Champy, 1993; p. 70).

7.4. Informatisation

The concept of 'informatisation' was introduced by Zuboff (1988) and has become widely used in the context of analysing the social and human consequences of the introduction of ICT. It is essential to distinguish it from the concept of 'automation'. The latter refers to the delegation of routine activities to computer control. The concept of 'informatisation' refers to the generation of new information about the work process when ICT is introduced. For example, the data generated through the computer control of production can make the work process more transparent. Furthermore, informatisation provides a basis for the broader participation of skilled workers in maintaining and shaping the patterns of work.

In Zuboff's terms, ICT alters the nature of work and marks the point of departure from an earlier industrial system to an informed one which requires symbolic manipulation, and in which new knowledge may be acquired by the work process itself. Zuboff construes computer technology as a revolutionary medium which actually constructs work, offering the alternative possibilities of human self-realisation or human enslavement. In informed work the computer mediates between the worker and the material upon which they operate in a new way. However, sharing information challenges entrenched hierarchies: Zuboff's fieldwork revealed managers who, fearful of losing their traditional monopoly over knowledge and power, suppressed rather than encouraged the empowerment potential of the new technologies.

In his account of what he calls the 'control revolution', Beninger (1986) outlines the evolution of modern electronic surveillance from pre-industrial systems. He argues that they are a continuation and acceleration of previous processes that began a century ago, reminding us that:

'Micro-processor and computer technologies ... are not new forces only recently released upon an unprepared society, but merely the latest instalment in the continuing development of the control revolution.' (Beninger, 1986; p. vii).

Casey (1995) has proposed a model which refers broadly to changes on two levels. The first consists of more readily observable changes such as those caused by the widespread effects of advanced automation and ICTs in the production of goods and services. This involves an integration of skills and knowledge work in production tasks, centralised control of the information process, finance and the reorganisation of the workplace. Additional factors are the displacement and dispersion of workers, occupational de-specialisation, the growth of a polarised service sector and global markets. Moreover, the capacity of technologically advanced societies to produce more with fewer workers is a significant post-industrial condition. The second level refers to the changes brought about by advanced computer technologies in the nature of production - in what is being produced and valued. Central among these changes is the commodification of knowledge (Lyotard, 1993) and information as the 'informed' workplace transforms production and product.

Different levels of skill are needed at three different stages of the implementation of a new technology. In the first stage, the requirements are for high-level skills across disciplines where the fundamental properties of a new technology are being worked out. In the second phase, as the science and technology become more established, people who can work with the new technology and apply established production technologies and disciplines in fabrication and assembly become key. In the third phase, the established technology requires operators who can function in the informed environment (Hendry, 1999). During the phase when the new hybrid skills are being formed, such skill development may rely particularly on in-company

human resource development (HRD) activities to convert people from the disciplines in which they were originally educated or trained. As the technology and methodologies become established, this may be taken up by the education and training system. Characterising and responding to the skill needs of a new technology-based industry, therefore, means understanding its stage of development.

The reality behind the management rhetoric of the 'empowered' and 'informed' worker has been examined by Warhurst and Thompson (1998). They point out that there is a considerable difference between consultants and symbolic analysts (such as scientists and engineers) and basic-grade employees in the financial service sector, or those employed in call-centres and telesales. Much of this so-called 'informed' work is routine, stressful and extensively monitored for errors by supervisors. There is also contradiction at the heart of the service encounter. In informed customer-oriented work, operators are required to deliver high-quality service, yet they are under pressure to deal with customers as quickly as possible. The very uncertainty that inevitably accompanies the human element drives management to attempt to standardise the encounter as a means of ensuring quality, or at least, consistency. Management has always sought to possess and control the 'knowledge' which workers possess. It is argued that the knowledge worker is not a post-industrial phenomenon, but rather, an integral part of the development of industrial capitalism. Therefore it might be more useful to jettison the very broad notion of knowledge workers in favour of a more realistic appreciation of the growth of knowledgeability in work.

Many policy makers have assumed that the development of the information society will lead inevitably to flexible production, intellectual work, new skills, and more and better opportunities for learning. However, these opportunities vary significantly with the function of the division of labour within companies and the particular work situation of employees (Kovaks, 1998). Given persistent unemployment, the proliferation of peripheral and precarious jobs and work situations that hardly favour learning, lifelong learning will involve only some of the citizens of the information society.

7.5. Skill needs arising from the introduction of ICT into the workplace

The traditional concept of the skilled worker was one who had completed an apprenticeship within a defined occupational category. However, this never applied to all sectors, nor to all countries. Where work has been affected by ICT, this is an even less satisfactory way of defining the skilled worker. In this context, 'skill' has three dimensions:

- (a) an attribute of the person, which can be measured and quantified, say by tests or questionnaires; this is the analytical approach developed by psychologists;
- (b) an attribute of the job; this aspect is usually emphasised by management and industrial relations theorists;
- (c) a function of the historical and political context, such as the way in which occupations are designated 'skilled' by different interest groups; this is the approach favoured by sociologists and historians (Noon and Blyton, 1997).

The learning needs arising from ICT are often defined in terms of key skills. These are conceived as generic, transferable competences for dealing with the ICT-related aspects of work situations. Generally, the idea that it is possible to define and teach key transferable skills for working with new technology holds out the hope of producing a flexible workforce and solving the problem of training people for an uncertain future. However, some researchers argue that the existence of all-encompassing, generic key skills is little more than wishful thinking (Hyland, 1998; Johnson, 1998). Moreover, it is sometimes considered misleading to define the impact of ICT on the workplace in terms of a need for additional skills. While the use of ICT certainly requires the acquisition of certain definite skills, this may not be the most significant learning need. Instead of learning how to use ICT in the workplace, the real need is to be able to work effectively in workplaces into which ICT has been introduced. This is to recognise that ICT may affect the overall organisation of work, as when an organisation networks its functions. Many of the learning needs then arise from the re-organisation accompanying the introduction of ICT, rather than from the need to operate particular devices. Employees will need to understand the new work process, and if they have acquired no more than ICT-specific skills, they may not possess the understanding necessary for effective work in the transformed work situation. Johnson (1998) goes so far as to assert that defining learning needs in terms of skill requirements threatens rich and deep conceptions of teaching, knowledge and the individual.

Employers who make use of ICT frequently refer to the need for employees with 'the right attitude', and complain of the difficulty of finding people with this virtue (Hendry, 1999). This call is most commonly heard in service organisations, where there is a need to communicate with customers. Sometimes the term 'intrapreneurship' is used, meaning taking the initiative in dealing with matters outside the employee's own direct responsibility. This requirement is also becoming important in computer integrated manufacturing, where employers seek employees with the ability and willingness to work flexibly. The ability to cooperate in autonomous teams is vital in manufacturing organisations which have adopted cellular production processes and just-in-time practices. The qualities required have a tacit character which are not easily certified. Despite advances in psychometric and other selection techniques, recruiting remains a far from perfect art, and people are generally matched with jobs by the traditional mix of qualifications (often as an initial screening device), experience and interview. Under these circumstances, a

worker who has a tacit skill might find it difficult or impossible to signal the fact to a prospective employer. The practical significance for policy makers is that it might be unwise to rely on the labour market to provide the incentives to individuals to develop the qualities needed in this new type of work.

Grieco (1987) conducted a series of ethnographic studies into the effects of informal networks for the transfer of information and tacit skills that enable individuals to gain tacit skill and acceptance in their workplace. This included support, especially during the early stages of their employment when the new recruits require a degree of 'carrying' by more experienced workmates. Grieco argues that the kinds of 'attitudinal' qualities that are evident in such day-to-day working practices and integral to effective functioning are very much overlooked by the approach to competence which dominates many countries' systems of vocational education and training.

7.5.1. ICT and the need for work process knowledge

The concept of work process knowledge (*Arbeitsprozesswissen*) is discussed in depth in another chapter of the present volume (Boreham, 2002). Briefly, this way of knowing includes an expanded understanding of work roles in parts of the organisation other than the employee's own, an awareness of the interdependency of activities in different departments, and characteristics of the system as a whole, such as the flow of work through the organisation upstream and downstream of the worker's own station. Knowledge of this kind is needed for working in organisations which have developed more flexible structures and which have introduced new technology in search of greater competitiveness. This is especially true of organisations that make extensive use of ICT. The introduction of new technology typically broadens work roles: when employees make the transition from manual worker to supervisor of an automatic process, they usually take responsibility for managing a sequence of operations and thus need a broader knowledge of the work process. In the service sector, computerised systems typically run many operations in parallel, and integrate activities previously carried out by different departments. So here, too, it is important for operators to know how the whole work system is organised.

The importance of work process knowledge for working in contexts where new technology has been introduced is demonstrated in studies carried out by members of the WHOLE network (WHOLE, 2000). In one study by Fischer, Binder and Rasmussen, a distinction is drawn between two perspectives on how computers change the industrial workplace. The first focuses on the capacity of computers for automating manual and intellectual work - that is, altering the work content of individual employees. This approach has identified needs for new kinds of skill (e.g. when a process is automated, the sensory skills of working directly with materials may be superseded by the abstract, problem solving skills required to supervise an automatic process.) However, where computerisation has occurred, much of the

individual work practice in terms of engagement with tools and materials remains the same. In contrast, Fisher et al. argue that the most significant impact of computerisation is a general reframing of collective practice - in particular, changes to the status and interrelations of different groups of employees. They describe the computer as 'an interface technology', in the sense that when a production process is computerised, the most significant changes are those affecting interfaces between groups of workers.

This can be understood by considering the results of an investigation of computer aided production management (CAPM), a computer technology which helps to plan production times, production capacities, etc. This can increase flexibility and meet the goals of just-in-time production. Most CAPM systems are based on a set of assumptions about the way work should be organised, but Fischer et al. (WHOLE, 2000) point out that these might not be stated explicitly during the design or implementation phases of computerisation. Usually, they conflict with the situation on the shop floor, and in consequence it becomes necessary to restructure the labour process. This involves changing the employees' images of the old and new work situations, which are generally deeply ingrained and implicit.

For example, in one company, the introduction of a CAPM system resulted in the formulation of new policies for in-house manufacture and outsourcing of certain machined parts. One part, which had previously been machined in-house, was now bought in, but proved unsatisfactory. It emerged that, prior to the introduction of CAPM, changed part specifications were communicated to in-house machinists informally. However, it was now necessary to document the new requirements and test the parts when they were received from outside suppliers. Consequently, the management had to define this responsibility and allocate it to an employee, or alternatively recognise it as an extension of the original machinist's job. In either case, the introduction of the new technology made accountabilities more explicit, and created a need to negotiate the relationships between different groups of employees. The most important training needs arising from the introduction of the CAPM system were of this kind. Fischer et al. describe an effective approach to such re-training, which involved asking each group to make explicit its image of competent work in the new situation, and meet in groups to work out a new pattern of operations. This has to be done in a participatory way, as it cannot be assumed in advance that a specific technology will require a specific kind of work organisation and a specific set of new skills. The changes needed depend on the unique history of the labour process within that particular enterprise. Because computerisation modifies the social organisation of work, and because the social organisation in each workplace has developed in its own way, the most appropriate way of re-configuring inter-group relationships will have to be discovered anew in every case.

7.6. Changing perspectives on the use and role of ICT in education and training

As in other areas of society, information and communication technologies are playing an increasingly important role in education and training. This is reflected in the priority given to ICT implementation and development in national policies and reforms. The effects of the new technologies can be seen in most areas of education and training policy development, including curriculum, institutional development, pedagogy and the changing roles of teachers and trainers. This chapter limits considerations to two aspects: the changing curriculum for teaching and learning about the new technologies, and the impact of the use of ICTs as a tool for teaching and learning. It is argued that these issues are contributing to a transformation of the curriculum for education and training in Europe.

7.6.1. ICT as a subject of education and training

The content of 'academic' or 'general' education curricula, based on older ideas of subject and discipline, changes relatively slowly. More important are the changes in the way these subjects are taught. Conversely the applied skills and knowledge required in the work force is far more dynamic in nature. Changing work organisations, new occupational profiles and the implementation of new technologies to the work process require the continuous updating of skills and knowledge. The rapid introduction of information and communication technologies is posing a major challenge to established forms of education and training.

This challenge takes different forms. Some traditional occupational profiles have virtually disappeared, or in other cases have been largely transformed. For example, twenty years ago touch-typing, audio typing, shorthand and filing formed the mainstay of most secretarial courses. Today secretarial courses, where they have retained the name, focus on the use of different computer applications for the administration of a modern office. In other occupational fields the introduction of ICTs have led to new 'modules' being integrated within the curricula. Design engineers are now required to be able to handle CAD/CAM applications. In other occupations the pace of change has been slower. However, for students in areas such as electronics not only are they required to learn new skills, but they also have to cope with an underpinning technical knowledge base that is also rapidly evolving. In contrast, some construction and craft trades have been relatively unchanged until recently, although even here new technologies are leading to the revision of learning programmes in many European countries.

In all these cases the degree of curriculum development and change is largely related to the speed and nature of the introduction of new technologies in different occupational fields. It is not technology alone that has determined the changing curriculum contents. New forms of work organisation and new patterns of

commerce have also led to pressures for change, with the appearance of subjects such as entrepreneurship, team-working and dealing with customers all making their mark on learning programmes.

The very pace of change has posed a major challenge to curriculum authorities. Traditional forms of curriculum updating, ranging from the German review of training regulations, the UK functional analysis and the Dutch 'royal route' have all proved inadequate to deal with new demands. Common to all countries is the complaint from employers that vocational curricula are old fashioned and out of date (and also common is the lack of agreement as to just what should be in the curriculum!).

Most countries have found ways to speed up the revision of vocational curricula and the introduction of new programmes for new occupational profiles. At the same time many European countries have granted increased autonomy to regional bodies and to schools to design curricula to meet local needs. However, changing demands on vocational and occupational learning have led to a far wider debate on the purpose, content and organisation of vocational education and training.

This debate has taken a number of different directions. First, there has been the argument that, because of the need for higher levels of skills and knowledge, general education should be increased as the foundation for technical training. This is reflected in the general trend to raise the school leaving age in European Member States and in the introduction of higher levels of secondary vocational education in many countries. It is also reflected in the increasing tension in the relationship between school-based education and work-based training in terms of pedagogy and organisation.

At the same time there have been demands for broader curricula and programmes for vocational education and training. Broader programmes, it is argued, can provide for more flexibility and transferability and better prepare students for continuing learning. In Germany there has been pressure to reduce the present 374 recognised training occupations to some 100 core occupations. Similarly a number of countries are experimenting with modular programmes allowing broad initial training with optional specialisation.

The second debate has been over the introduction of key qualifications, dealt with at greater length elsewhere in this book. There is a tension between the use of key qualifications as a higher – or compensatory - level of continuing general education (as arguably happens in the UK) and key qualifications as a genuinely transformative element of vocational education. There has also been a protracted and largely sterile debate over whether ICT should be one of the recognised 'key qualifications'.

These debates are leading to a questioning of the whole role and purpose of education and training. Commentators, such as Heidegger and Attwell (2001), have challenged what they see as the excessively reactive nature of education and training provision. Existing education and training systems and curricula are reactive to changing demands for skills and knowledge from industry and society.

The campaign for lifelong learning merely seeks to equip individuals with the ability for continuous adaptation to those changing demands. Instead, say Heidegger and Attwell, vocational education and training should equip students with the abilities to shape technologies and work organisation. Such an undertaking requires a new relationship between work and learning.

Whilst the idea of pro-active shaping may be seen as a radical scenario, other measures presently being piloted have scarcely less transformative potential. The movement for more coordinated or unitary curricula between school and work-based learning may be viewed as a prelude to the development of new forms of curricula that genuinely transcend the binary divide between academic education and occupational training. Such a move recognises the changing relationship between knowledge and skills in the workplace encapsulated in the term 'work process knowledge'. It also recognises the need for skills and knowledge-based on an understanding of holistic work processes, rather than on the performance of disaggregated tasks, as was common in the past.

Even more fundamental is a reassessment of the role of work-based learning. In many countries apprenticeship declined in the late 20th century, the main reasons being their low value compared to higher education and the decline in traditional industries. New occupations – for instance computer programming – were seen as requiring higher level knowledge and skills more suited to university learning.

However, questions are increasingly being asked as to whether traditional forms of higher education are providing the ability to apply skills and knowledge in complex work situations. In the UK students who have undertaken post graduate programmes in computing are finding they do not have the immediate skills to work in the industry. This is leading to a number of different approaches. One is the provision of 'modern' apprenticeships, while another is the provision of graduate apprenticeships. These are often based on ideas of situated learning and this approach is increasingly being used in 'new' occupations. In Germany there has been an enthusiastic response to the introduction of a new apprenticeship route in information technology. Additionally, growing numbers of graduates are pursuing apprenticeships – or work-based learning programmes – after undertaking an initial degree. Perhaps of most significance, however, is the increasing vocationalisation of higher education. Once more, this takes different forms, including the requirement to undertake a period of work experience as part of a degree programme and the introduction of vocational diplomas through polytechnics, high schools and universities. In the UK it is now planned to introduce a two-year higher education diploma in a wide range of vocational subjects and with flexible delivery to allow students part time study while working.

Changing technologies and work organisation are having an even more dramatic effect on in-company training. In the 1990s competitive advantage was already seen as being heavily dependent on the skills and knowledge of the workforce. This prompted many companies to move beyond 'training strategies' (with human

resource development being reserved for managers) to competence development strategies. Increasingly opportunities for learning have been opened up to larger parts of the workforce with the introduction of teamwork and new forms of work organisation. However, more recently the increasing value of knowledge (or information) within enterprises is leading to yet another appraisal of strategies. Attwell and Hughes (2000) report how leading edge companies are seeking to develop processes of knowledge management and knowledge development as a means for innovation. From an academic standpoint there have been a number of important contributions looking at how knowledge is developed in communities of practice (Lave and Wenger, 1991), at different types of 'sticky' and 'leaky' knowledge (Brown and Duguid, 1998) and the relations between tacit and formal knowledge (Nonaka and Konno, 1998). The next period may well see a challenge to traditional divisions between human resource management (HRM) and human resource development (HRD) and most significantly between learning and work. The organisation of work will become the focus for creating learning opportunities.

The changes outlined in this brief survey cannot be attributed solely to the introduction of information and communication technologies. However, it can be said that the implementation and spread of these technologies is leading to a complete re-appraisal of the relations between education and training and work.

7.6.2. Information and communication technologies as tools for learning

In this section, we will review some of the different ways in which information and communication technologies are being utilised in vocational education and training. Needless to say, the list is not comprehensive or exhaustive. Furthermore, in the real world the different contexts are not so clear cut. However, a consideration of these different contexts is needed if we are to explore fully the issues involved in pedagogic design.

The earliest applications of ICT in education and training were for distance learning. Instead of attending courses at a VET school or institution students used ICT technologies to learn in their own homes or at work. The use of ICTs replaces or enhances earlier distance learning materials based on text packages. The provision of ICT-based programmes allows flexibility in terms of time and space. It allows access for geographically isolated students or for those without the time to attend traditional learning programmes or for students who are tied to the house through disability or care responsibilities.

Distance provision can be used to enhance links between education and industry and allows students from different countries and cultures to work together. Many institutions are developing individual modules available through distance learning, both to allow increased choice through economies of scale or to allow experimentation with different learning modes and technologies.

The pedagogic design implications will be considered further below. Suffice to say here that distance learning requires very high levels of student motivation, more

traditionally associated with professional learners and continuing vocational training than learners in initial education. Scheuermann (2000) notes that programmes available through the Internet tend to have a high drop out rate as learners sign up without realising the work and time commitment needed. While undoubtedly successful in enhancing access to VET provision there is some debate as to the effectiveness and efficiency of distance programmes. Managers and policy makers have tended to favour such programmes as allowing cost efficiency savings but some researchers and practitioners doubt that such savings are possible. The provision of on-line courses requires that students have access to a work or home PC and to the Internet, thus excluding many of the potential students who could most benefit from such provision. Furthermore, it requires a degree of pre-knowledge and confidence in the use of the technologies (not least of all in being able to type). Finally, Brown and Keep (2000) question whether the individual nature of distance learning militates against the learning of high-level communication skills increasingly regarded as central to occupational qualifications.

Probably the greatest impact of ICTs within school based vocational education and training has been as support materials for traditional classroom teaching. In this respect, there is a vast range of different technological and pedagogical applications. Students are using computers for word processing, for searching for resources and materials through the World Wide Web, while there are large collections of CD-ROMs in almost every academic and vocational subject. The implementation of the new technologies has led to major changes in the roles of libraries – indeed many UK based institutions have renamed their libraries as learning resource centres – providing access to on-line databases and CD-ROMs, as well as video and print media. In some subjects there are specific computer based applications. As well as institutionally based resource centres, many public libraries are using ICTs to play a new role in providing learning facilities. The use of ICTs within the classroom may lead to profound changes in pedagogic design and approach. However, Sinko (1998) considers the main change is that ‘the traditional classroom is becoming virtual’ (p. 272).

A major impact of ICTs has been to encourage the development of open and distance learning centres. Usually these are drop-in facilities – with ‘facilitator’ support – although models vary greatly. In Lucas Girling, a motor car component factory in South Wales, workers have a weekly entitlement to learning in a well-equipped company based learning centre. In another context, Pontypridd College, in the same region, has established a centre in a high street shop – offering passers-by short ‘taster’ programmes in basic skills and computer awareness training. The same college also operates a basic skills workshop in its main college facility – allowing students the opportunity for extra practice in basic skills, including numeracy and English – using computer based learning materials. A further development is the growth of publicly sponsored cyber cafes in an attempt to overcome Internet access problems caused by inequality.

The growing number of different centres offering learning is leading commentators to ponder on the future role of traditional VET institutions and the need for new forms of partnership in providing learning opportunities. There is a growing application of ICTs for 'just-in-time' learning in the workplace. Computer based machines are being developed with their own learning interface. Employees can learn as and when they need to or when they have a slack period in the production process. Once more, the remarks above on instructional design are apposite here.

A further extension of this idea is the development of intelligent or expert systems and of networked learning systems. Expert systems can make deductions from previous searches and inputs. The DIODYS system, developed by researchers at the University of Bremen, allows maintenance engineers to search for previous solutions to problems and to input their own answers into the system. The program itself will prompt them with possible solutions to their problems. Such systems allow the development of organisational learning in communities of practice. Similarly, there are indications of considerable growth in the use of intranets for shared learning between groups and communities. These are not formal learning systems but use ICTs to build up shared knowledge. There is a need for more studies on how these systems are being used to support continuing professional development in communities of practice.

There have also been considerable developments in the use of virtual environments and simulations. These are particularly useful for allowing the acquisition of skills and knowledge for 'critical' situations which it is undesirable to replicate in the real world – for instance fire and emergencies on oil rigs, or in the gas supply or nuclear industry. Simulators are also widely used now for the training of airline pilots and sea navigators. Simulations may also be used to provide experience in situations where the cost of materials is high or where continuous process production means stoppages in the production process are expensive.

No doubt there are other applications not covered in this brief account. A recent Cedefop survey (Attwell, 2000) concluded the key factor was the instructional design and pedagogic processes underpinning ICT design. The next section looks at major pedagogic theories before going on to explore their implications for the implementation of ICTs.

7.6.3. Pedagogic theories

There has been much written recently by researchers and practitioners regarding pedagogic approaches to computer assisted learning. Much of the debate is between those who favour a more instructionalist or didactic approach and those advocating pedagogies based on constructivism. Pantel (1997) in developing a framework for computer-supported learning pedagogies, traced the evolution of pedagogic approaches in the 20th century. His view is that the response strengthening model, which influenced the first half of the last century, lays

emphasis on the role of feedback to enhance learning. Knowledge is considered to be dependent upon the associations people make between stimuli and responses. Drill and practice was the instructional method of choice of the proponents of this theory.

The information-processing model proposes that knowledge is a definite entity that can be transferred from one person to another. This assumption gave rise to didactic instruction and classical instructional design with lecturing as the prevalent instructional technique. Constructivism came into light in the early 1980s and proposes that knowledge is 'constructed' individually in a person's mind. Individuals have their own mental framework which is a function of their beliefs, past experiences and knowledge. When a person comes across new information, he understands and assimilates it in the context of his existing mental structures thereby constructing new knowledge. Hence, learning is seen as a process of internal negotiation of meaning.

Under constructivism the goal of instruction is to help learners 'develop their learning and thinking strategies' and the evaluation of learning outcomes consists of 'determining how the student structures and processes knowledge'. Constructivism propagates the importance of creating a learning environment that facilitates higher-order thinking and metacognition (awareness of one's own cognitive abilities and the ability to apply them to the task at hand). It shifts cognitive labour, such as analysis and synthesis of information, from teachers to learners. Constructivists advocate that students be allowed and encouraged to take ownership of their learning, thus ensuring that learning activities are more authentic and meaningful to them. Within the constructivist community there seems to be agreement that constructivist learning environments are good for advanced knowledge acquisition. There is no consensus, however, on its appropriateness for lower levels of education, which involve introductory knowledge acquisition.

Socio-cultural theories are rooted in constructivism but they focus on the role of community and environment in the creation of knowledge as opposed to the constructivist focus on internal negotiation of meaning. They acquiesce that meaning can vary but contend that it is defined by the community of practitioners which uses it. Thus, knowledge resides in communities. Meaning-making is the result of active participation in socially, culturally, historically, and politically situated contexts. Socio-culturalism is more extreme in its beliefs than situated learning in that it focuses on the development of the collective knowledge of a community, as opposed to the development of individuals' knowledge within a community. Adherents to the socio-cultural theories of learning, like constructivists, argue that it is important to reflect the complexity of the application domain in the learning environment. This would contribute to the authenticity of the learning activities.

7.6.4. The need for a pluralistic approach

While Pantel (1997) provides an admirably brief and comprehensive review of a developments in learning theory there are problems in applying his classifications to vocational education and learning. First, like any taxonomy there are not always such clear divisions between different pedagogic approaches. Rather, the approaches should be seen as different axes on a scale. Different approaches to pedagogic design may lie at one end of the axis but may equally be found at any point along that scale. Furthermore, many learners and teachers apply different strategies and pedagogies depending on the particular nature of the learning to be undertaken.

Second, it is necessary to comment on the debate as to whether different pedagogies are applicable to different types and levels of learners. There is a tendency by (mostly higher education) researchers and practitioners to equate vocational and occupational knowledge and learning with lower level or introductory studies. Predictably, we would contend such an assertion. It would seem reasonable to suppose that most introductory level learners might require higher levels of support than more experienced and confident practitioners. However, that is a different issue from the pedagogic approach. There are a number of examples of constructivist pedagogic designs employed to support people with special learning needs, some employing sophisticated applications of information and communication technologies. Similarly, there are examples of effective instructional designs for people requiring higher level training in, for example, new communication technologies.

Learning psychologists have tended to approach the question of pedagogy by pointing to individuals' different learning strategies and to the need for pedagogues to design approaches which meet these individual preferences and needs. Enthusiasts for computer assisted learning have asserted that one of the great potentials of educational technology lies in the ability to design interfaces which allow learners to select and develop their own learning strategy. This may be overstating the case. Such a theory tends towards holding the technology to be pedagogically neutral. We would argue that the design process for learning systems and artefacts embodies within it the pedagogic assumptions, experiences and principles of the designer. The important choice is not whether to use technology, but rather what pedagogy we will follow. Technology as a category is neutral to this choice: we can design networked technology that supports either a constructivist or an instructional approach equally well. However, specific instances of technology are not neutral: educational technology looks very different depending on which pedagogy is being supported. Designers of ICT based systems and educational multimedia need to be explicit in the pedagogic assumptions their development embodies.

Bibliography

- Attwell, G. *Information and communication technologies, vocational education and training and systems design*. http://www2.trainingvillage.gr/etv/cedra/ict/Documents/Systems/top_fs.html, Cedefop, 2000.
- Heidegger, G.; Attwell, G. The social shaping of work, technology and organisations as a guiding principle for vocational education and training. *This volume, Chapter 14*, 2002.
- Attwell G.; Hughes, J. *Capitalising on achievement*. Leonardo da Vinci programme in the UK, DfEE, Sheffield, 2000.
- Barnatt, C. *Challenging reality: in search of the future organisation*. London: John Wiley, 1997.
- Beninger, J.R. *The control revolution*. Cambridge, Mass.: Harvard University Press, 1986.
- Blake, M. Teleworking: the teleworkers' perspective. *European Journal of Engineering for Information Society Applications*. No 12: Feb. 1999, pp. 10-16.
- Boreham, N.C. Transforming vocational curricula with work process knowledge. *This Volume, Chapter 12*, 2002.
- Braverman, H. *Labor and monopoly capital*. New York: Monthly Review Press, 1974.
- Brown, J.S.; Duguid, P. Organising knowledge, *California Management Review*, 1998 40(1): 90-111.
- Brown, A; Keep, E. *Review of VET research in the UK*. Luxembourg: Eur-Op, 2000.
- Casey, C. *Work, self and society: after industrialism*. London and New York: Routledge, 1995.
- Castells, M. *The rise of the network society*. London: Blackwell, 1996.
- Cohen, S. On becoming virtual. *Training and Development*, Vol. 51, No 5, May 1997, pp.30-8.
- Earls, A.R. True friends of the family. *Computerworld*, 17, Vol. 31 No 7, Feb.1997, pp. 83-5.
- Goddard, J. ICTs, space and place. In Mansell, R. (ed.) *The new telecommunications. A Political Economy of Network Evolution*, 1994, pp. 274-85.
- Goddard, J.B; Richardson, R. Why geography will still matter: What jobs go where? In Dutton, W.H.; Peltu, M. (eds). *Information and communication technologies: visions and realities*. Oxford: Oxford University Press. 1996, pp. 197-214.
- Grieco, M. *Keeping it in the family*. London: Tavistock, 1987.
- Growth, competitiveness and employment: the challenges and way forward into the 21st century, *Com 93 700 Final*, December. 1993.
- Haddon, L; Silverstone, R. Telework and the Changing Relationship of Home and Work. In Heap, N. et al. (eds.) *Information Technology and Society*. Open University: Sage, 1995.

- Hammer, M.; Champy, J. *Reengineering the Corporation*. New York: Harper Business, 1993.
- Hendry, C. *New Technology Industries*. Dfee, Skills Task Force Research Paper, No 10, 1999.
- Hyland, T. Skill Scam. *Guardian Education*, 14 July, 1998, pp. 2-3.
- Johnson, S. Skills, Socrates and The Sophists: Learning From History. *British Journal Of Educational Studies*, Vol. 46, No 2, 1998, pp. 201-13.
- Kern, H.; Schuman, M. *Das Ende der Arbeitsteilung?* (The End of The Division of Work?). Munich: Beck, 1984.
- Kovaks, I. Trabajo, Cualificaciones y Aprendizaje a lo Largo de la Vida.' Ilusiones y Problemas de la Sociedad de la Informacion. (Life-Long Work, Skills and Learning. Illusions and Problems Of The Information Society). *Sociologia del Trabajo*, Fall, No 34, 1998, pp. 3-25.
- Lave, J.; Wenger, E. *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press, 1991.
- Lytard, J.F. *Political Writings*. (Translated by Readings, B; Geiman, K.). New York: UCL Press, 1993.
- Moss, L. Telecommunications and the Economic Development of Cities. In Dutton, W. H. (ed.) *Society On The Line: Information Politics In The Digital Age*. Oxford: Oxford University Press, 1999.
- Nonaka, I.; Konno, N. The Concept of "Ba": Building a Foundation for Knowledge Creation. *California Management Review*, Vol. 40, No 3, 1998, pp. 40-54.
- Noon, M.; Blyton, P. *The Realities of Work*. New York: Macmillan Business, 1997.
- Pantel, C. Educational Theory. A Framework for Comparing Web-Based Learning Environments. Chapter 2 of Masters Thesis: Simon Fraser University. Abstracted by Vaibhavi Gala, http://ifets.ieee.org/past_archives/archiv_150499_250899/0262.html, (1997).
- Peltu, M. et al. Computer Power and Human Limits. In Dutton, W.H. (ed.). *Society on the Line: Information Politics in the Digital Age*. Oxford: Oxford University Press, 1999.
- Piore, M.; Sabel, C. 1984, *The Second Industrial Divide: Possibilities for Prosperity*, New York: Basic Books
- Post Parliamentary Office of Science and Technology, Working at a Distance: *UK Teleworking and Its Implications*. London: Post, House Of Commons. 1995
- Rice, R.E.; Love, G. Electronic Emotion: Socioemotional Content in A Computer Mediated Communication Network. *Communication Research*, No 14, 1987, pp. 85-108.
- Rice, R.E.; McDaniel, B. *Managing Organizational Innovation: The Evolution from Word Processing to Office Information Systems*. New York: Columbia University Press, 1987.
- Richardson, R. Back Officing Front Office Functions - Organizational and Locational Implications of New Telemediated Services. In Mansell, R. (ed.) *The New*

- Telecommunications: A Political Economy Of Network Evolution*. New York: Doubleday, 1994, pp. 309-35.
- Sinko, M. Learning technology – one foundation for the future school in Finland – results of the national ICT assessment project. *Lifelong Learning in Europe*, No 4. Helsinki: KVS, 1998, pp. 215-219.
- Sproull, L.; Kiesler, S. Computers, Networks And Work. *Scientific American*, September 1991, pp. 116-23.
- Stanworth, J.; Stanworth, C. *Telework: The Human Resource Implications*. London: IPM, 1992.
- Warhurst, C.; Thompson, P. Hands, Hearts and Minds: Changing Work and Workers at the End of the Century. In Thompson, P; Warhurst, C. (eds.). *Workplaces of the Future*. Macmillan Business, 1998, pp. 1-39.
- WHOLE Project*, 2000 EU Targeted Socio-Economic Research Programme, Thematic Network On Work Process Knowledge In Technological And Organisational Development, <http://www.Man.Ac.Uk/Education/Euwhole/Home.Htm>
- Wilson, A. *Teleworking: Flexibility for a Few*. Brighton: Institute of Manpower Studies, 1991.
- Zuboff, S. *In the Age of the Smart Machine*. New York: Basic Books, 1988.

CHAPTER 8

Rethinking the role of the assessment of non-formal learning

Jens Bjørnåvold and Alan Brown

8.1. Introduction

Assessment has traditionally been understood as a way of judging and/or measuring the learning and performance of individuals within formal education and training settings (Little and Wolf, 1996). This traditional role is currently undergoing substantial change as a number of European countries (and countries outside Europe) pay increasing attention to the development of assessment methodologies, trying to measure the informal or non-formal learning taking place at work, in leisure time activities and at home (Bjørnåvold, 2000). The introduction of the *Bilan de competence* in France and the development of a variety of approaches to accreditation of prior learning and prior experiential learning in the UK from the late 1980s can be looked upon as forerunners of this tendency.

During the last five years, many European states have presented and started to implement reform plans that made use of new assessment methodologies and systems (Bjørnåvold, *op.cit.*). The tasks faced by this new generation of assessments are very different from those faced within formal education. Instead of operating within a specified institutional context where learning goals have been (more or less) pre-defined, assessments of non-formal learning have to face a variety of learning forms and outcomes. To a certain extent this is because activities previously defined as work, hobbies and family life are being redefined as 'learning'. A positive interpretation would be that this gives access to a huge reservoir of knowledge and competence only marginally and unsystematically tapped so far. A negative interpretation would be that this is an intrusion of measuring and testing into social areas until now only marginally affected by such techniques.

In order to understand these somewhat ambiguous developments it is useful to pose three interrelated questions. The first is which methodologies have been introduced in order to expand assessment and measurement techniques into areas of non-formal learning? A limited number of cases will be presented in order to exemplify these developments and to discuss whether we face a fundamental change of methodological direction or merely an extension of existing approaches. As neither their potential nor their limitations can be understood without adequate

contextualisation, the second question asks what are the main motivations behind these efforts to introduce assessments into new areas and what expectations are they supposed to meet? This can be partly answered by looking into the official objectives, as expressed in policy papers accompanying the various initiatives. Although certain national differences exist, there has been substantial cross-national learning, facilitated in part by the European White paper on 'Teaching and learning' (European Commission, 1995) and the Leonardo da Vinci programme. The nature of underlying expectations leads on to the third question: are current methodological approaches to the assessment of non-formal learning able to respond to the expectations with which they are confronted? Full and final answers cannot, of course, be given to these questions. We hope, however, to be able to highlight some of the challenges and dilemmas facing the new wave of assessment methodologies currently being developed.

8.2. A new direction?

The issue of identification, assessment and recognition of non-formal learning is commonly treated as something exclusively linked to developments at national and public level (Klarus, 1998, Bjørnåvold, 2000), but this is too narrow a focus. Both the White paper on 'Teaching and learning' (European Commission, 1995) and the Leonardo da Vinci programme (from 1995) highlight the European dimension to this issue. In addition, Bjørnåvold and Pettersson (2000) emphasise how initiatives at sector, branch and even enterprise level have added to the complexity and richness of the issue.

While these initiatives share an interest in assessing learning outside formal education and training, aims and instruments vary. In order to capture the characteristics of this diversity, a limited number of cases will be examined according to two criteria. First, assessment approaches can be sorted according to the level at which they operate. A methodology designed to operate at a European level must necessarily differ from one operating at national, sectoral or enterprise level. Economic and organisational constraints may also differ. Second, the new generation of assessments can be classified by the locus of control, according to who sets the terms for implementation. The bulk of methodologies proposed and developed at national level during the last 5-10 years have been closely integrated into formal education and training systems, making it possible to earn full or partial credit through the recognition of non-formal learning. While this is often presented as a more flexible approach to education and training, the main emphasis is still directed towards established formal qualifications, and only those parts of the non-formal learning defined as relevant within this setting are recognised.

In contrast to this are methodologies defined within a labour market or enterprise setting. In these cases the process may not be oriented towards formal

qualifications, but rather seek identification of competences relevant to individual careers (within or between enterprises) or in the context of human resource management. Less constrained by what is defined as relevant by the formal education and training system, these approaches may potentially be better positioned to identify those competences that are not developed within formal education and training and thus transcend formal qualifications. In some instances a balance between education and training and the labour market is sought through the introduction of qualification standards developed in cooperation between educational authorities and representatives of employers and employees. While systems linked to formal education have been dominant so far, the number of approaches linked to the labour market or enterprises seems to be growing.

8.2.1. The European Personal skills card

Although still not implemented, the proposal from the European Commission (1995) to introduce a European Personal skills card (PSC) may serve as a starting point for our review. The card is intended to provide a record of knowledge and know-how for all who want one. The European Commission (1996) stated that a skills card requires the identification of 'core knowledge', 'vocational or technical knowledge' and 'key skills that cut across disciplines'. These areas, designed to form the basis of a European skills accreditation system, will need to be broken down into coherent units and classified in increasing order of difficulty. This should make it possible to assess an area of knowledge from the most elementary to the highest level. Although no fixed list of areas of knowledge and know-how exist, it is assumed that the areas in question must be relatively well established without any major doctrinal controversies and should leave little room for 'national or cultural subjectivity'. The aim is not to create a single European test covering all core areas, but to establish a common testing framework able to use the potential of expert systems and telematic networks.

Over five years since the White paper, there is still nothing like a fully developed European skills card. In spite of this, the idea of a PSC has influenced European debates and developments in this area. The Commission initiated, from 1995/96, through the Socrates and Leonardo da Vinci programmes, an experimental framework of 18 projects working on issues of 'automated assessment'. These projects can be divided into three groups. One group focuses on testing and assessment of basic knowledge in mathematics, physics, biology, chemistry, statistics and geography. These projects combine a strong link to specific topics within formal education, while also trying to define a core of European knowledge. A second group focuses on the assessment needs in specific sectors such as banking, business administration, industrial process and the food industry, with the content defined and controlled according to the requirements of enterprises and the labour market. The third group focuses on cross-sectoral competences such as computer skills, languages and key skills. Apart from the key skills project, these

projects are topic-oriented, but influenced by the requirements of formal education and the labour market. The approaches to automated assessment have provided important experiences that impinge on the feasibility of a European Personal skills card.

One follow-up to the PSC has looked at US experiences of automated assessment (Cullen and Jones, 1997). This study concluded that the main problem related to the development of a PSC is not technological, relating to SMART card technology or assessment software, but in the 'socio-technical contextualisation' of such approaches. The question is how such assessment technologies can be embedded in appropriate legal, institutional and organisational frameworks. The Personal skills card can therefore no longer be understood as a single instrument, but as a rather vague framework influencing a number of programmes and projects. So far, the effort has suffered from technological or instrumental bias. While it makes sense to look into the potential of expert systems and automated assessment, basic concerns related to the aims (summative or formative), quality (reliability and validity) and legitimacy (legal and political integration) of the assessments in question should not be overlooked.

8.2.2. Assessments on the terms of formal education and training: integrating 'external' knowledge

In several European countries we find systems where individuals, on the basis of non-formal learning, are given the right to take ordinary tests and assessments administered within formal education and training. Assessment and testing methodologies developed within the formal system are applied to competences developed outside the formal system, at work and elsewhere. The German and the Norwegian systems illustrate this approach quite well. The *Externenprüfung* has been an element of the German dual system for decades, and approximately 5% of all candidates each year are experienced workers who exercise their right to take the final craft examination (*Abschlussprüfung*) alongside apprentices. The *Externenprüfung* operates in accordance with the content, principles and structure of the formal pathway. So the competences acquired outside the formal system, irrespective of how different they are from those produced in the formal system, have to be presented and restructured (by the candidate) according to the principles of the formal system.

A parallel to the *Externenprüfung* can be found in the Norway where a candidate may take the final craft examination designed for apprentices on the basis of his or her practical work experience. Section 20 of the 1952 Vocational training act (the '20 arrangement) stipulates that 'the craft examination may be taken without any contract of apprenticeship by those who have not less than 25% longer general practice in the craft, than the period of apprenticeship'. A relatively standardised assessment model is followed, operating according to the principles of planning, implementation and evaluation. The scheme was used moderately in the past but

during the 1990s this changed and there was dramatic growth in 1997-98. Approximately 14 000 candidates attended in each of those years, double those for a 'normal year', particularly in construction, transport, electro-mechanical industry and health and social care. The popularity of the scheme may be a reflection of the relatively low level of formal training in these areas. It also reflects the general pressure towards formalising qualifications, the most important drivers of this being wages and security of employment.

In both Germany and Norway these tests and assessments are conducted at the national level, their focus and priorities being controlled by the formal education and training system. The tests are looked upon as necessary links between the non-formal and formal systems, although questions of quality, in terms of validity and reliability, arise. Representatives of the Norwegian system admit that assessment practices may vary between different examination boards and regions, and that no formal controls have been built into the system.

8.2.3. Linking education and work; assessment in performance and output-based systems of education and training

Although controversial in other respects (Wolf 1995, Eraut, 1996), the English NVQ system has been instrumental in drawing attention towards assessment of prior and non-formal learning. This follows the emphasis on output or performance: it does not matter how or where you have learned, but what you have learned. Instead of treating non-formal learning as a residual factor to be integrated into the formal system in a flexible way, as is the case in the German and Norwegian external tests, a performance based system should, in principle, treat all forms of learning as equal. This implies that the learning in question can be judged in a proper way, underlining the critical role of assessment tools in this approach to education and training. During the 1990's, partly influenced by the NVQ system, several European countries introduced performance-based systems for vocational education and training, including the Netherlands, Ireland and Finland. During the last couple of years, Spain, Italy and Portugal have also moved in this direction. Assessment issues have become central in all these cases, the Dutch case illustrating some of the methodological developments that have taken place.

The Dutch development of systems for assessment of non-formal learning can be traced back to 1993 when the Ministry of Education set up a commission on *Erkenning Verworven Kwalificaties (EVK)*. This recommended that an infrastructure to support assessment methodologies should be developed, the social acceptance of *EVK* (recognition of acquired qualifications) should be promoted, and methodologies should be developed through pilot-studies. The development of methodologies was largely delegated to CINOP (*Centrum voor Innovatie van Opleidingen*), which developed these in a limited number of sectors, including child-care and construction. The approach was closely linked to, and could not have been carried through without, the new structure of vocational standards introduced in the

vocational education and training act (*WEB*) in 1996.

The methodology involves a candidate wishing to have his or her non-formal learning recognised having to go through two stages. In the first stage, all available documentation is gathered in a portfolio (formal certificates, statements from employers, examples of work carried out and so on). This documentation is then compared with the requirements listed in the national qualification structure and a decision on partial qualification may be reached. Normally this stage will be followed by a practically-oriented assessment aiming at formal certification. The methodology is centred on assessment of the planning, execution and evaluation of a practical task. In the first stage, planning, the aim is to assess the candidate's methodological competences and his or her ability to plan the task ahead. Criterion referenced interviews are used together with observation of work preparation. The second stage focuses on the execution of the task, trying to assess execution as well as reflective skills through a combination of observation (of process and result) and a criterion-oriented interview. In the third stage, evaluation, the candidate is asked to reflect on the task performed, to identify alternative ways of doing it, and to indicate how the chosen approach could be transferred to other working situations.

The emphasis on evaluation and reflection is an interesting aspect of the Dutch approach, and that part of the assessment utilises four strands of questioning. First, in terms of the preparations, why did the candidate act in a certain way and were other options available? Second, in terms of the process itself, why did the candidate act as she or he did and could other options be envisaged? Third, in terms of the product (or service), how can the candidate tell that it complies with requirements? Fourth, in terms of the completion of the task, why did the candidate act the way she or he did and are other options possible? This illustrates the strong dialogical character of the approach - success relying not only on formal procedures and descriptions but also on the abilities and experiences of the assessors.

The CINOP approach is linked to the qualification structure introduced through the vocational education and training act (*WEB*), and a qualification has to be derived from an occupational profile or other similar legitimate source of information (Broekhoven and Herwijnen, 1999). These profiles reflect qualification requirements in industries and branches and are divided into five levels. The first four levels are: assistant; skilled worker; professional; and middle manager or specialist. A fifth level, focusing on higher professional education, has been planned but not implemented. Each level is sub-divided into objectives outlining the required knowledge, skills and attitudes. As in the UK (Eraut, 1996), problems related to the formulation of qualification requirements and standards immediately became one of the main concerns facing the Dutch approach. On the one hand standards have to be broad enough to cover the huge variety of practices existing even within one occupational area. Too broad specifications, on the other hand, run the risk of becoming irrelevant. This problem of criterion and domain referencing (Popham 1978, Black 1998) has faced all countries trying to develop and implement systems

for the assessment and recognition of non-formal learning. Black (1998) describes the challenge in this way:

‘the definition of a domain can only be adequately specific if it can express the boundaries, both of the content and of the ways in which this content is to be expressed, or manipulated or put to use by a candidate’ (p.65).

He comments that the wider the domain, the more difficult becomes the assessment task. This applies to the new outcome and performance based systems for education and training where the definition of qualification domains is a critical part of the exercise. The definition of these domains, and decisions about what counts as appropriate experience, is part of a political process of deciding what counts as useful learning and appropriate assessment. This illustrates that the challenge of designing assessment methodologies at national level cannot be reduced to a (narrow) question of tools and instruments, but must include an understanding of the political-institutional framework within which these tools are supposed to function.

8.2.4. Career and labour market oriented assessment: the *Bilan de competence*

In France, the 1985 law on the *Bilan de competence* introduced a system for the validation of occupational competences acquired outside formal education. The initiative for this may come from an enterprise or a worker. This right was strengthened through the Law of December 1991 entitling employees to educational leave (of 24 hours or 3 working days) for the *Bilan* process. This was intended to permit the employee to review his or her occupational and personal competences, motivation and aptitudes, in order to facilitate occupational and educational development. As with the German, Norwegian and Dutch approaches discussed above, the *Bilan de competence* is a national system defined and administered according to national law. But while the German and Norwegian external tests and Dutch outcome-based assessments are intrinsically linked to formal education and training, the *Bilan de competence* is focused on the labour market and the enterprise.

Officially, the *Bilan* has a clear formative role. The idea is to give feedback to the employer or employee on questions of competence in order to support further learning or career development. More than 700 organisations and institutions have been accredited as *centres de bilan*, competing over requests for assessments. The profile and professional basis of these organisations varies greatly, as does their methodological approach. The following examples show how two different centres have approached the process.

The first centre, a public training organisation, divided the process into three phases. First, a preliminary interview where the motivation and needs of the employee were clarified and where the procedures of the *Bilan*, and its voluntary

character, were emphasised. Second, an investigative phase where motivation, personal and occupational interests, plus personal and occupational competences, are analysed and mapped out, using standardised tests to decide on matters like temperament and preferences. The intention was to reconstruct the background of the individual, in order to see whether there was a competence 'core' on which to build. Finally, in the third phase, the results of the analyses are presented to the candidate and used as a basis for dialogue on future training and career plans, in a way comparable to occupational guidance. After having concluded this process, the candidate receives a synthesis document supposed to identify clearly his or her personal and occupational competences, thus helping to clarify the necessary steps to be taken to realise future plans. According to formal regulations, this document should normally contain information on: the context of the *Bilan* (who initiated it, how was it realised?); the competences and abilities of the assessed person in light of their occupational aims; the prospects for realising these occupational aims; aims concerning education and training; and actions needed to realise these aims. This document then becomes the property of the candidate, and cannot be used by others without the consent of the person in question.

The second centre, a private enterprise, divided the process into six phases (five if the customer is an individual). The first (enterprise) stage consists of an interview with representatives of the management in order to present the process of the *Bilan* and clarify the objectives of the enterprise. During this interview the centre tries to get an overview of potential career development plans and training pathways in the enterprise. In the second phase the actual mapping of individual competences starts. This process operates according to criteria such as description of the candidate's own working situation, network, problems and tensions at the workplace and so on. The idea is to capture the main characteristics of the person and his or her situation at work. At the end of this interview, the candidate is given the task to work out an overview of his or her own competences, formal or non-formal. The fourth phase uses this 'homework' as a point of departure and tries to establish whether existing competences are fully utilised. The idea is to define more precisely the potential of the person and clarify where improvements could be envisaged. At the end of this phase the candidate is given the opportunity to take part in a standardised test covering the most important elements of his or her competences. In the fourth and fifth phases, the analytical part is used as a basis for guidance. The candidate is given 'homework' between these phases and the objective is to increase consciousness of his or her potential and future possibilities. The sixth phase, the actual handing over of the written *Bilan*, finalises the process. Normally this document will contain three or four alternative but inter-linked proposals for further development.

How successful the various approaches to the *Bilan de competence* have been is difficult to judge. There is no institutionalised control of the results of the *Bilan* process. Some criticisms of the approach have been made. First, there are doubts

that the formative role of the *Bilan* is not strong enough, as the synthesis document is rarely able to point to occupational projects or prospects; normally rather general recommendations for further training are given. Second, in spite of the efforts to analyse the competence of each candidate, formal and non-formal, many synthesis documents stick to formal elements, that can be documented through certificates and diplomas. Finally, in some cases, a blind faith in standardised and automated tests seems to exist, preventing tailored analyses appropriate for the circumstances of the individual.

These weaknesses do not alter the fact that the *Bilan de competence* is one of the few competence measurement systems operating on a large scale. It is also one of the few systems operating on a formative basis - the main idea being to clarify the potential of individuals. This, it is hoped, will then aid their further learning and strengthen their career possibilities. That the *Bilan de competence* does not aim to give formal recognition of competences according to a qualification standard makes it distinctly different from the other systems so far considered. The main reference points are individuals and enterprises. Other external references are not referred to, at least not formally, although there might very well be informal standards reflecting the professional background and methodological choices of the *centres de bilan*. Hence the summative role of the *Bilan* is intentionally weak, if we use summative in the sense of 'summative for the accountability to the public' (Black, 1998), whereas this is a central feature of traditional assessment and testing in France.

8.2.5. Industry-driven approaches to assessment

There are clear, although incomplete, indications that industrial sectors and branches are becoming increasingly active in the field of identification and assessment of competences. The focus on non-formal learning is, in most cases, explicit and there is a tendency to initiate work across national borders, focusing on the sector and the industry rather than the nation. This tendency is reflected in the Leonardo da Vinci programme. In the three first years of the programme (1995-97) support was given to approximately 100 European projects working on issues of identification, assessment and recognition of competences, with the majority focused on assessment methodologies at sector or branch level. This indicates increased attention to the role of non-formal learning at work. It might be that the diversity of approaches at this level, operating within relatively well defined occupational domains and serving somewhat narrower and more specific objectives than those faced at national level, will be more influential than public systems, national or European. Exemplifying this industrial activity are the continuing experiments of the French chambers of commerce and industry. As these experiments are based on procedures defined by the European Accreditation Association, a group consisting of private and semi-public accreditation bodies from the EEA countries, this allows reflection on assessment standards defined outside the public domain.

Colardyn (1999) highlights the somewhat paradoxical character of the way existing systems for the assessment of prior and non-formal learning in France are discussed. During the 1990s, diplomas at all levels have been made accessible through recognition of prior learning outside formal education and training institutions. However, a diploma can never be achieved entirely through assessment of prior learning. At some point, which will vary from diploma to diploma, the person in question has to take formal exams. So while the system has been made more flexible, the reference point is still the formal education and training system:

‘...recognition of learning is completely linked to the content of diplomas. Prior learning or experience can not be recognised as such; they are recognised as a part of a diploma, as part of an input process leading to formal education degrees. This means that individuals and in particular adult and experienced workers not interested in passing an additional diploma can not get their prior learning or experience recognised’

(Colardyn, *op.cit.*, p.4).

In a project started in 1998, the objective has been to develop a methodology and a system for the assessment and recognition of what an individual can actually do in a work situation, independently of any teaching setting. It aims to capture the results of various learning processes undergone by an individual in a working environment. Furthermore:

‘certification of competences is not concerned with assessment of performance. There could be considerable debate on that subject as it is mainly a question of how competences and performance are defined. Assessment of competences implies no judgement on how well an employee performs his actual job. This judgement is to be left to the internal functioning of the enterprise’

(Colardyn, *op.cit.* p.6).

A total of 15 local chambers of commerce and industry and 24 enterprises have been involved in the experiment. An independent certification body, the association for the certification of vocational competences, has been set up. The various chambers are represented in the governing board of this association. In addition, in order to include employers and employees, a committee for certification has been set up. This oversees all aspects of the assessment process, and all assessment standards and proofs have to be submitted to it. This committee, operating at national level, is expected to play an important role in securing the quality and legitimacy of the approach. This system has been linked to a European norm (EN45013) outlining ‘standards for bodies operating certification of personnel’. Developed through European cooperation on accreditation, this norm is supported by all the nationally recognised accreditation bodies of the EEA. Traditionally these bodies have focused on testing, inspection, and calibration of technical administrative systems, but they have gradually included certification of personnel

in their activities. The objective of EN45013 is to establish a process for specifying what will be assessed, ensuring that the assessment is transparent to all parties involved and impartial, as well as reliable and valid.

The Chambers of commerce and industry, when translating this norm into the French context, emphasised three major principles: the need for representation of all interested parties; the separation of training and certification; and the need for assessment and certification by a third party. The setting up of the committee for certification was an effort to meet the first principle. The second principle was to be met through a focus on results and outcomes:

‘..not on the processes to get to the results. The assessment and certification process for certification of competences is separate from any kind of training, regardless of its length or the setting in which it occurs’
(Colardyn, *op.cit.*,p.7).

The third principle, assessment by a third party, is crucial, linking into the quality, reliability and validity of the assessment process itself. An assessment of an employee cannot be conducted by his direct supervisor but has to be done by an expert in the particular domain who has been trained and certified as an assessor. The work of the assessor will be checked by a *verificateur* (verifier) responsible for monitoring the work of a group of assessors. This check and control system also has a third and fourth level. At national level the accreditation office will serve as an appeals office, and at international level national activities will be monitored by a team following ISO procedures.

The institutional set up, though crucial for the legitimacy of the exercise, cannot fully solve the fundamental question of assessment standards or reference points. The standards to be developed and issued by the committee for certification will be based on: characterisation of competences and their elements; a non-exhaustive list of examples of proofs extracted from the work situation in enterprises; a duration of validity; reference to the job-descriptions created by the National Agency for Employment; and reference to the diplomas accessible through the assessment of prior learning. Standards are submitted for approval to the committee for certification and then published. Updates are supposed to take place at regular intervals.

For the time being, the main experimentation and concern is directed towards how to collect individual competence proofs. Standards in a total of 15 different domains were covered during 1998 and 1999. Nine enterprises were involved with each assessment standard, working on the competence standards and the proofs. Three main types of proofs are envisaged:

- (a) proofs extracted from the work situation of each enterprise, forming the core of the proof. Certification of competences must reflect activities in the work situation - there is no question of inferring external elements. It is stated that proofs have to exist prior to the setting up of the portfolio;

- (b) complementary information, mainly testimonies from supervisors and colleagues, although sometimes, if appropriate, tests can also be used;
- (c) additional information, for example observation or interviews to verify the authenticity of the proofs.

The emphasis on proofs has led to what we may term a ‘bottom-up approach’ to the development of standards. The enterprises involved in the experiment have brought forward lists of proofs stemming from their own contexts. The final (but non-exhaustive) list of examples presented in every standard thus reflects this variety. Although collected in single enterprises, the proofs tend to appear repeatedly, in spite of contextual differences:

‘the nature of the proofs extracted from the work situation contribute to support the idea that certified competences are transferable from one work situation to another’

(Colardyn, *op.cit.*, p.11).

Perhaps the most interesting aspect of this industry driven approach to assessment is the way that the bottom up approach to the development of standards could contribute to the development of a community of judgement about assessment that is driven from an understanding of how assessment operates in practice. This would seem to acknowledge that the development of a working consensus about assessment processes is itself a process that takes time, resources and commitment to achieve.

8.2.6. Enterprise methodologies for the assessment of competence

Most managers would not immediately look upon identification, assessment and/or recognition of non-formal learning as directly relevant to their day-to-day activities. However, while the vocabulary might be unknown, efforts to identify and measure employees’ skills are common. In human resource management tools for competence measurement in some form are of crucial importance, in order to facilitate systematic improvement. The instruments used to achieve this information range from traditional personnel files, containing information on formal education and former work experience, to sophisticated techniques for testing and self-assessment. The exchange of experience between those with expertise in human resource management and those with expertise in assessment has not been systematically developed. However, Mercedes Benz (MB, now Daimler Chrysler) provided an example of how a productive inter-relationship between the different approaches can be achieved.

In 1993, MB announced a plan to build a new car manufacturing plant in Alabama, USA. Alabama is an area characterised by weak industrial traditions, with few people skilled in car building. Recruiting workers mainly from the local area, MB faced a basic challenge: how to select and recruit good workers in a situation where their competences had been developed in totally different contexts. Traditional

information on knowledge and competences, diplomas and certificates, were of limited value in this situation. A total of 60 000 people applied for 900 available jobs. The questions faced by the selectors were how to measure what people know and how to validate these competences against the requirements of production. It was acknowledged that Mercedes Benz did not have the right instruments to do this job. Cooperation with the University of Alabama and various private assessment organisations was initiated and a complicated 12 level process was designed and developed from scratch. A combination of interviews, tests, and observation of behaviour in a work environment was introduced. After initial selection, applicants attended pre-employment training where the 'ability to learn' was addressed and assessed. The basic objective, according to MB, was to find 'generalists able to learn', not specialists in the traditional, formal sense. The assessment task was thus focused on attitudes, abilities to communicate, approaches to problems, and so on, rather than upon predefined, undisputed areas of knowledge.

The MB approach was based on economic considerations, as formally non-skilled generalists were cheaper than formally skilled specialists, and upon the need to develop the necessary manufacturing competences from zero to an operational level in two to three years. It was also clear that very few Germans would be transferred to Alabama, thus making it necessary to train managers and coordinators at all levels and in all functions. After the initial recruitment process, assessment methodologies were integrated into the normal managerial function, focusing initially on the selection and training of managers. It is interesting to note that the assessment approach used by MB was more complex than the public assessment methodologies discussed so far. This meant that the amount of time and money used for assessment far exceeded what is usually envisaged for public systems. The case also illustrates that there is a limit to the degree of simplification and standardisation that should be introduced into assessment methodologies. The Mercedes Benz approach in Alabama put a strong focus on learning abilities and learning context. These elements cannot be captured through the use of standardised and automated tests on their own, but require tailored solutions able to reflect the uniqueness of individual learning experiences and competences.

8.2.7. Task and/or technology-specific approaches to assessment

A number of projects from within the Leonardo da Vinci programme have developed methodologies to assess competences linked to specific tasks or technologies. Some of the topics and technologies covered are laser technology, welding, environmental engineering, thermal spraying, cleaning, wastewater handling and security services. These areas are either examples of technologies developing too fast to be adequately covered by traditional schooling (laser technologies) or those to a great extent falling outside the domain of formal schooling (cleaning). While working within a relatively limited and clearly defined domain, many of these approaches work across national borders. Working with specific tasks and

technologies, these projects seem to be much more inclined to see the limitations of pure national solutions. We will exemplify this assessment approach through consideration of the case of the 'European computer driving licence' (ECDL).

The idea of a computer driving licence originated in Finland in 1988. The scheme was introduced in 1994 and the ECDL-foundation, currently consisting of 14 national computer associations, was set up in 1997. A computer driving licence is awarded to candidates who pass seven modular tests. One of the modules tests theoretical understanding, while the remaining six assess the practical abilities to use different types of software, including operating systems, word processing and spreadsheets. In 1998 the ECDL was evaluated and the evaluation concluded that the ECDL has been successful in several respects. Candidate numbers had grown steadily, up to 146 000 mid 1998 and there was a functioning structure for administering tests in the different countries, facilitated by links to national computer associations. In the evaluation the following strengths were emphasised: the ECDL has a defined purpose, a defined target group and is clearly meeting a need; the link to existing test centres has been important; and there is a clear syllabus specifying the knowledge and skills to be assessed (although more work is needed on this point).

Some criticisms were voiced, basically linked to weaknesses in the formulation and design of individual questions. The success of the ECDL, based on a clear definition of the domain to be assessed and an efficient institutional structure, provokes reflection on future strategies in the area of assessment as a whole. Will the development of a multitude of isolated assessment methodologies, linked to specific tasks and technologies, provide a better solution than the development of general methodologies at national (or even European) level? The ability to define the boundaries of the domain to be tested has been presented (Black, 1998) as a prerequisite for reliable and valid testing. Can the example of the ECDL, and other task- or technology-specific approaches, clearly having followed this principle, give rise to a bottom-up approach to the identification, assessment and recognition of non-formal learning. Increasing activity at sector and enterprise level certainly supports this kind of development, pushing competence measurements forward, largely outside the control of formal education and training. It might be argued that approaches such as the ECDL only operate on the periphery of the huge reservoir of competences developed through non-formal learning, and that the ECDL, and other related projects, are addressing areas which can be easily measured in a fairly objective way. Such a criticism implies that crucial competences, for example related to communication, cooperation and problem solving, will remain much harder to tackle.

8.3. Why have new assessment methodologies been developed?

The discussion so far illustrates that we face a concentrated but highly diversified push towards the introduction of methodologies and systems for identification, assessment and recognition of non-formal learning. Although in many cases still at an experimental stage, we can observe a clear motivation among actors at European, national, sectoral and enterprise level to move in this direction. The question is why has this happened? What has triggered this wave of activity, affecting most European countries almost simultaneously? Three possible explanations are examined. The first will dwell on what is characterised as the search for key qualifications, the search for the ‘magical potion’ that will enable us to deal with rapid technological and organisational change and survive in the global market. The second will focus on the need for ‘institutional re-engineering’, and the link between measuring competences and redesigning learning systems. The third will discuss whether we are in a situation where solutions are seeking problems: where methodologies and systems are being developed in an institutional vacuum, not responding to actual needs.

8.3.1. In search of the magical potion: the identification, assessment and recognition of key qualifications

Although normally treated as two separate issues, the question of how to define, identify and develop key qualifications and the challenge of how to assess non-formal learning are closely related. It can be argued that these two debates reflect different aspects of the same issue, at a time when increasing attention is being focused on learning and knowledge requirements in a society characterised by unprecedented organisational and technological change. Irrespective of the many, and partly conflicting, interpretations of key qualifications (Kämäräinen, 1999) as well as of non-formal learning (Bjørnåvold, 1998), a common concern among those working with these questions is the search for elements of knowledge and competence transcending specific organisations and/or technologies. The ability to face new settings and unexpected problems is presented as of particular interest, the objective being to prepare people for uncertainty by broadening their basis of knowledge and experience. Dieter Mertens formulated this concern in the following way in 1972:

‘mental capacity should not only be used to gather factual knowledge, but rather be looked upon as a transfer point (*Schaltzentrale*) for intelligent reactions. In this context, education should first and foremost support handling and solving of problems’ (p.15).

In his effort to define and delimit key qualifications, Mertens identified a number of distinct elements. ‘Basic qualifications’ included abilities such as analytical and

critical thinking as well as the ability to cooperate and communicate. The abilities to sort, interpret and make use of existing information in various settings were defined as 'horizontal qualifications'. As many situations and most problems are highly unstructured (Simon, 1973), the ability to structure information and sort the important from the unimportant is of decisive importance. The command of practical skills relevant across enterprise or sector boundaries was defined as 'transversal knowledge'. Thus key qualifications are less about knowing facts, theories and rules (knowing that) than about applying them in social, organisational and technological settings (knowing how). In the decades since the publication of Mertens' work, this emphasis on basic, horizontal and transversal knowledge has been transformed into policy statements in most European countries as well as at EU level. For example, the European Commission 1995 White paper, concerned about the difficulties in predicting future knowledge needs in detail, warned against a too narrow approach to education and learning:

'in the future, individuals will be called upon to understand complex situations which will change in unforeseeable ways (...) they will also be confronted with an increasing variety of physical objects, social situations and geographical and cultural contexts (...) the development of a broad knowledge base, namely the ability to grasp the meaning of things, to comprehend and to make judgements, is the first factor in adapting to economic and labour market change' (p.9).

The answer to this challenge to develop and support a broader knowledge base is through a combination of formal and non-formal learning. Formal education must be systematically supplemented through learning taking place outside formal education, in the family, at work and during leisure time. Such a diversified approach, combining the qualities of different learning areas, is necessary in order to avoid a too narrow approach to learning:

'in fact an excessive standardisation of knowledge prevails. It tends to give the impression that everything has to be taught in a strictly logical order and that (...) identifying quality is a question of mastering a deductive reasoning system based on abstract concepts, in which mathematics play a predominant role. In certain cases deductive approaches can thus make students passive and restrict the imagination'

(European Commission, 1995, p.11).

The attention given to the issues of key qualifications and non-formal learning can be interpreted as a reflection of this general demand for a broader, multi-dimensional knowledge basis. Applying this perspective to the two issues, their inter-linked roles become apparent. Key qualifications can be looked upon as a set of learning objectives, applicable at various levels and relevant to individuals, enterprises and schools. Key qualifications are intangible in the sense that they are metaphors or theoretical constructs drawing our attention to certain aspects of

human action, communication and learning. Instead of looking upon key qualifications as packages of knowledge to be listed wherever appropriate, they should be looked upon as guiding principles for learning. If key qualifications are to become something more than topics for academic debate, this guiding role is of critical importance. The focus on these less visible aspects of human competences indicates that practically oriented support strategies may need to be developed.

Methodologies and systems for identification, assessment and recognition of non-formal learning can be looked upon as tools for realising such a practical strategy. The terms informal and non-formal learning are, however, not very helpful in this respect. Non-formal learning is defined in a negative sense, covering what is not included in formal education and training. It gives no positive indication of content, profile or quality. The concept does, though, draw attention to the rich variety of learning areas and forms available outside formal education and training. A closer link to the key qualifications issue might therefore be useful and give the exercise more direction. The linking of formal and non-formal learning domains can thus be viewed as a way of realising and materialising the objectives expressed through key qualifications.

Learning outside formal education and training institutions is increasingly presented as a prerequisite for a learning strategy aiming at a broader knowledge and competence base, transcending specific organisations, technologies, contexts and problems. Measurement and assessment techniques have clearly been given a central role in transforming this issue from a rhetorical to a practical level. It is left as an open question whether existing approaches are able to fill this role.

8.3.2. Identification, assessment and recognition of non-formal learning as an element in the re-engineering of education, training and learning systems

A substantial refocusing of vocationally oriented education and training is currently taking place, often initiated at the public level with a move from input-oriented to output-oriented systems. In countries such as the UK, Finland and the Netherlands it is emphasised that what matters are the competences, not how you acquired them, but these still have to be identified and assessed. The link between such education and training reforms, intended to be more open, flexible and inclusive, and the development of methodologies and systems for assessment, is thus obvious and direct. This re-engineering can also be coupled to the growing emphasis on lifelong learning, with the requirement for a stronger focus on the link between various forms of learning in different domains at different stages of life. While the formal system is still very much focused on initial education and training, a lifelong learning system has to face the challenge of linking a variety of formal and non-formal learning areas. This is necessary to meet the individual's need for continuous and varied renewal of knowledge and the enterprise's need for a broad array of knowledge and competences, a sort of knowledge reservoir to face the

unexpected. In this context, the question of identification, assessment and recognition of competences is crucial, as they have to be made visible if they are to be fully integrated into a broader strategy for knowledge reproduction and renewal. These two challenges are emphasised, to varying degrees, in all the countries studied. In some countries, methodologies for the identification, assessment and recognition of non-formal learning are looked upon as necessary tools to open up these new pathways. It is left as an open question whether the existing systems are able to fill this function.

8.3.3. Solutions seeking problems and suppliers seeking customers

The area of identification, assessment and recognition of non-formal learning is characterised by highly articulate suppliers of solutions (at European, national and sectoral level) and very quiet users (individuals and most enterprises). Only in a few cases can the development of measurement and assessment methodologies be described as driven by demand or as a push from the bottom up. If we study the last half of the 1990s, when this tendency gained speed and strength, the existence of programmes like ADAPT and the Leonardo da Vinci at European and sectoral level has contributed to the setting and changing of the assessment agenda. The availability of additional money, linked to a limited set of specific priorities, inspired a high number of institutions to involve themselves in the development of assessment instruments and tools. Although the results from these projects may be of varying quality, the long-term impact on the agenda of the organisations and institutions involved should not be underestimated. The coming period will show whether this supply-driven movement will find users, for example at sector and enterprise level, appreciating the efforts already made.

At national level we can observe how clusters of countries have learned certain lessons from each other and how the existence of a methodological instrument in one country may attract attention from neighbours. For example, the Irish approach to accreditation of prior learning is very closely related to UK efforts in this area, without apparently acknowledging the considerable problems that occurred in practice (Wolf 1995). This is perhaps due to a tendency for policy-makers in one country to focus upon the policy intentions and instruments in another country rather than upon how they operate in practice. Hence policy-makers looking at the English NVQ system often seemed unaware of 'the impossibility of delivering NVQs as they are meant to be delivered, because of time, space, money and the realities of individuals' record-keeping capacities' (Wolf 1995, p.117). On the other hand, the Finnish system for competence based assessment has, during a period of 3-4 years, attracted considerable attention in the other Nordic countries. To a certain extent it is possible to follow how policy formulations travel from the documents of one country to the documents of another (in this case from Finland to Norway and Denmark and finally to Sweden). The fact that these policy documents have led to further experimentation and reform make the phenomena even more important.

Mutual learning is generally positive. Although a substantial transfer or copying of methodologies and approaches has taken place, the degree of local adaptation and change is also considerable. The dominating top-down character of the initiatives is, however, striking and it is an open question whether the proposed solutions will find proper problems, users and customers. In this light it is interesting that the very limited success of NVQs in England meant that the national authority (first NCVQ and then QCA) put extra effort into selling the system to other countries as a means of raising revenue. Indeed it is ironic that the feature that makes the system attractive to others, extremely demanding and rigid requirements that look as though they deliver high national standards, is the very element that increases the likelihood that 'factors which are extraneous to assessment will in fact preclude effective and high-quality assessment from taking place' (Wolf 1995, p.125).

8.4. Combining different forms of assessment to answer new questions?

From the above it could be argued that the emphasis on assessing non-formal learning is supply-driven, but the current emphasis seems to rest on two further factors. First, there is the desire to broaden the knowledge basis of societies, and to link theory and practice in a more efficient way. Second, there is the desire to redesign and re-engineer education and training systems in the direction of outcome based and lifelong learning oriented systems. These two factors can be linked by the question: are current methodological approaches to the assessment of non-formal learning able to respond to the expectations with which they are confronted?

Assessments within formal education and training have traditionally fulfilled a number of different and partly conflicting functions. Educational and occupational selection has traditionally been very important. Certificates and diplomas can be used as signals of the successful completion of a certain educational pathway, declaring an individual suited for a certain task or position. Those lacking the appropriate certificate, irrespective of personal qualities, are by definition regarded as unsuitable. This 'summative' role of formal education and training thus appears particularly antithetical to non-formal learning. This need not necessarily be the case, however, if formal education and training seeks to strengthen links between formal and non-formal learning prior to the summative assessment being made. Examples of this can be seen in the recognition and formal credit being given to work-based learning and the growth of practice-based degrees, where learning from experience through processes of critical reflection is the primary vehicle for learning and assessment. Such approaches are becoming widespread in the UK for example, and, although they make extensive use of non-formal learning, they still result in the award of traditional graduate or post-graduate awards.

Summative assessments themselves need not necessarily involve traditional examinations either. They could utilise some of the assessment methodologies highlighted in this chapter, or others such as synoptic assessment, as a means of reviewing the accumulated understanding of a domain as a whole, including the ability to apply skills, knowledge and understanding in a range of contexts. From this it is clear that new assessment methodologies drawing upon non-formal learning can be used to facilitate and recognise a broader knowledge base within society. They do this most effectively, however, when they are used within a holistic approach to learning and assessment, rather than setting themselves apart from more formal education and training.

A second role of assessment within formal education and training is the promotion of learning through systematic diagnosis and feedback. This 'formative' role implies a strong interrelation between teaching and learning processes and the actual assessment. Formative assessment within formal education and training has usually, though not exclusively, focused upon progress in learning that will eventually be summatively assessed. The assessment methodologies outlined in this chapter, however, have drawn attention to the way it is possible to use formative assessment as a means to build confidence and commitment and to develop key qualifications such that they have a direct effect upon the performance of individuals as learners in other contexts. This again draws attention to the need for a holistic approach to learning and personal development, which makes use of a range of approaches to learning and assessment.

This is important too as it has implications for the desire to redesign education and training systems. This is because there is a paradox in that if you are interested in education and training delivering a wider range of outcomes then you need to give greater thought to the relationship between learning processes and outcomes. The English NVQ system has struggled in vain for the last decade to come to terms with the fundamental flaw in its initial design that it was sufficient to pay almost exclusive attention to the outcomes of learning and ignore the processes of learning. The lesson here is that new assessment methodologies can contribute to the redesign of education and training, so that they are oriented towards a wider range of outcomes, including recognising the need for individuals to feel they are willing to continue learning in a variety of contexts throughout their lives. However, it should be acknowledged that these methods are only one part of the required learning and assessment mix, and they should not be expected to carry the full weight of such fundamental change on their own.

The final lesson to be drawn from this review is that the extent to which current methodological approaches to non-formal learning are able to respond to rising expectations about what they may do depends partly upon how inclusive these approaches are. The bottom-up approaches outlined in this chapter specifically tried to involve people at all levels in thinking about issues fundamental to learning and assessment. This is not to downplay the possible role for top-down

developments, but rather to acknowledge that such systems will need to pay particular attention to building a community of judgement through the networking and training of assessors. The rationale for this is that these people should have an input as to how the assessment approach will work in practice, rather than just being expected to implement a system designed largely in isolation from those with practical experience of assessment. Any review of the role of assessment should, therefore, ask whether it strengthens the links between formal and non-formal learning, and whether it does this in an inclusive way. In order to move forward it is important that the issues raised here are widely debated and we hope that this chapter is a contribution to that debate.

Bibliography

- Bjørnåvold, J. Validation and recognition of non-formal learning: the question of validity, reliability and legitimacy. In Cedefop, *Vocational education and training - the European research field*. Background report . Volume II (pp.216-232). Luxembourg: Office for Official Publications of the European Communities, 1998.
- Bjørnåvold, J. *Making learning visible: identification, assessment and recognition of non-formal learning*. Luxembourg: Office for Official Publications of the European Communities, 2000.
- Bjørnåvold, J.; Pettersson, S. *Transparency of vocational qualifications: the Leonardo da Vinci approach*. Luxembourg: Office for Official Publications of the European Communities, 2000 (Cedefop Panorama Series).
- Black, P. *Testing: friend or foe? Theory and practice of assessment and testing*, London: Falmer, 1998.
- Broekhoven, S.; Herwijnen, A. *EVK versus EVC? Assessment of non-formal learning in the Dutch private sector*, Thesis Educational Sciences, University of Nijmegen, Nijmegen, 1999.
- Colardyn, D. Steps towards reliable measurement and recognition of skills and competences of workers. *Conference paper, French assembly of chambers of commerce and industry*, Paris, 1999.
- Cullen, J.; Jones, B. *State of the art on approaches in the United States of accreditation of competences through automated cards*, London: The Tavistock Institute, 1997.
- Eraut, M. *The assessment of NVQs*, Sussex: University of Sussex, 1996.
- European Commission, *White Paper, Teaching and learning: towards the learning society*, Brussels: EC, 1995.
- European Commission, *A European skills accreditation system, internal information memorandum*, Brussels: EC, 1996.

- Kämäräinen, P. *Key qualifications and new learning concepts; a paradigm shift in the curriculum development for vocational education and training*, IVETA '99 conference, Sydney, 1999.
- Klarus, R. *Competenties erkennen*, 's-Hertogenbosch: CINOP, 1998.
- Little, A.; Wolf, A. (eds), *Assessment in transition: learning, monitoring and selection in international perspective*, Oxford: Pergamon, 1996.
- Mertens, D. *Überlegungen zur Frage der Identifizierung und Vermittlung von Schlüsselqualifikationen im Erst- und Weiterbildungssystem*, study for Council of Europe, Erlangen, 1972.
- Popham, W.J. *Educational evaluation*, Boston: Allyn and Bacon, 1993.
- Simon, H. The structure of ill structured problems, *Artificial Intelligence* 4, 181-201, 1973.
- Wolf, A. *Competence-based assessment*, Buckingham: Open University Press, 1995.

CHAPTER 9

Developing a regional dialogue on vocational education and training

Ludger Deitmer and Peter Gerds

9.1. Introduction

This chapter will examine the importance of regions to the development of the vocational training system in Germany based on recent research and practice. The debate in Germany has intensified since some of the regional *Länder* governments began taking steps to develop their vocational training schools into regional training and development centres with greater autonomy and a stronger image. In addition, in many places, regional partners are conducting a regional vocational training dialogue. This takes the form of a series of events including seminars, reports and pilot projects. Those taking part include regional and local representatives of trade and industry, vocational training schools, employer associations and the public administration as well as researchers. In addition to a general consideration of the direction of the national vocational training system in Germany, these events have focused on specific structural and programme development to modernise the German vocational training system from a regional perspective.

Regional actors increasingly see a need to make more intensive use of local structural opportunities in order better to tackle the problems of education and training and regional development. Key aims in regional dialogues are to effect better regional development, in line with the national criteria and framework and to develop vocational training to stimulate regional development. These dialogues are further stimulated by advice and commentary from researchers and experts. The proposals emerging from the debates are being taken up by the *Land* ministries responsible for regional vocational training and translated into specific programmes and reform measures (Heidegger and Rauner, 1997, *Senator für Bildung*, 1999).

In summary, the idea of a regional vocation education and training system is based on the increased demands for vocational training to meet regional and local needs. In Bremen, in north Germany, the vocational training dialogue is focusing on the following issues:

- (a) whether there is adequate scope for local and regional development within national regulations and criteria;

(b) whether staffing and material resources in the region are sufficient to define and organise training provision of this kind.

However, the vocational training dialogue is also raising many other questions and, as yet, little progress has been made in answering them. How can a region develop into a 'learning region'? Is it worthwhile for regions to support cooperation of this kind between different institutions? What problems do forms of cooperation have to overcome? What conditions are required for the development of these innovation and learning networks? How do the institutions and actors involved benefit from dealing with innovation through dialogue? How can regional vocational training dialogue be organised as an instrument for determining the development and location of vocational training in the region?

Nevertheless, we must emphasise that structural problems in Germany cannot be resolved solely through developing pilot projects and models of best practice or by means of discussion. A new consensus must be found between the region, the state and the European Union, and through developing processes in which the region can play a stronger role. It is clear that appropriate answers cannot be found from a national perspective alone. There has been a massive increase in the demands on the German vocational training system as a result of the changes in technology and the economy. The question remains open as to whether, within national regulations and criteria, there is adequate scope for regional development by schools and companies. Are there adequate legal frameworks and financial scope for this to be achieved? Do the regional agencies have the competences needed to develop new networks of relationships between regional companies, schools and other agencies responsible for innovation? Do these regional networks or cooperative relationships between places of learning help to ensure that better regional vocational training opportunities ensue for the benefit of all concerned?

In any case, it is apparent throughout Europe that regions are beginning to reform themselves and a new, expanded understanding of the region is gaining ground, which includes human resources in the broadest sense. Behind this lie radical reorganisation and restructuring of companies and the formation of new networks between companies and their suppliers. Last but not least, the existing institutions of initial and continuing vocational training are also changing. It is not currently possible to foresee how these institutions will develop in the future, whether they will become more or less important to the region, whether they will be marginalised, or replaced or supplemented by other social and individual forms of organisation of skills training. It is only certain that these institutions must play an active part in developing new organisational forms, if they want to survive in the long term. To this end, there is a particular need for development of competences and instruments for intensifying the regional dialogue. It is equally important for vocational training, including school-to-work transition and initial and continuing vocational training, to be understood as one system and for the vocational training system in the region to be structured accordingly (Nyhan, Attwell and Deitmer 2000; Stahl, 2000).

9.2. The importance of the region as a new platform for VET reform in Germany

The concept of the learning region emphasises that learning processes constitute the core of innovation, providing a basis for the definition of innovation networks. Concepts such as regional innovation networks and regional VET dialogue have a common denominator in the idea of the region, but in some ways they are very different from it. The term 'regional innovation network' is the broadest concept, based on the idea that innovations take place in networks and that the region is an important context for innovation (Morgan, 1997). The term 'regional VET dialogue' relates to developments in vocational education and training in the region, which are taking place through dialogue. This can be linked to regional innovation in two respects. First, VET dialogue and the associated intended improvement of vocational education and training can be regarded as an active focus for regional development or development of the ability of regions to innovate. Second, it conveys the idea that VET development requires dialogue, if it is to be integrated into regional development. Thus, there is a definite connection between ideas of a regional VET dialogue, a learning region and regional innovation networks (Manske, Ruth and Deitmer, 2000).

9.2.1. The concept of learning regions and of regional innovation environments

With the new understanding of the regional economy, which depicts human resources as an independent value factor, regional innovation networks have for some years been attracting a great deal of attention. In this context, the idea of a regional innovation environment as a geographical entity gives only a partial picture. It should, rather, be understood as the totality of the social and cultural elements guiding the actions of individual and social actors, with particular emphasis being given to collective learning processes on the part of the actors in the innovation environment (Camagni, 1991; Crevoisier and Maillat, 1991). These learning processes facilitate the improvement of the regional environment for innovation. This view is opposed to the previous reductionist view of regions as 'statistical spaces', sites or purpose-oriented spatial abstractions (which provided a framework for state regional policy geared to balance). In contrast, these regional policies are compelled to embrace a new understanding, in that European, national and regional policies increasingly take greater account of the human potential of their region.

This idea of a learning economy advances the development approach based on endogenous human potential. Learning economies focus on the capacity and potential of the actors for learning and innovation. The actors, as well as being drawn from trade and industry, also include public representatives of the region, from institutions of higher education, vocational training institutions, public

institutions, etc. (Cooke and Morgan, 1993; Nelson, 1996; Braczyk, Cooke and Heidenreich, 1998; Lundvall, 1999). The region is understood as being a socio-economic construct, capable of action, and in a position itself to structure its development activities for the benefit of its citizens.

This greater regionalisation or 'discovery' of spaces is set against the background of the international division of work between end users and suppliers (whether in the form of production or of services close to production) in a network of relationships which are spatially determined. Global enterprises are attempting to achieve integration across functions and businesses and 'spatial proximity' is becoming increasingly important as a success factor for the development of regions. Larger enterprises are reorganising and developing circles of regional suppliers in their immediate vicinity. With the reorganisation of production, the incentive for regionalisation and for the spatial concentration of functions and actors is growing. It is not clear whether this will also benefit regional vocational training (Freeman, 1991; Jürgens and Krummbein, 1991).

The approach of regional innovation environments is based on regional innovation networks, which emphasise the spatial proximity of regional innovation agencies. An innovation network is defined as a spatial network-based on informal links and interaction, which increases the capacity of the individual institutions for innovation, via cooperation and dialogue. This approach also emphasises the importance of a common understanding or guiding concept, expressed in shared attitudes. The partners in the regional VET dialogue know that they are dependent on one another and act accordingly. Projects are tackled jointly or use is made of the know-how of the other regional innovation agencies to resolve particular problems. The learning region is based on a comprehensive innovation or learning concept, in which vocational learning is linked to learning processes related to work and organisation. At the same time, various fields of policy are inter-linked, including the regional promotion of trade and industry, commerce, crafts and services, labour market promotion, science and education policy, and associated policy fields such as environmental policy. On no account is a region of this type an isolated community. Instead, it initiates strong incentives for development, because although it is in competition with other regions, it can still create a new impetus and new prospects through the close exchange of information and experience with other regions (Huggins 1997; Deitmer and Hüster, 1999).

9.2.2. Possibilities and prospects

The central idea behind the learning region is based on effective support for cooperation between initial and continuing vocational training, research and development institutions from the regional universities and institutions of higher education and industrial, craft, commercial and service sector enterprises. These are linked with one another through regional learning and innovation networks. The consolidation of the research and development infrastructure that has occurred in

many places is extended by adding vocational training and continuing training institutions. Little progress has previously been made in cooperation between initial vocational training and research and continuing training, from the point of view of either content or economy. With the extended dual cooperative approach to VET discussed here, it is possible that a considerable improvement could be made in the provision of additional training places and in improving the quality of VET (Holz, Walden and Rauner, 1998).

The development of regional VET and innovation centres lies at the core of these proposals, along with an innovation programme run by the learning and innovation networks. The learning environment can be developed through looking at learning options and opportunities within the region. Learning may take place in many different venues - in enterprises, vocational schools or institutions of higher education in the region. Some regional pilot schemes developing regional cooperation in the provision of learning places have proved successful, although with great variation in the quality of cooperation (Euler, 1999). With greater cooperation and interchange between VET teachers and trainers in enterprises, integrated training can develop. At the planning level, this means coordinating the vocational school curricula and company training plans. This process is stimulated by projects organised jointly by vocational schools and enterprises. A positive start has been made in a number of cases, but this is the exception rather than the rule (Rauner, Ruth and Deitmer 1995; Deitmer and Rauner, 1996; Holz, Walden and Rauner 1998; Senator für Bildung, Bremen, 1999).

9.3. Elements of regional VET dialogue

Structural changes taking place in the regions and radical changes in the VET system and institutions not only involve risks but also open up opportunities for expansion and modernisation. In this process, VET is not just dependent on the economy, but can generate a major impetus for regional development, if it tackles the new challenges. In particular, this means developing a plural system of inter-linked learning venues with the aims of promoting self-organised learning, including both initial occupational training and continuing vocational training, and improving the regional infrastructure (Deitmer and Eicker 2000). In order to support this development process, there is a need for appropriate regional programmes, the elements of which are outlined in the next section.

9.3.1. Programmes for supporting regional VET dialogue and developing innovation networks

The quality of skilled work in industry, crafts, services and commerce is largely influenced by the quality of VET provision in the region. Incentives are needed to promote the quality development process. This can be achieved via planning,

development and implementation of regional economic programmes. What should their objectives be?

Which areas should the measures in the programmes cover? Regional VET programmes need a mission ⁽⁵⁾. A regional programme should have general objectives, which lead to:

- (a) cooperation between those involved in VET;
- (b) professionalism on the part of trainers;
- (c) an increase in the numbers of workers undertaking training to 6-7% of the workforce;
- (d) making involvement in training more attractive to companies and enterprises;
- (e) higher training quality accompanied by reduced training costs.

Ten key principles underpin the proposed programme of reform (Rauner 1999; Deitmer and Gerds 2000).

9.3.1.1. The promotion of training partnerships via implementation of regional programmes of cooperation between learning providers

Regional programmes of cooperation between learning venues could be used to promote training partnerships between enterprises and between enterprises and vocational schools. They offer an opportunity to support the participation of innovative and specialised enterprises, which have dropped out of the VET system, to increase quality training and the numbers undertaking work-based training. While vocational schools must be included in the training partnerships, enterprises should retain responsibility for vocational training.

9.3.1.2. From dual to dual cooperative vocational training

The theory and practice of vocational training must be coordinated in such a way that they go hand in hand. It is no longer sufficient only to coordinate VET plans for enterprises and schools at the national level. If school and enterprise-based learning are really to go hand in hand, teachers, trainers, enterprise proprietors and guilds must coordinate vocational training in the region.

9.3.1.3. Vocational schools as regional centres for the development of competences

Vocational schools must develop more strongly into centres for the development of competences and innovation for their region, their occupational sectors, their guilds and their enterprises. Examples of developments in this direction have shown that opening up to the regional economy leads to a change in the school from which all

⁽⁵⁾ The VET conference in Bremen defined this as follows: 'The ability to help shape the world of work in a socially, economically and environmentally responsible way. High-quality VET is the best precondition for job satisfaction and success. It also constitutes the basis for occupational independence and a business career. VET is seen as a strategic resource in the region' (*Senator für Bildung*, 1999, p.66).

parties benefit. The schools become contact points for sectors and enterprises and the problem-solving skills of staff increase, with a positive impact on skills training both within and outside the school system. In addition to regulated vocational training courses, in future there will be a particular need to offer an extensive range of highly flexible skills training provision. Centres for the development of competences should be given an opportunity to participate in regional, national and international innovation programmes, to increase their know-how and import innovative new know-how into the region. To do this, such schools need new legal and organisational forms, to enable them to take up new opportunities for action in order to equip themselves for the new roles.

9.3.1.4. Raising training quality and reducing training costs

Partnerships, between enterprises, together with the centre for the development of competences, can provide a broad range of training opportunities at different levels, leading to improved quality and reduced costs.

9.3.1.5. Raising the upper level of the dual system and establishing links to continuing vocational training

The principle of duality is central to the development of higher vocational training. It means that dual routes can be organised for continuing professional development for the occupation, facilitating progression from dual initial training through courses at vocational schools to study at institutions of higher education. There is also a growing need for management staff in all sectors of the economy. The structures of the existing training courses cannot provide skills training for sufficient numbers, because there is too great a gulf between initial occupational training and academic study. There are no dual system courses for managers. A logical continuation of higher level vocational training is integrated master craftsman (*Meister*) and engineering dual training in institutions of higher education. This could make an effective contribution to closing the entrepreneurial gap in the craft trades. The existing routes to study usually lead out of the occupation. There is a need for the option of dual skills training in combination with a qualification for entry to both specialised vocational and general institutions of higher education, i.e. a higher level of the dual system, consisting of a general senior technical school extended to year 13, incorporating the dual vocational school.

9.3.1.6. Vocationally oriented education at all stages of the general education system

From primary school level upwards, students need more opportunities to develop realistic views of the world of work and the options for VET following general education. The '*Runde Tisch Arbeitslehre*' [round table on work-related teaching] is already studying this issue. The redesign of the 'world of work' subject in secondary stage I schools should include discussions on the regional economic environment

and enterprises and companies, with the intention, for example, of increasing the proportion of women in occupations traditionally dominated by men. Sponsorship by enterprises and cooperation between schools and enterprise working parties would make it possible for the world of work to be opened up at school early on and in an increasingly differentiated way.

9.3.1.7. Professionalisation of training and continuing training for teachers in vocational schools

Many teachers in vocational schools have a high level of vocational skills and knowledge because they have often completed a course of vocational training before their higher education. In conjunction with universities, vocational courses should be made as attractive as possible, so that they become the first choice for prospective students. A high level of professionalism on the part of vocational teachers in vocational schools is a key aspect of a regional VET development programme. In highly innovative occupational fields in particular, teachers in vocational schools need regular opportunities to update their skills through periods of practice and research in industry, commerce and crafts.

9.3.1.8. Concentration and professionalisation of continuing vocational training

The adult education sector has developed continuing vocational training and a large number of measures in the field of continuing vocational training also target the final stages of initial vocational training. Many teachers in continuing vocational training measures also work in vocational schools. Admittedly the number is decreasing, but it shows that the staff of vocational schools can take professional responsibility for wide-ranging initial and continual training provision in the new school centres for the development of competences.

9.3.1.9. Regional VET dialogue

Regional VET reform should be accompanied by VET dialogue that includes all involved in VET. The objective is the increased utilisation of the training potential in enterprises. In particular, SMEs training skilled workers should enter into a dialogue with enterprises that no longer provide their own training. These enterprises also have strengths that they could bring into vocational training, for example by providing skills training for trainees from other enterprises in their specific work and business processes. In principle, all enterprises could (again) participate in vocational training on the basis of such a model of give and take. From job to job, and from occupational field to occupational field, there is a need for a dialogue to be organised between enterprises and vocational schools, trade associations and other self-organised bodies, a dialogue on how training in an occupation or an occupational sector can be organised to make training attractive to every enterprise and company.

9.3.1.10. *Involving universities and institutions of higher education*

Almost every region has research institutions directly or indirectly studying vocational training issues, many of which also advise companies, trade unions, ministries and other institutions on matters of VET reform. Here, the view that innovation and reform are dependent on cooperation between practice, science and politics must be translated into action. Regional vocational training dialogue is dependent on the groundwork done by VET research.

9.3.2. **Interfaces between initial and continuing vocational training: the development of learning systems in the region**

Initial and continuing training institutions are at present separate and are not coordinated. While the ability of initial training to adapt to the new economy is hampered by the high level of regulations, the opposite is true of continuing vocational training, which is characterised by confusion, proliferation and curricular uncertainty. Bringing initial and continuing vocational training closer together offers an opportunity to address both problems through greater deregulation of initial training and increasing regulation of continuing training. Vocational schools are currently only involved in higher vocational education through technical schools (Gerds, 1999; Gerds and Lund 2000). This involvement has proved to be extremely beneficial to the continuous development of specialist skills and to securing recognition of vocational school teachers by enterprises. The discrepancies between initial training and continuing vocational training can be characterised in following areas.

9.3.2.1. *Institutions*

In the field of continuing training, the institutional system is currently undergoing a process of destabilisation and differentiation (Faulstich, 1999). Technical schools are responsible for only 3 % of provision. Private institutes and work-based learning are becoming increasingly important. The continuing training system is responsive to demand as is apparent from the example of IT training provision. However, there was a time lag of around ten years in the initial training system before the first regulated IT training occupations were developed.

9.3.2.2. *Curriculum*

The curriculum for initial training is heavily prescribed: content and objectives are nationally determined, with a resultant loss of dynamic. More open curricula and more complex and interdisciplinary subject units ('learning fields') are currently being introduced in initial vocational training. In contrast, continuing training provision has always been more open and learner centred. If initial and continuing training were brought closer together, this could go some way towards compensating for the disadvantages of over and under-regulation.

9.3.2.3. *Certification*

Insofar as continuing training certificates are issued, these are not usually recognised. Only certificates in regulated, advanced training occupations are recognised. Qualifications obtained in initial vocational training are not connected with continuing training, so it would be sensible to arrange for reciprocal recognition of certificates.

9.3.2.4. *Professionalisation*

There is limited professionalisation of teachers in continuing training. In contrast, in the field of initial training, academic qualifications (consisting of vocational educational theory, and specialised vocational orientation and experience) and systematic preparation are the norm. Although programmes in initial training are currently in a state of crisis, the level of professionalisation achieved by staff in that sphere goes far beyond that achieved in continuing training. There is an urgent need to link initial and continuing training in integrated study and professional programmes.

9.3.2.5. *Financing*

Initial training is publicly funded. The disadvantage of this is that schools have little flexibility or room for manoeuvre in expenditure on materials and staffing. Furthermore, opportunities for development are increasingly restricted by ever more limited public resources. In contrast, continuing training is financed by a mixture of state subsidies, grants, fees, contributions and other income. Here, there is great dependence on the economic climate and competition, which is not always conducive to professionalisation and improvement of quality.

In view of these trends, the field of continuing training can only be strengthened by an increase in public responsibility accompanied by closer links to initial training. Such an increase would have to involve greater regulation, for example via appropriate Federal regulations. In this way the conditions should be created for bringing initial and continuing training together in public vocational training centres, to the benefit of both sides.

9.3.3. **Education and training of VET professionals**

The following principles should be adopted in establishing and developing university programmes for the professional development of VET teachers and trainers. First, there is the need for interdisciplinary course structures including subjects, issues and methods from education, vocational educational theory, social sciences and subject and vocational specialisms. Second, university programmes should be developed to support subjects in demand in the region and to support regional development. For subject and vocational specialisms, based on skilled work in particular occupations and occupational sectors, there is a need to create close links with the regional economy. If vocational training is to support and accompany

structural change in the region, vocational training staff must be able to develop specific and high-quality knowledge and know-how transfer for the region. A precondition for this is the identification of regional development models and new occupations. Since traditional training occupations are frequently too narrow and do not cover interdisciplinary skills, the development of new job profiles to support regional development models offers an opportunity to modernise jobs and, at the same time to support regional development.

Subjects included in courses at the universities can be developed on the basis of regional development models, describing both the historical and existing and future priorities and economic structures. When the subjects of the courses have been harmonised with the economic, sector and business priorities in the surrounding region, theory and practice can be more closely linked, and courses be made more practically based. Such coordination of regional and vocational development will definitely result in a smaller number of occupations and occupational fields than are currently seen in the German vocational training system. To coordinate course provision with regional development models while preserving the vocational principle, it is proposed to develop nine core occupational fields (instead of the present 16). This will permit the development of new, multifaceted job profiles and will at the same time ensure that they can be linked to the existing system (Gerds, 1999).

9.4. Insights into regional VET dialogue in practice

9.4.1. New concepts in the evaluation and monitoring of regional VET processes

Programmes and projects for developing regional vocational training systems require a tailor-made evaluation procedure. As we understand it, innovation processes must be seen as a social process, which is multi-layered and characterised by uncertainty. The evaluation should therefore focus on the innovation process itself, in which the evaluators become moderators of the process. An actor-centred procedure is also recommended, in which the actors in the region are actively involved (Ehrlich, 1995). It should be possible to use evaluation as a tool for steering the networks and should offer those actively involved in the project opportunities to reflect on the goals achieved and refocus on those still outstanding. This view of evaluation, which will be explained in the next section, is based on recent findings from evaluation research (Fettermann, 1996; Kuhlmann, 1998).

Evaluation research is limited by the problem of inadequate use of the results of evaluation, which are often only of use to the client. To solve this problem, user-oriented evaluation designs have been developed and applied since the 1980s. They should not be understood as meaning that the results are simply reported to users, but as meaning that dialogue-based interaction between self-evaluation and external evaluation is practised. There is much to be said for a qualitative and process-oriented evaluation design accompanying the process, which both

provides useful information for the policy makers and planners (who often finance regional programmes) and also encourages the projects to undertake critical self appraisal in the context of networks and regional development. In this way, conclusions can be drawn for further action. Furthermore, the personal and institutionalised relationships between actors in the region, the quality of cooperation and the quality of communication can be investigated. For the evaluation of regional innovation processes, actively moderated monitoring has the best chances of involving users and those involved in vocational training networks in the region and providing them with information useful in building up their innovation and learning networks.

To summarise, the following criteria for the evaluation of regional innovation networks can be formulated (Manske, Ruth and Deitmer, 2000):

- (a) sustainability - this investigates the creation or promotion of sustainable structures in innovation networks, and hence whether those involved in the project have the dynamism and skills necessary to continue the innovation after the development measure ends;
- (b) reflectivity - the innovation discourses in the context of process evaluation are intended to improve communication between actors from different institutions. They should be able to reconsider their own position, and learning processes should be facilitated in the sense of reframing perspectives;
- (c) participation - here, the aim is not to eliminate the divergence in interests, but to balance them better via moderated interaction. This should be achieved by means of the participation of all the regional actors in the innovation and all involved in the network measures. This facilitates better identification with the results of the evaluation.
- (d) multiple perspectives - this addresses the different or heterogeneous viewpoints of the different target groups involved in evaluation. The risk of misinterpretation can be reduced by observing and considering the subject of the evaluation from many perspectives.
- (e) discursiveness - importance is attached to discussion in evaluation. The results of the evaluation are discussed with the actors in the project, in order to identify possible misunderstandings between the evaluator and those being evaluated early and to reflect the findings back.

9.4.1.1. The three-stage evaluation procedure for regional cooperation networks

The evaluation procedure involves the preparation and implementation of evaluation workshops including all those participating in the cooperation network. The aim is to make a diagnosis of the current project status against the objectives from the perspective of all participants (inter-subjective dimension), and to relate this to other data (objective dimension). On the basis of the evaluation results, steps are laid down for joint action in the project. This is done by means of follow-up discussions between project representatives and the assessors, with a view to possible changes

in future action in the form of a binding agreement on the objective.

Essentially, the procedure consists of applying an analysis of the useful value ⁽⁶⁾ of the networks. Here, participants are directed to come to an agreement on the effectiveness of their project. This is done with the aid of primary and secondary criteria, which are taken from the development programme and evaluated and weighted by the network partners. Weighting and evaluation produce the useful value of the project in the form of a figure ⁽⁷⁾. The experience of such evaluation meetings is positive if they achieve their most important objective, namely if they initiate a learning process in which all participants engage in specific and moderated reflection on their own actions in the project development process. Project participants, who usually come from different institutions and have not necessarily found a way to cooperate and work together, can now agree on future development priorities.

Thus, the procedure should be seen as a new mix between responsive and systemic evaluation approaches, in which the most important part is played by the project participants themselves (Manske, et al., 2000). As a rule, the strengths and weaknesses of the project are obvious, so that it becomes clear to the assessment team in what areas any changes of direction are necessary. These findings form the basis for reflection leading to consensus on future requirements. The results feed into a project management report, which is intended first to give sponsors or investors information on the progress of the project and, second, to help to guide the project in further work. The progress report is also presented in the form of an innovation web. This shows at a glance how successful the individual projects in the programme are at the time of the evaluation ⁽⁸⁾. When the procedure is carried out

⁽⁶⁾ The analysis of useful value is a procedure for evaluating public and private projects whose usefulness cannot be fully determined in monetary terms, such as publicly subsidised research and development projects or pilot schemes. Thus the analysis of useful value is a kind of extended analysis of economic efficiency, particularly when the criteria for the effectiveness of R&D projects can only partially be determined in terms of market prices and when complex processes, such as apply in a cooperation network, are to be evaluated.

⁽⁷⁾ The main criteria are given percentage weightings in accordance with the importance attached to them by project participants, in such a way that the relative weightings of all the main criteria total 100%. The same applies to the relevant secondary criteria. They are then evaluated and marked from 1 to 5, on the basis of how well or badly a particular criterion (goal) has been achieved at the time of the evaluation. Multiplication of weighting and evaluation gives a figure for the usefulness of the project from the point of view of participants.

⁽⁸⁾ This tool for presenting projects bundles six central innovation dimensions in the development programme, which can be measured on a three-stage scale. The dimensions reconstruct the status quo of the project in relation to central development criteria supporting the programme: work and technology as a unit, transfer orientation in the region, skills for innovation processes, dialogue and participation in innovation, process orientation and regional effects in the context of structural innovations. The more strongly the individual dimensions are developed, the more successfully the project evaluated has met this criterion at the time of measurement (see also Rauner et al., 1995; Deitmer et al., 1997).

in several parallel projects it is possible to present a graphical summary for a region (Rauner et al., 1995; Deitmer et al., 1997; ITB, 1999).

9.4.2. Empirical results from different case studies

Comprehensive experience is available to us from a number of years of evaluation activities in 15 sponsored regional projects (Rauner et al., 1995; Deitmer et al., 1997). Experience of the tool itself is overwhelmingly positive, and in most cases regional actors have been encouraged successfully to reflect critically on their activities. In the course of the evaluation process, the objectives and status of their project have become ever clearer. The discourse process in many ways represents a learning process, in the analysis and assessment of the effectiveness of innovation processes in the region and the creation of new insights via dialogue.

In the Bremen *Land* programme, Work and technology, it was principally 'soft' innovation factors that found strong expression through the use of innovation webs. Interpretation of the innovation webs made it clear that the programme's strengths lie in the approach to structuring (i.e. integrated processes, characterised by dialogue) of various innovation processes. All the projects were characterised by a transfer orientation and regional impact on cooperation-oriented networking and/or the labour market. The effort made in all the project networks to make the project findings useful to the region was clearly discernible. The question is, however, whether this effort has resulted in long-term effects in terms of the creation of structures.

Such long-term effects could be a regional innovation environment, in which, for example, permanent regional innovation centres for the structuring of work and technology were set up, an ongoing innovation dialogue on key innovation topics, with extended communication and cooperation links, was established, or new service functions ensued, with companies being founded (e.g. new service companies, software companies, etc.). Obviously, the development of this new structurally innovative infrastructure and these new service functions presents a major challenge, not only for the individual projects, but also for the programme as a whole.

Between 1994 and 1999 the GoLo project developed a training partnership in the Wilhelmshaven region of north Germany involving 19 regional enterprises and a vocational training centre. The example of Wilhelmshaven shows how the idea of structurally oriented VET can be successfully implemented in a network of learning venues and can help to improve training quality and create new training places (Holz, Rauner and Walden 1998; Rauner, 1998; BLK/BIBB, 1999; Deitmer et al., 2000). The following principles are based on an analysis of the project:

- (a) the network of regional learning venues should provide an infrastructure allowing enterprises to reduce the costs of training. This should also enable specialised enterprises to participate in the regional vocational training system. The example shows that as a result the number of training places can be significantly increased;

- (b) the network should offer a range of designated enterprise-based learning opportunities. Teachers from schools and trainers from the enterprises cooperate in the development of project work and teaching and learning assignments;
- (c) the vocational school supports coordination of training through the network;
- (d) the teaching concept of the integrated learning and work tasks leads to a marked reduction in enterprise-based training organised on school lines, and involves trainees in the enterprise's value-added process.

A preliminary result of the research is that a structural programme for regional educational innovation can be successfully implemented as a sustainable – and therefore structurally innovative – regional development programme only as part of a coordinated regional policy and comprehensive innovation management. Figuration⁽⁹⁾ of the networks at project level serves as a fundamental catalyst for the success of these processes. This means the bringing together of suitable, complementary project partners.

9.5. Guidelines for the implementation of regional VET dialogue

Our experience has shown that new management concepts and appropriate regional development policies and programmes are needed to bring about new regional cooperation through networks. One interesting example is institutional cooperation in 'learning venue combines', which aim to make training available even when it would not normally be possible. Experience shows (verifiable in the structurally weak region of Wilhelmshaven, for example), that innovative projects of this kind may be able to mobilise the endogenous potential and develop synergy. Training networks can allow the strengths of the training enterprises to compensate for weaknesses. Resources (facilities, workshops, laboratories and staff) can be shared at low cost. Training quality can be raised by moving learning back into the work process. Existing training potential in the region can be better developed and utilised by incorporating vocational schools.

The question of the organisation of 'learning venue networks', including their management and control, becomes more important the more strongly the network cooperation gains ground in practice.

Evaluation of these processes also then becomes necessary, in order to study and learn from successful cooperation between enterprises and vocational schools

⁽⁹⁾ The concept of figuration goes back to Norbert Elias and has been taken up by various authors (quotation based on Eichener, 1994). It involves the highly political task of bringing the right actors together in project networks, i.e. the actors from enterprises and science/education who are required in order to achieve synergetic effects. Interplay with actors in the immediate environment is also important: associations, chambers, professional associations from various policy areas.

and researchers. In this context, barriers must be studied, in order to bring a new professionalism to the implementation of learning venue networks.

Some criteria that could further this new practice are listed below based on analysis of various network projects. A criterion for success for all projects is how participants' various perspectives and objectives can be related to one another by a process of agreement. This involves the following criteria and activities:

- there must be a leadership and executive function;
- a functioning dialogue structure must be established across all areas;
- cooperation objectives with criteria for success must be agreed at the outset;
- provide training in project management techniques;
- provide for regular interim project presentations with partners;
- initiate skills training processes at several levels at the outset;
- create a positive project image via project marketing;
- project development via moderated workshops;
- create a balance between individual interests and project interests;
- problem-solving via prototypes;
- demonstrate and visualise project progress;
- output is not the only criterion for success – so too are sustainable processes;
- be prepared for conflict resolution;
- help with problems with interfaces and communication;
- continuous project evaluation/control.

Learning projects involving integrated learning and work tasks, involving enterprises and schools, which are at the same time integrated into the production and market process of an enterprise, often improve the quality of vocational training. In the best-case scenario, training partnerships of this kind make it possible to increase VET quality and at the same time to reduce the costs to participants, and to exploit the training potential of the region more fully.

Bibliography

- Modellversuch GoLo: Gestaltungsorientierte Berufsausbildung im Lernortverbund, *BLK/BIBB - Gemeinsamer Abschlußbericht des AWV, BBS II und ITB zum Bremen*, Wilhelmshaven, 1999.
- Braczyk, H.-J.; Cooke, P.; Heidenreich, M. *Regional innovation systems*. London, 1998.
- Camagni, R. (ed.). *Innovation Networks: spatial perspectives*. London, 1991.
- Cooke, P; Morgan, K. The network paradigm: new departures in corporate and regional development, in: *Environment and Planning*. 1993, pp. 543-64.
- Crevoisier, O; Maillat D. Milieu, industrial organisation and territorial production system: Towards a new theory of spatial development. In Camagni, R. (ed.). *Innovation Networks: spatial perspectives*. London: Belhaven Press, 1991.

- Deitmer, L.; Rauner F., *Zukunft Handwerk*. Das Handwerk als regionaler Innovationsträger. Beiträge und Ergebnisse der Handwerkstagung "Zukunft Handwerk", Bremen, 1996
- Deitmer, L.; Endres, E., Manske, F., Riedel, M.: Management und Steuerung von Verbundprojekten: Verfahren und Instrumente; *Reihe ITB Arbeitspapier*. Bremen, 1997.
- Deitmer, L.; Hüster, W. Zur Organisation der Bremer Berufsbildungskonferenz - Ein Rückblick zum Vorgehen und zum Diskussionsverlauf. *SchulVerwaltung, Zeitschrift für SchulLeitung, SchulAufsicht und SchulKultur*, Ausgabe Schleswig-Holstein, Hamburg, Bremen, 3 Jhg. 2000, Nr. 2, S. 40 ff.
- Deitmer, L; Eicker, F. Integrierte Innovationsprozesse, Regionalentwicklung und Berufliche Bildung. Beiträge zur "Lernenden Region" und Erfahrungen mit ihrer Ausgestaltung. Bremen, 2000.
- Deitmer, L.; Drowing, P.; Heermeyer, Reinhard. Improving regional VET-systems by networking – the case of GoLo: Setting up "Qualification networks" for shared training programs between local enterprises and vocational training and education institutions. In: Nyhan, B.; Deitmer, L.; Attwell, G. *Towards the learning region – education and regional innovation in Europe and United States*, Luxembourg: Office for Official Publications of the European Communities, 2000 (Cedefop Reference Series).
- Deitmer, L.; Gerds, P.; Wie kann sich die Region zu einer 'lernenden' Region entwickeln?. *Dokumentation der GEW-Fachtagung 'Wir machen die Beruflichen Schulen fit für das nächste Jahrtausend!'*. Landesverband Mecklenburg-Vorpommern Schwerin, 2000.
- Ehrlich, K. Auf dem Weg zu einem neuen Konzept wissenschaftlicher Begleitung. *Berufsbildung in Wissenschaft und Praxis*, 1995, Vol. 24, No 1.
- Eichener, V. Das Management von Figurationen im Bereich regionaler Wirtschafts- und Technikförderung. In Lange. E. (ed.). *Der Wandel der Wirtschaft, Soziologische Perspektiven*. Berlin, 1994.
- Euler, D. Zwischen Engagement und Exkulpation - Über die fehlenden Bedingungen einer Lernortkooperation. In Holz, H.; Rauner, F.; Walden, G. (eds). *Ansätze und Beispiele der Lernortkooperation, Berichte zur Beruflichen Bildung*. Berlin: BIBB, 1999.
- Faulstich, P. Lebensbegleitendes Lernen und Perspektiven der Weiterbildung. In: Senatsverwaltung für Arbeit, berufliche Bildung und Frauen (eds): *Expertise für ein Memorandum zur Modernisierung der beruflichen Bildung*, Berlin 1999, p. 236f.
- Fetterman, D.M.; Kaftarian, S.J.; Wandersman, A. (eds). *Empowerment evaluation: knowledge and tools for self-assessment and accountability*. Thousand Oakes CA, 1996.
- Freeman, C. Networks of innovators. A synthesis of research issues. *Research Policy*, 1991, No 5.

- Gerds, P. Ausbildung von Berufspädagogen für alle Lernorte in der beruflichen Bildung. *Die berufsbildende Schule*, 1991, Vol. 43, No 12.
- Gerds, P.; Heidegger, G.; Rauner, F. *Das Universitätsstudium der Berufspädagogen - Eckpunkte für ein Zukunftsprojekt*, Bremen, 1999.
- Gerds, P.; Lund, E.: *Schulentwicklung und Innovationskultur*. Eine Fallstudie am Beispiel der Staatlichen Gewerbeschule Bautechnik in Hamburg. Bremen/Hamburg, 2000
- Heidegger, G.; Rauner, F. *Reformbedarf in der beruflichen Bildung*, Gutachten für das Land Nordrhein-Westfalen. Düsseldorf, 1997.
- Holz, H.; Rauner, F.; Walden, G. (eds): *Ansätze und Beispiele der Lernortkooperation*. Berichte zur Beruflichen Bildung. Heft 226. Bonn: BIBB, 1998.
- Huggins, R. Competitiveness and the global region. The role of networking. In Simmie, J. (ed.). *Innovation, Networks and Learning Regions*. London, 1997.
- Institut Technik und Bildung. *BLK-Programm: Neue Lernkonzepte in der dualen Berufsausbildung - Informationen für Antragsteller*, 1. und 2. Antragsrunde. Bremen: ITB, 1998.
- Jürgens, U.; Krummbein, W. (eds). *Industriepolitische Strategien. Bundesländer im Vergleich*, Berlin 1991
- Kuhlmann, S. *Politikmoderation*. Evaluationsforschung in der Forschungs- und Technologiepolitik. Baden-Baden, 1998.
- Lipsmeier, A. Zur wissenschaftlichen Begleitung von CAL-Modellversuchen im allgemeinen und zur Evaluation von 'OLLI' im besonderen. *Berufsbildung in Wissenschaft und Praxis*, 1997, Vol. 26, No 1.
- Lundvall, B. A.; Borrás, S. *The globalising learning economy: implications for innovation policy*. DG Science, Research and Development, EUR 18307 EN, Luxemburg 1999
- Manske, F.; Ruth, K.; Deitmer, L.; Wie evaluiert man regionale Innovationsprozesse und zu wessen Nutzen? Neuere Erkenntnisse der Innovations- und Evaluationsforschung als Ansatzpunkte zur Entwicklung und Nutzung eines aktorsorientierten Evaluationsverfahrens. In Deitmer, L., Eicker, F. (eds.); *Integrierte Innovationsprozesse, Regionalentwicklung und Berufliche Bildung*, Bremen 2000
- Morgan, K. The learning region: institutions, innovation and regional renewal. *Regional Studies*, 1997, Vol. 31, No 5.
- Nelson, R. R. *The sources of economic growth*, Harvard University Press, Cambridge 1996
- Nyhan, B.; Attwell, G.; Deitmer, L.: *Education and regional innovation in the European Union and the United States*, Luxembourg: Office for Official Publications of the European Communities, 2000 (Cedefop Reference Series).
- Pätzold, G. Berufspädagogisch geleitete Lernortkooperation - eine anspruchsvolle Aufgabe. In Holz, H.; Rauner, F.; Walden, G.: *Ansätze und Beispiele der*

- Lernortkooperation, Berichte zur beruflichen Bildung des BIBB.* Berlin/Bonn: BIBB, 1998.
- Rauner, F. Ausbildungspartnerschaft – Das Modell ‘GoLo’. *Berufsbildung*, 1998, No 50.
- Rauner, F.; Ruth, K.; Deitmer, L. *Bilanz des Bremer Landesprogramms Arbeit und Technik 1990-1995.* Bremen: ITB, 1995.
- Rauner, F. Reformbedarf in der beruflichen Bildung. In: Senator für Bildung und Wissenschaft, Landesinstitut für Schule; Institut Technik und Bildung. *Regionaler Berufsbildungsdialog, Dokumentation der Bremer Berufsbildungskonferenz*, S. 24-29, Bremen, ITB, 1999.
- Ruth, K.: *Industriekultur als Determinante der Technikentwicklung. Ein Ländervergleich Japan–Deutschland–USA*, 1995.
- Senator für Bildung und Wissenschaft, Landesinstitut für Schule; Institut Technik und Bildung. *Regionaler Berufsbildungsdialog, Dokumentation der Bremer Berufsbildungskonferenz*, 1998. Bremen, ITB, 1999.
- Simmie, J. (ed.). *Innovation, networks and learning regions.* London, 1998.
- Stahl, T. Stimulating regional innovativeness: the learning region. In Nyhan, B.; Attwell, G.; Deitmer, L. *Towards the learning region. Education and regional innovation in the European Union and the United States*, Luxembourg: Office for Official Publications of the European Communities, 2000 (Cedefop Reference Series).

CHAPTER 10

Interpretation of the relevance of work experience for future-oriented educational strategies

Toni Griffiths and Fernando Marhuenda

10.1. Introduction

10.1.1. Purpose, scope and relevance of the research project

The TSER Work experience project is analysing and exploring work experience in vocational and general education in the 16-19 age range as a vehicle for learning in the context of the changing future of work. This requires an exploration of learning theory, an examination of pedagogy and an analysis of the relationship between formal (or school-based) and informal (or work-based) contexts of learning. Given the different backgrounds of the partners drawn from six European countries, several perspectives are taken into account in the process of research. These vary from psychology and curriculum studies to sociology and business studies. All, however, converge in looking at the nature and scope of the learning processes in workplaces which people develop in the role of students. We believe that one of the distinctive aspects of our research lies in its focus on learning in workplaces and the age range of the population we are studying.

There are different educational contexts in which work experience may be offered: within general education, within school-based vocational courses and within school- and work-based apprenticeship. Eighteen case studies have been selected in the light of the theoretical underpinning of the project with which the research team has been concerned. This includes testing the role of the teacher/trainer as an effective mediator between and within different contexts of learning and an exploration of the impact of theory on certain aspects of practice as a catalyst for learning. Despite acknowledging with Fernstermacher (1989) that 'teaching' does not necessarily cause 'learning', we believe that the pedagogic practices of mentors and trainers in workplaces have a significant impact upon the knowledge developed and acquired by students. Pedagogic practices in workplaces are important in the process of forming the occupational identities of 16-19 year olds both as workers in general and specialists in particular - and therefore as citizens as well - and will be an aspect tested in the case studies.

The wider context of the project is policy development at a European level and

considerable work has been undertaken to enable the team to establish a European-wide view of policy and labour market issues relevant to the education potential of work experience. The formal objectives of the project can be found on the project's website (<http://www.ucl.ac.uk/epd/other.html>). The research questions which inform the work of the project were framed at the outset as:

- (a) what common terminology and concepts can be developed during the course of the research - and in the context of the overarching questions - in order to facilitate current and future collaborative research between university researchers in partner Member States?
- (b) what are the current policies of government, businesses and educational and vocational institutions in member states towards work experience as an education and training strategy for the future? Are such policies based on previous good practice or on futures analyses?
- (c) how are businesses and educational and vocational institutions responding practically - as learning organisations - to the challenge of the changing workplace and the likely demands of employment in the 21st Century? What models of work experience are being developed to address these issues? Do they reflect lifelong learning objectives?
- (d) what models of innovative work experience can be identified in selected courses in partner member states? What are the strengths and weaknesses of these models?
- (e) what features of the workplace environment are most helpful in developing flexible and core skills? What is the most effective relationship between classroom learning and workplace learning?
- (f) how can core/transferable/flexible skills be developed and assessed through work experience? What are the most appropriate roles for educational institutions and business in such learning assessment?
- (g) what criteria have been developed to judge the quality and effectiveness of current practice in domestic and European work experience? What success and quality criteria are appropriate for domestic and European work experience of the future across Europe?
- (h) what are the inhibitors and facilitators of change in educational institutions and in businesses in relation to education-business partnership innovation, with particular reference to work experience?
- (i) what economic, social and cultural factors facilitate or inhibit the successful transfer of innovation or good practice across European vocational education and training systems?
- (j) what are the implications of the research for policy and practice at national, regional, business and educational institution level?

10.1.2. Links with other projects

The project has strong synergy with another TSER project, 'Work process knowledge in technological and organisational development', among the aims of which is the investigation of the kinds of knowledge employees need to cope with new working conditions. The two projects are connected in a TSER cluster established by DGXII and aspects of their inter-relationship are referred to later in this chapter. The project has also established connections with the Leonardo da Vinci 'Spes-Net' project (sharpening post-16 education strategies by horizontal and vertical networking) and it has been possible to discern areas of thematic synergy. These are: improving parity of esteem between academic and vocational education; links between school and working life; developing new knowledge and skills; increasing curriculum flexibility; and having an impact upon policy. In addition, some of the problems faced by both projects are similar, for example: the implications of academic drift; employability; the polarisation of work opportunities; and assessment issues. The course of development of the two projects suggests an overall convergence in problem definition combined with a recognition that, in working at a European level, differing histories are involved which perhaps require differing approaches and a constant questioning of assumptions.

10.1.3. Current project issues

The project is based upon a European literature search and review of work experience, work-based learning and learning theory. These inform three broad explorations.

First, the team has developed a theoretical framework for the research based upon an examination of learning theory and its implications for pedagogy in formal and informal learning contexts. This has led to the development of a typology and modelling of post-16 work experience which is described at the end of this chapter. The concern with pedagogy arises from theoretical explorations and has led the project to explore the role of the 'mediator' (the teacher or trainer) in working within and between different contexts of learning. Here there is synergy with the approach of the Leonardo project (Lasonen, 1997; Lasonen and Young, 1998; Stenström, 1999) in refuting an approach to education and training as one in which bodies of knowledge and types of skill are separate and bounded entities which can be taught independently of their actual, practical application.

The decision to approach pedagogy and curriculum from the standpoint of both vocational and general education, rather than from the standpoint of VET alone, reflects the natural differences which arise in research located in the very different educational, economic, social and cultural contexts that are found in different national systems. The project explore ways in which real connections which enhance learning can be made across both formal and informal contexts and work-based and general or academic curricula. It examines the connections between a curriculum perspective and a sociological approach (Young, 1998), and

contextualise curricular analysis within current debates about such issues as the 'learning society', 'learning organisations', 'knowledge work' and so on. Curricular issues and work experience are connected to current definitions of work, both traditional and new.

Second, a framework for policy analysis is being developed which draws upon detailed national studies from the partner states (Benke and Gorgenyi, 1998; Christensen, 1998; Griffiths and Guile, 1998; Madsen and Wallentin, 1998; Marhuenda, 1998 and McKenna, 1998) and a European-wide perspective on convergent and divergent trends. This is described in more detail in Section 2. Third, an exploration of 18 case studies (three per partner state) of work experience is under way. These have been selected on the basis of their 'innovation within context' and those involved will be offered the opportunity of developing a further European dimension. Work so far by the project team has established that, in spite of often excellent work experience arrangements, the quality of the learning experience may be unrecorded or, where recorded, done so in an overly mechanistic way - with different learning contexts in effect unconnected and the significance of the mediating role neglected.

However, we are also concerned with organisational issues of work experience which go far beyond what is traditionally discussed in the literature: in particular, we are concerned with the pedagogical arrangements of teaching and learning at work. Organisational issues take into account both macro and micro factors and include policy issues as well as such matters as teaching conditions, calendar and time allocation of schemes, term or alternance arrangements, instructors' responsibilities and so on. These issues have only recently been discussed in the relatively scarce academic literature on work experience. Ashworth and Saxton (1992) and Miller et al. (1991) are important exceptions to this in the formative emphasis they give to the role of the teacher and instructor, going beyond the mere 'arranging' of patterns. Work is something which can be taught in a codified way, be it formal or informal, and work itself is something which can be learned as an educational activity and not simply at random or by 'exposition'.

The basic assumption of the whole research project is that work experience displays important features which make it a valuable tool for teaching and learning in changing economic conditions – the knowledge-based economy – and for understanding new modes of production which go qualitatively well beyond the developments of the industrial era. And yet, school modes of teaching and learning are widely considered as the appropriate mechanisms under the industrial paradigm. There is potential in work experience to move away from instructional towards constructivist perspectives, implying changes in the notions of curriculum and its relation to organisational issues. This is one of the most interesting aspects of our research because work experience, understood in such ways, helps us redefine the traditional ways of viewing businesses and schools, taking them both,

for example, as 'learning organisations' able to produce knowledge in different ways and to bring about the personal and professional development of young people.

Work experience, therefore, requires us to conceptualise learning more broadly than research focusing primarily on schools and to build upon previous work and often profoundly differing perspectives. The modelling of work experience that we describe at the end of this paper allows us also to rethink the different models as phases through which the student in a work experience scheme develops. These phases therefore demand different student-teacher-instructor relationships, varied assessment procedures, different emphasis on different contents of learning and, in general, a growing consciousness of the world of work and education and, therefore, of the world itself.

The project's 18 case studies will explore these issues in a variety of ways. The research team has also resolved to explore the relationship between theory and practice through particular questions within the case studies based on those discussions. The role of teachers, trainers and 'experienced others' in helping learners to grasp the relationship between formal and informal learning is crucial. Indeed the process of mediation and the role of the mediator within and between contexts is highly significant in the learning process, a factor described by Ashworth and Saxton (1992), although not using the term 'mediation'. The following are examples of the kinds of questions being pursued through the case studies and/or which may form the basis of different kinds of intervention within practice. This approach, among others, should be helpful to the research team later in drawing out possible models which will be useful at a European level for addressing work experience as a meaningful strategy relevant to the challenge of future work.

- (a) how can students be supported to use what they learn in school to enhance learning in the workplace?
- (b) what is done in the school to use and develop learning acquired in the workplace?
- (c) how are students encouraged to use the resources and encounters of the workplace to develop their understanding?
- (d) do those students who have learnt the 'tacit rules' of school life gain more from workplace opportunities for learning?
- (e) how does work experience help students to cope with the demands of future work?
- (f) how far do the school and workplace work effectively to 'connect' the learning which arises from each context?

10.2. The European context

10.2.1. The purposes of work experience

No common definition or statement of the purposes of work experience is evident across the six partner states, although there are a number of common assumptions. In all partner states there are debates about the purposes of work experience, about how the benefits of workplace learning can be realised and about how it can be made meaningful for participants and relevant to the labour market. All see work experience as being multi-functional. The wide range of purposes that it is seen as serving include the following:

- (a) a means of providing practical skills training in the workplace as in the traditions of apprenticeship;
- (b) a means of applying theoretical knowledge in practical workplace situations as in models of alternance training;
- (c) a means of providing school and college students on general education and broad vocational programmes with opportunities to experience and gain awareness of the world of work, its culture, disciplines and norms;
- (d) a means whereby young people can acquire and develop generic, key, transferable skills applicable to a broad range of new and traditional occupations;
- (e) a means of providing careers education and careers sampling for young people;
- (f) a company recruitment strategy helping to reconcile individual career choice with company recruitment needs;
- (g) a means of providing a bridge into the world of work for the young unemployed and for reactivating the long-term unemployed;
- (h) a means of providing contact with the adult world and the world of work for disaffected, disadvantaged and marginalised young people.

This very multi-functionality, as well as being one of the strengths of work experience, can also give rise to uncertainty and lack of clarity as to its purposes and about how and by whom it should be defined. Hart (1992) revisits the definitions of work and education found in many current debates to find out that many of them present work as an individual activity. Work, as Hart understands it, should have a strong cooperative element. It is from this basis that she analyses biases of sexual divisions, international divisions, work restricted to capitalistic modes of production, work as an activity completely detached from education, the glorification of technology, the devaluation of experience and the elevation of expert knowledge, artificial divisions of careers and occupations. In summary, she examines the triumph of instrumental rationality and the anti-educational experience of work.

The divergence of view in different countries about the purposes of work experience is linked to the extent to which work experience is integrated into the

VET system and whether formal regulation exists to oversee its effective implementation. Even where this exists and is accepted, as in Denmark, there will be disagreements. Some employers question the value of work experience in training entrants into high technology industries; others see work experience organised by schools as a poor strategy in that students may be trained for occupations for which supply already exceeds demand in the labour market.

At the other end of the spectrum, Hungarian commentators report strong disagreements between partners regarding the division of roles and responsibilities for the organisation and delivery of work experience. Some of these disagreements relate to debates about the use and distribution of funding derived both from central government and from an employer levy. Lack of clarity about the role of the state and differing views as to the efficacy of the market in regulating the system add to the disagreement. Generally, however, the lack of consensus reflects the volatile situation created by the rapid political and economic transition experienced by Hungary and accompanied by recurring crises, especially in the early 1990s, when both companies and educational institutions were struggling for survival.

Other differences of perspective, as in Ireland, affect, for example, the extent to which older or newer industries are considered to be appropriate settings for work experience. Traditional industries, including agriculture, are considered in some quarters to be inappropriate. At the same time, there have been sharp debates as to whether work experience is useful or valuable at higher levels of ICT training.

Linked with these problems of definition are debates in several of the partner states about what makes work experience 'real' or 'authentic'. Shortages in the number of available placements, a common feature, have led to a search for alternatives such as 'work shadowing' or ways of 'simulating' the experience of work in other settings, often school-based settings. However, work experience itself is recognised as already being at a stage removed from 'real' work.

Despite these differences and a common lack of clarity about how work experience should be defined, there is consensus across the partner countries about the 'value' of work experience. This accords with the findings of Green et al. (1999) that agreement about the value of work experience is a common theme of policy discourse across Europe, although there is no clear convergence or uniformity in details of practice. It is expressed as a marked interest in work experience as a strategy assist young people in making a more effective transition to the world of work (EC, 1995). Rauner (1999), for example, has presented a four-model transition typology and Madsen and Wallentin (1998) have analysed the operation of the school-based vocational education model in the context of Swedish policy and practice.

10.2.2. VET reforms: common problems facing work experience in the partner states

The systems of 16-19 education and training in all the partner countries have undergone recent reforms. Most attribute the need to reform and modernise the systems to attempts to align training with current and future demands of labour markets for flexible workers with good levels of general education and generic/transferable skills, as well as relevant technical skills and knowledge. Green et al. (1999) have noted a number of trends affecting the evolution of most European education and training systems. Broad factors such as demographic change, the effects of technical innovation and globalisation on jobs, and an increasingly prolonged process of insertion into the labour market have all influenced policy and curricular change. Policy makers have largely assumed that new definitions of skill are emerging which place greater stress on holistic understanding of organisations, systems and processes (Nyhan, 1999).

The demands of rapidly changing technology-based economies have led to a situation in most European countries where general or academic skills are, in effect, increasingly vocational. There has been a growing demand for higher levels of general education and access to higher education. Greater integration of general and vocational education has encouraged increasing numbers of students to remain in full-time education. However, at the same time, increased participation in education has led to growing concerns, not least among employers, that formal education cannot adequately prepare young people for working life. The effects of such trends are evident in the reforms which have taken place and in the debates about work experience and work-based learning in the countries represented in this project. Hungary's reforms are so recent that their impact is impossible to evaluate but its experience is particularly interesting as the extreme economic pressures have served to highlight issues which have affected other countries less markedly. In other words, there are problems which affect all or most of the partner states and which Hungary has suffered in an extreme form.

Both Hungary and Spain note, as a particular problem, sectional interests among employers who prefer to recruit and train their own workers to suit their own immediate needs rather than enter into partnership arrangements with schools or colleges. While this problem of lack of commitment on the part of employers to a national training strategy is of particular concern in Hungary and Spain, it remains a common concern across all the partner countries, with the possible exception of Denmark. All the partner states are attempting to address the problem of insufficient numbers of work experience placements to meet the requirements of school and VET systems; Ireland joins Hungary in reporting relatively acute shortages.

Problems of quality in work experience are seen as being due to a number of factors. However, there is convergence among the project countries in attributing low quality to low levels of training among instructors and supervisors in the workplace and lack of industrial experience among school and college teachers.

The problem is widely recognised; several contributors see its solution in recurrent vocational experience for teachers and pedagogic training for instructors. In Hungary, the problem of workplace instruction is acute, although one positive legacy of the former system is a high level of teacher training.

The lack of clearly defined roles and responsibilities between education and business/industrial partners in terms of organising and delivering work experience affects all the partner states to a greater or lesser extent, with the exception of Denmark. In Hungary the problem is exacerbated by the continuing expectation, despite the recent market reforms, that the state should play a greater role in regulating the provision of work experience and of training in general. The role of the state in Hungary still remains unclear, nor is there agreement about how much faith should be placed in market forces.

10.3. Work experience, work process knowledge and a connective model of work experience for the future

10.3.1. Learning through work experience

As Simon, Diplo and Schenke (1991) have noted, work experience is not an end in itself, but a means to help develop the broader notion of 'work education', something which may be viewed from different pedagogical perspectives (Carr and Kemmis, 1988) - instrumental, hermeneutical, critical. However, reflexivity in learning is only possible through the development of a critical pedagogy. A critical pedagogy of work experience would involve exploring the technical as well as the social relationships of work, including the use of technology, the organisation of factories and workshops, union negotiation policies, working conditions, and work and leisure relationships. It would also involve addressing the issues of skills and competences from a holistic rather than a fragmented standpoint, the latter reinforcing instructional rather than formative learning goals. It might imply giving teachers a say in the design of any programme and attempting to develop the learning potential of the organisation beyond the allocation of specific placements to students. The relationships between work and education (Charner and Rolzinski, 1987) are interrogated in this project. It is not only work which puts demands on education but, from an educational perspective, existing forms of work may need to be revised and criticised if experience of work is to be truly educational.

Different approaches to work experience do, of course, have their strengths but most share a number of weaknesses. These include the tendency to neglect the influence of context upon human development; the failure to appreciate the situated nature of learning and thus insufficiently to recognise the problems associated with gaining access to, and participating in, workplaces as communities of practice; the tendency to afford experience an 'over-privileged' place in learning; and the failure

to develop a curriculum framework that enables students to relate formal and informal learning.

10.3.2. The importance of context

Individuals do not experience nor form judgements on objects and events in isolation; they do this in relation to a contextual whole (Cole, 1995). An uncritical acceptance of the separation of knowledge from context leads to problems which have a direct bearing on how students learn and develop through work experience. These problems include insensitivity to the opaque nature of many modern workplaces. Current approaches to work experience tend to assume that workplaces, work practices and work cultures are transparent and susceptible to observation and direct experience. However, Gick (1995) points out that it is not easy to locate the knowledge that resides in an organisational context. It involves both participation in the 'communities of practice' of the workplace (Lave and Wenger, 1991), as well as the ability to cross organisational boundaries in order to identify the different types of knowledge, for example, tacit knowledge (of procedural rules) which are necessary to contribute effectively to the process of production. Nyhan (1999) emphasises the importance of context in his description of the learning approaches of 'visionary' companies. He points out that the reason why the predominant learning approach is called 'informal learning' is to highlight the importance placed on 'contextual learning', that is learning embedded in the working process of the company as distinct from formal, context-free knowledge.

10.3.3. The 'situated' basis of learning

One recurring assumption in much of the work experience literature is that students can easily gain access to and operate in work contexts. This, however, neglects the extent to which participating in a 'community of practice', such as a workplace, can be highly problematic. As Ghererdi et al. (1998) have observed, it requires 'host' organisations actively to provide opportunities for learners to observe, discuss and try out different practices with members of the 'community' they have temporarily joined. Questions which arise include, first, the extent to which the 'host' organisation enables students to participate in workplace 'communities of practice' and, second, whether education and training providers of work experience recognise that students need to learn while playing their part in workplaces (Beach and Vyas, 1998).

Beach and Vyas have suggested three forms of learning with which students need to engage: 'learning on the fly' (i.e., making requests for help), 'learning by collaborating' (i.e., working, talking to and undertaking 'low risk' and 'stretching' activities alongside a more experienced person) and 'learning by observing'. They conclude that students do not easily accomplish these methods of learning, partly because these types of 'horizontal development' are not easily reconciled with conventional ideas about 'vertical development' and run counter to their

experiences within school. This means that assisting students to relate their work experience to their formal programmes of study will involve developing curriculum frameworks that take explicit account of their 'vertical' (theoretical) and horizontal (practical) development.

10.3.4. The limitations of 'experience'

Learning involves remaining sensitive to context, being aware of the social and collaborative basis of the production of knowledge and skill and having access to theoretical concepts to help elucidate the relationship between practice and theory. Many approaches to work experience have perceived the student's experience as the central means by which worthwhile knowledge and skill about the world of work is acquired. As Boud et al. (1993) noted, the concept of experience which lies at the heart of pedagogies of experiential learning, including learning in work experience, is rooted in a rational/positivist epistemology in which experience is constructed as being transparent, giving students unmediated access to the world. Thus, knowledge of the world of work is deemed possible because it is assumed that there is a direct correspondence between the world and the way it is represented in the student's experience.

There are several issues which arise from this. Learning from experience tends either to be presented as a natural characteristic of all learners or as a pedagogic technique. In the case of the former, it is assumed that the 'raw material' of work experience can be transformed into some form of meaningful knowledge through the controlled use of the senses (observation) and through the application of reason (teacher-facilitated reflection). However, this can easily become little more than a form of information processing if teachers play down their pedagogic role. Also it overlooks the extent to which learning, like any other activity, is a 'situated' process, is influenced by the social and cultural context in which it occurs and therefore does not result in context-free information. The idea of teacher/trainer-facilitated reflection is complex. All too often pedagogic considerations in work experience are reduced to the application of a specific set of methodological procedures designed to facilitate the recollection of experience (Usher et al., 1997). By virtue of the procedures having generally been derived from a meshing of the Kolb (1984) learning cycle and behavioural learning outcomes, they are assumed to be constant across all contexts and capable of guaranteeing the authenticity and validity of the experience. However, worthwhile reflection involves teachers exploring with learners the extent to which experience is influenced by the constraints of its context and, as Young and Lucas (1999) argue, this is likely to involve the use of concepts to provide a theoretical framework in which learners can reflect critically upon their experience.

Experiential learning approaches tend to bypass the integral role of concept formation in the process of learning in informal contexts, something which helps to maintain the separation of formal and informal learning. As indicated above, a

process of mediation needs to underpin the process of learning in informal contexts so learners are immersed in ideas as well as in the world of experience. This would provide learners with a basis for connecting their context-specific learning, which they gain during work experience, with ideas or practices which may have originated outside those contexts.

The TSER work process project has also noted (Boreham, 1999) that, under the conditions of modern work, experiential learning may be difficult for the following reasons: new technology sometimes makes the work process difficult to experience and therefore difficult to learn from; a strong division of labour has sometimes survived which fragments experience and this can be a major constraint on the development of work process knowledge; in some contexts, employees are members of professions (guilds) which enforce a strong division of labour; because of this, instructors who have acquired their expertise on-the-job may not teach trainees concealed aspects of the work process or may teach fragments of it while omitting aspects of the work they did not participate in. A conscious engagement with the implications for learning of 'tacit' knowledge may easily be neglected.

10.3.5. Using work experience to develop work process knowledge

The TSER project has looked at the impact of new business strategies based on more flexible organisational structures and new technology. It describes (Boreham, 1999) the typical scenario of a company with several well-targeted production lines, a short 'time-to-market' and high levels of innovation. This demands from employees a different kind of knowledge: instead of knowing only what is needed to execute a specific task with a given technology, they need knowledge of the whole production process, knowledge for operating in teams and knowledge to work with ever-changing technologies. This is 'work process knowledge' (*Arbeitsprozesswissen*), important features of which include system-level knowledge about the overall flow of activity in the organisation, and the combination of general, theoretical knowledge with local, experiential knowledge.

Many existing approaches to VET and HRD define work-related knowledge as small packets of information underpinning narrow operations. Boreham (1999) argues that there is a need to challenge these assumptions and develop a new theoretical base for HRD and competence development. Apart from developing formal elements of a programme of study, including work experience, to assist the student to understand individual tasks, activities or behavioural expectations, it has also been recognised that it is vital to develop a broader understanding of the actual work context. As Fischer and Stuber (1998) have argued, such a combination of theoretical and practical learning prepares apprentices to engage more rapidly with new organisational forms of production.

The prime purpose of work experience, from this perspective, would be to help students attune themselves more successfully to the changing context of work. The idea of 'attunement' recognises that the development of any individual is affected by

the tasks or activities which he or she is asked to undertake in a specific context and that the context, in turn, is also affected by their development (Kindermann and Skinner, 1992). A key concern, therefore, is to ensure that students learn about the context in which they are working and are presented with opportunities to learn and develop within that context. Attwell and Jennes (1996), however, have argued that work experience will not by itself promote work process knowledge and that it needs to be mediated - perhaps by the introduction of concepts, perhaps by subject knowledge and therefore through the role of mediators. This is something that is being explored through the series of case studies in our current project. Attwell and Jennes conclude, in relation to the German VET programmes, that these programmes will have to be evolved to help students connect formal and informal learning more explicitly. However, they do not provide any explicit guidance on how to achieve that objective, other than suggesting that students need to be supported to 'reflect-on-action'. While it is clear that work process knowledge recognises the importance of work context, it is also important that it takes account of learning theory in reconceptualising how to learn in and through workplaces.

10.4. Implications for future-oriented educational strategies

10.4.1. Future strands of research and development

Future research could take two directions in the context of this discussion. First, it would be important to research the impact of the inclusion of work experience as a thoroughly integrated part of both the vocational and the general curriculum. Second, the relationship between both work experience and VET and general education in relation to wider social and educational goals should be the subject of further research which will build upon what emerges from this and related research projects.

Assessment is an issue common to both directions for research and requires the attention of associated research. A key question revolves around the possibility of assessing the 'horizontal development' of students when assessment tends to be understood merely as a technical problem in which the main issue is how to show possession of experience and how to certify and accredit learning. Assessment thus tends to be treated as separate from the process of learning, yet as a process it seems to have more importance for both the individual and the potential employer. However, assessment is only one part of the educational process and, when treated as more than that, may function as an anti-educational force, as Connell (1996) has shown.

Future-oriented educational strategies should build on the new approaches to work experience and allow the issues which are emerging from this project to be addressed. A whole new understanding of curriculum processes should evolve from

these considerations, enabling informal contexts of learning to be related to formal education. Research on the curriculum of vocational education is under-developed and needs concepts other than those used in curriculum studies in academic education.

Reconceptualisation of the pedagogy of work experience, with a focus on teaching as well as on learning, will be crucial (Griffiths and Guile, 1999). Research literature on human resource development may be useful, with its emphasis on the transformative roles of the teacher and instructor involved in mentoring, supervision and other approaches which differ from traditional, instructional approaches. There is clearly room for employing tools that are formative, and driven by educational rather than instructional goals, in order to undertake research on the latent and hidden potential of work experience for transforming practice. The teacher's role in defining the curricular format of work experience - beyond its programming and arrangements - is an important issue being researched in the 18 project case studies.

The broader lesson is that educational research should directly address the world of work and its relation to changes in the labour market. This is not an easy task as many companies resist research which they do not see as directly benefiting them. Unions, too, should be involved with some urgency in research on work experience schemes as they still have an important role in the formation of occupational identities and can offer a distinctive perspective that is different from that of both employers and educationists.

10.4.2. Work experience as a form of reflexive learning

In summary, therefore, learning through work experience should not be predicated upon adaptation to fixed and stable work environments, nor should it be seen as the acquisition of decontextualised knowledge and skill. Nor, for that matter, should it be seen as a mechanistic process of presenting experience for accreditation. Rather, the idea of learning through work experience needs to be based upon a more 'reflexive' theory of learning (Guile and Young forthcoming; Dewey, 1986; Kolb, 1984; Schön, 1987). This should take account of the influence of the context and the changing organisation of work upon student learning and development, the situated nature of that learning and the importance of developing a curriculum framework that enables students to relate formal and informal learning. Consequently, learning through work experience may involve the use of concepts that may be external to the context of work itself.

The term 'connectivity' may be employed to define the purpose of the pedagogic approach required to take explicit account of the 'vertical' development and 'horizontal' practice of learners. They require support in considering how concepts can be appropriated to help them mediate the relationship between their formal programmes of study and, for example, trends in labour markets and work organisation. Learners, teachers, employers and employees will also need to

recognise the value of using work experience as an opportunity for learners to 'learn to negotiate how they learn' in workplaces (Beach and Vyas, 1998). This is as well as, from the employer perspective, using work experience as an opportunity to add value to core business (Guile and Fonda, 1999).

Learning from work experience, therefore, involves learners, teachers, employers and employees coming to terms with a dual agenda. Students not only have to develop the capacity to participate within workplace activities and cultures, they must also learn how to draw upon their formal learning and use it to 'interrogate' workplace practices. Equally, there is the potential for the learning acquired through work experience to form the basis for interrogating formal learning. This is the basis for 'reflexive learning'. Without the mediation described above, reconciling 'vertical' and 'horizontal' development can be a highly troubling activity. These ideas about learning through work experience reinforce how 'host' organisations need to provide 'environments for learning' (or opportunities to participate in 'communities of practice') if they are to maximise the learning potential of these activities for themselves and for learners. This very much implies a reappraisal of pedagogy (Griffiths and Guile, 1999) by organisations and teachers and the development of those explicit and implicit strategies which support learning, irrespective of content. Students are either left without support, having themselves to reconcile the relationship between formal learning and workplace learning, or they are left with the impression that these are totally separate forms of context (Guile and Fonda, 1999).

10.4.3. Modelling work experience

A typology of approaches to work experience has been discussed by the research team and is presented below. The different models of work experience embody changing responses to policy, to the learner, to skills needed, and to pedagogy. The five models naturally reflect the influence of different economic, technological and social factors prevailing within European countries as well as new ideas about learning and development. They may be viewed as part of an evolving continuum of learning through work experience - although the models may be specific to periods of economic and technological development and thus reflect changing educational ideas about the process of learning. The different models, therefore, can and do co-exist in different countries. They are analytical rather than descriptive; no specific work-based programme fits neatly into any of the models and some programmes may contain elements of more than one model. The typology is not prescriptive but, as with any analytical framework, it is not without its own values and priorities. The fifth model, which is based upon the principle of connectivity, has innovative features which are relevant to future approaches to effective learning through work experience. The models are described below and are then presented diagrammatically.

A TYPOLOGY OF WORK EXPERIENCE

MODEL OF WORK EXPERIENCE	TRADITIONAL MODEL	EXPERIENTIAL MODEL
Purpose of work experience	'Co-development' 'Launch' into work and work	Key skill/ between education assessment
Assumption about learning and development	ADAPTION	ADAPTION and SELF-AWARENESS
Focus of work experience	Managing tasks and instructions	Managing contributions
		PLUS recording experiences
Management of work experience	SUPERVISION	ARMS-LENGTH SUPERVISION
Outcome of work experience	Skill acquisition Knowledge of 'work readiness'	Economic and Industrial Awareness
Role of education and training provider	Provide: formal preparation programme	Facilitate: briefing for and debriefing of work experience

GENERIC MODEL	WORK PROCESS MODEL	CONNECTIVE MODEL
'Attunement' to work competence	environment	'Reflexivity'
SELF-MANAGEMENT	ADJUST and TRANSFER DEVELOPMENT	VERTICAL AND HORIZONTAL
Managing action plan and learning outcomes	Managing work processes, relationships and customers knowledge and skill	Working collaboratively to apply and develop
PLUS	PLUS	PLUS
managing situations supporting employability	adding value for employer 'entrepreneurial ability'	'boundary crossing'
FACILITATION	COACHING	DEVELOPING AND RESITUATING LEARNING
Assessed learning outcomes	System thinking	Polycontextual and connective skills
Build: portfolio of achievements	Support: Reflection -in and on -action	Develop partnerships with workplaces to create: 'environments for learning'

Model 1 -The traditional model: the purpose of this model is to 'launch' students into work - typically in most EU Member States it is based upon a technical-rational perspective on work experience. The role of formal learning is to prepare students for future learning and the role of work experience is directed towards learning tasks.

Model 2 -The experiential model: the purpose of this model is the 'co-development' of learners. It represents an attempt to reform the traditional model in response to the need for students to acquire less occupationally specific knowledge and skills, and more generic knowledge and understanding about the content of work. The role of formal learning is to familiarise students with occupational changes and to develop their economic and industrial awareness. The role of work experience is to undertake activities to acquire an awareness of economic and occupational change.

Model 3 - The generic model: the purpose of work experience is to provide evidence of key skill development or for key skill accreditation. It is an explicit attempt to develop an alternative to the traditional model, based on slightly different principles that emphasise using work-based experience to acquire learning outcomes (accreditation of knowledge, skills). The role of formal learning is very limited: competent work-based activity is all that is required and workplace learning is the major source of evidence for accreditation.

Model 4 -The work process model: the purpose of this model is to 'attune' learners to the changing demands of the workplace. It represents an attempt, limited to apprenticeship-based programmes that have a 'work process knowledge' component, to address the omissions of Models 1 - 3, namely to acknowledge the social nature of work-related knowledge and skill and to reassert the key role of the teacher. Thus, the teacher role is to facilitate the process of reflection-in-action (e.g., to help develop the attributes of know-how, skill, competence, etc.) but not reflection-on-context (e.g., product market and management strategy). Model 4 seeks to combine the emphasis in the traditional model on the role of the teacher with the commitment to self-management and self-development of Models 2 and 3. The role of work experience is to provide an opportunity to develop work process knowledge and the role of formal learning is to support that.

Model 5 -The connective model: the purpose of this model is to assist learners to 'connect' their vertical and horizontal development and hence their formal and informal learning. This model requires an approach to workplaces whereby they become 'environments for learning'. Its development and application will demand the active involvement of researchers, policy makers, practitioners and employers alike for it is not a model of learning which can be superficially or spasmodically engaged. It has the potential to avoid the limitations of past practice and to engage creatively with the challenges of the future. The connective model could come to offer a living, continually developing illustration of what theory can offer practice and how learning can be an active product of their informed connection.

One of the pedagogic aims of the connective model is to enable teachers (and trainers) to introduce theories and concepts which learners can use to interrogate and assess critically workplace practices and contexts. Work experience should involve formal and informal identification of problems for analysis and provide opportunities for applying theory and also concepts for exploring the implications of different solutions to problems. This should enable the learner to develop broader forms of expertise than could be acquired within either formal education or training. The pedagogic goal of the model is to encourage students to develop critiques of, and alternatives to, existing practice and to apply them in the process of developing their capabilities.

Bibliography

- Ashworth, P; Saxton, J. *Managing work experience*. London: Routledge, 1992.
- Attwell, G; Jennes, A. Work process knowledge and new forms of development of professionals for vocational education and training, Paper at *Third work process knowledge meeting*, Bremen, Dec. 12-14, 1996.
- Beach, K; Vyas, S. Light pickles and heavy mustard: horizontal development among students negotiating how to learn in a production activity. Paper presented at the *Fourth Conference of the International Society for Cultural research and Activity Theory*, University of Aarhus, Denmark, 1998.
- Benke, M; Gorgenyi, I. *Work experience for the 21st. Century. Policy analysis: Hungary*, unpublished paper. Budapest: National Institute of Vocational Education, 1998.
- Boreham, N. Outline of contribution by the WHOLE network: 'Work process knowledge in technological and organisational development', paper for the *Cluster of TSER projects relating to HRD and competence development*, 19 April, Brussels, 1999.
- Boud, D; Cohen, R.; Walker, D. (eds). Introduction: Understanding learning from experience. In Boud, D; Cohen; R., Walker, D. (eds). *Using experience for learning*. Milton Keynes: SRHE/Open University Press, 1993.
- Carr, W; Kemmis, S. *Teoría crítica de la enseñanza*. Barcelona: Martinez Roca, 1988.
- Charner, I; Rolzinski, C. (eds). *Responding to the educational needs of today's workplace*. San Francisco: Jossey Bass Inc., 1987.
- Christensen, L. *Work experience for the 21st. Century. Policy Analysis: Denmark*, unpublished paper. Copenhagen Business School, 1998
- Cole, M. The Supra-individual envelope of development: activity and practice, situation and context. In Goodnow, J.J; Miller, P; Kessel, F. (eds). *Cultural practices as contexts for development*. San Francisco: Jossey Bass, 1999.

- Connell, R. 1996 *Escuelas y justicia social*. Madrid, Morata. *Schools and social justice*. Routledge, 1993.
- Dewey, J. Logic. The theory of inquiry. In Boydstone, J.A. (ed.). *John Dewey: the later works, 1925-1953, Vol 12*. Carbonadale: Southern University Press, 1986.
- European Commision, *Teaching and learning: towards the learning society*, Brussels: EC, 1995.
- Fenstermacher, G.D. Tres aspectos de la filosofia de la investigacion sobre la enseñanza. In Wittrock, M.C. *La investigacion de la enseñanza*, vol. I, pp. 150-179. *Handbook of research on teaching*, AERA-MacMillan, 1986, chapter 8. 1989
- Fischer, M; Stuber, F. Work process knowledge and school-to-work transition. In Scherer, E. (ed.). *Shop floor control: a systems perspective*. Berlin: Springer Verlag, 1998.
- Ghererdi, S.; Nicolini, D.; Odella, F. Towards a social understanding of how people learn in organisations: the notion of a situated curriculum. *Management Learning*, 1998, Vol. 20, No 2.
- Gick, J. Intellectual and manual labour. In Martin, L; Nelson, K; Torbach, E. (eds). *Socio-cultural psychology theory and practice of doing and knowing*. New York: Cambridge University Press, 1995.
- Green, A., Leney, T; Wolf, A. *Convergence and divergence in European education and training systems*. London: Bedford Way Papers, Institute of Education, University of London, 1999.
- Griffiths, T; Guile, D. *Work experience for the 21st. Century. Policy analysis: UK*, unpublished paper, UCL/loE, University of London, 1998.
- Griffiths, T; Guile, D. Pedagogy in work-based contexts'. In Mortimore, P. (ed.). *Understanding pedagogy and its impact on learning*. London: Sage Publications, 1999.
- Guile, D; Fonda, N. *Managing learning for added value*. London: Institute of Personnel and Development, 1999.
- Guile, D; Young, M.F.D. *Learning organisations and the question of learning*. Forthcoming.
- Hart, M.U. *Working and educating for lif: feminist and international perspectives on adult education*. London: Routledge, 1992.
- Kindermann, T; Skinner, E.A. Modeling environmental development: individual and contextual trajectories. In Asendorpf, J.B; Valsiner, J., (eds). *Stability and change in development*. London: Sage, 1992.
- Kolb, D. *Experiential learning: experience as the source of learning and development*. New York: Prentice Hall, 1984.
- Lasonen, J. (ed.) *Reforming upper secondary education*. University of Jyväskylä: Institute for Educational Research, 1997.

- Lasonen, J; Young, M. (eds). *Strategies for achieving parity of esteem in European upper secondary education*. University of Jyväskylä: Institute for Educational Research, 1998.
- Lave, J; Wenger, E. *Situated learning*, Cambridge, Cambridge Press, 1991.
- Madsen, T; Wallentin. C. *Work experience for the 21st. Century. Policy analysis: Sweden*, unpublished paper, Kristianstad University, Sweden, 1998.
- Marhuenda, F. *Work experience for the 21st. Century. Policy analysis: Spain*, unpublished paper, Universitat de València, 1998.
- McKenna, P. *Work experience for the 21st. Century. Policy analysis: Ireland*, unpublished paper, Dublin City University, 1998.
- Miller, A., Watts, A.G; Jamieson, I. (eds). *Rethinking work experience*. Brighton: Falmer Press, 1991.
- Nyhan, B. Building learning organisations. Putting theory to the test - Lessons from European companies. *European Journal Vocational Training*, 1999, No 16.
- Rauner, F. School-to-work transition – the case of Germany. In Stern, D; Wagner, D. A., (eds). *International perspectives on school-to-work transition*. Cresskill N. J., USA: Hampton Press, 1999.
- Schön, D.A. *Educating the reflective practitioner: Toward a new design for learning in the professions*. San Francisco: Jossey-Bass, 1987.
- Simon, R.I; Dipppo, D; Schenke, A. *Learning work. A critical pedagogy of work education*. New York: Bergin and Garvey, 1991.
- Stenström, M-L. (ed.). *Reflections on post-16 strategies in European countries: working paper no.9* Interim report of the Leonardo da Vinci Multiplier Effect Project III.3.a Priority 2: Forging links between educational establishments and enterprises 1997-2000 ID 27009. Institute for Educational Research, University of Jyväskylä: Jyväskylä University Printing House, 1999.
- Stern, D; Wagner, D. A. (eds). *International perspectives on school-to-work transition*. Cresskill N. J. USA: Hampton Press, 1999.
- Usher, R; Bryant, I; Johnston, R. *Adult education and the post-modern challenge*. London: Routledge, 1997.
- Young, M.F.D. *The curriculum of the future*. London: Falmer Press, 1998.
- Young, M.F.D; Lucas, N. Pedagogy and learning in further education. In Mortimore, P. (ed.) *Understanding pedagogy and its impact on learning*. London: Sage Publications, 1999.

CHAPTER 11

Bringing work-related learning back to authentic work contexts

Peter Dehnbostel

11.1. Revival of learning in the work context

Since the 1970s and 1980s learning has undergone a revival in the workplace. This can generally be attributed to the widespread use of new information and communication technologies, new work and organisational concepts and the shift from an industrial to an information society. New qualification and educational requirements and related learning concepts are developing in changing working and living environments. The priority in business is to facilitate and stimulate improvement, optimisation, development and innovation processes. This can only be achieved through intensive learning processes. Learning must be seen in the light of competitiveness and economic target setting. It becomes an important economic factor. More and more voices in business and management are expressing the conviction that continual learning processes in the workplace are the most significant, even the only, lasting way of ensuring a competitive edge in the future (see Arnold 2000; Pätzold and Lang 1999; Probst and Büchel 1994; Staudt 1995; Wildemann 1994, among others).

New learning approaches and forms, such as independent learning, lifelong learning, learning bays and quality circles represent an initial response to the changes in the requirements of business and society. They are particularly designed to help people acquire key qualifications and extensive occupational competence. Many people maintain that the level of key qualifications needed for occupational competence can only be acquired through the work process. As a result of this, learning bays were established within the work process in the early 1990s. They were based on the following assumptions. Hardly any key qualifications are learned at general education schools; and in training workshops within the context of initial vocational training around 20% key qualifications and 80% specialised qualifications are learned. This contrasts with learning bays where around 80% key qualifications and 20% specialised qualifications are learned (Bittmann et al. 1992, p. 57, see also Figure 2 in Section 3). Key qualifications include concepts such as ability to work as a member of a team, drawing conclusions, systematic thinking and personal qualities.

The rediscovery of learning in the workplace represents an about-turn in vocational training development in the Federal Republic of Germany. Since the early days of industrial vocational training in the last thirty years of the 1800s, vocational training has become increasingly centralised, systemised and regulated. Until the 1980s, the prevailing trend to improve the quality of vocational training concentrated on taking learning out of the workplace. The reversal of this trend goes hand in hand with new learning approaches and a move away from centralised learning and organisational concepts. In continuing training this is reflected by cuts in out-of-company courses, the interaction of work and learning in the work process and the promotion of independent and lifelong learning. The changes in the 'dual system', the German initial training system, which was strictly regulated up to now, are more deep-seated. Training periods in the workplace are being extended, new forms of work-related learning are being developed and training regulations are becoming more flexible and work-oriented.

Bringing work-related learning back to authentic work contexts should be regarded partly as a complement to, and partly as a replacement for, existing learning concepts. People have realised that the skills needed in the workplace can be acquired only to a degree in external vocational training. Skills contents for fixed and more or less static qualification requirements could formerly be successfully anticipated and transferred to authentic work processes. The swift change in qualification requirements through work-related innovations allows this only to a limited degree today. Key qualifications such as systematic thinking, drawing conclusions and interpersonal skills in particular must be acquired through learning in authentic work situations.

Nevertheless, learning in the workplace still has certain limitations, even in modern work processes. Economical, technical and structural constraints in particular restrict learning and learning-friendly approaches to work processes. No scientific proof exists on the extent to which company and educational interests converge or the extent to which we can speak of the 'Coinciding of economic and pedagogical reason' (*Senatskommission für Berufsbildungsforschung* 1990, p. VII). Investigations and studies on this subject have yet to be carried out. Theoretical conclusions from the revival of learning in the workplace are therefore difficult to evaluate at the moment. The automobile industry provides a good example of how ambivalent these developments are: retraining and reprofessionalising the workplace are being proclaimed alongside neo-Taylorist reorganisation (Nomura and Jürgens 1995; Springer 1999).

Current debate raises the criticism that the modern world of work is characterised increasingly by crumbling social relationships and dwindling possibility to establish a personal identity. As a result learning potential and learning opportunities at work are on the decline. We can see a clear move away from tradition and standardisation, in which established professional values and social relationships are giving way to labour skills adapted to the work process, with the focus on

flexibility and mobility. This can be traced back to constraints and internal dynamics in the prevalent industrial economic system, which increasingly demand more extensive and quicker production alongside more elastic and flexible work processes. Sennett (1998), for instance, is of the opinion that modern work processes are dominated by 'flexibility', leaving hardly any scope for opportunities for personality development and for establishing reliable social relationships.

In contrast, other viewpoints associate new learning forms, increased learning and educational opportunities and an improved learning culture with modern work and organisational concepts. The following opinions have been voiced in this context. The empirical and theoretical basis for these statements can be traced to research and development work sponsored by the Federal institute for vocational training (*BIBB*). Originally, the work comprised a series of pilot projects on 'Decentralised learning' conducted in the 1990s and this was supplemented by work on the research project 'Work-related innovation and learning strategies – implications for vocational education and training and in-company personnel development processes', carried out between 1996 and 1999. Both the pilot projects and the company investigations took place predominantly in medium-sized and large industrial enterprises which had just implemented, and in most cases were continuing, intensive reorganisational and restructuring programmes. Detailed documentation is available on the implementation and results of the series of pilot projects (see Dehnbostel 1999; Dehnbostel et al. 1996; among others) and the research project (see Dehnbostel and Dybowski 2000; Dybowski et al. 1999).

11.2. The growing significance of informal learning

The growing significance of informal learning goes hand in hand with the revival of learning in the workplace. This is demonstrated in the most important and also most widespread new work organisation patterns: group and project work. Here informal learning is a major factor in encouraging teamwork and innovative thinking and facilitating improvement and optimisation processes. In addition, decentralised forms of learning such as quality circles and learning bays have been introduced, linking work and learning systematically on the basis of experience. These forms of learning attach equal weight to improving occupational competence and providing cost-effective qualifications. They are deliberately designed to facilitate and promote learning processes and make it easier to gain the experience that results in substantive learning.

For clarification purposes it should be stated that on-the-job learning can be fundamentally divided into informal learning and intentional learning. Intentional learning is organised and aims to convey set contents and targets formally. It works towards a prescribed goal from the start. Informal learning, in contrast, achieves an educational goal, generally without consciously striving towards a specific result.

Informal learning is defined as non-organised and informal learning in society and the world of work.

Informal learning can be subdivided into two types of learning: learning by doing and implicit learning. We can roughly distinguish between these two terms, which in any case can only be separated analytically, by saying that learning by doing involves processing experiences by reflection, while implicit learning tends to occur unconsciously and without reflection. The learning processes for both follow on from actions and external experiences which individuals process as internal experiences in different ways. Learning by doing is especially important for vocational education and training, as it can be specifically encouraged through the structure of work processes and is an integral part of acquiring key qualifications.

The increasing significance of informal learning is also due to the too narrow limits of organised and intentional learning processes. Only a certain amount of occupational competence can be gained through intentional learning processes. Investigations show that the learning and development processes that form the actual basis of qualified workers' occupational knowledge are determined to a large extent by informal learning processes at work. Operational models for learning by doing assume that knowledge and insight is gained not when actions are repeated, but rather when unforeseen problems and uncertainties crop up during the working process and have to be solved (Dehnbostel 1998, p. 186 ff.). This is particularly true of modern, computer-based work processes with integrated improvement and quality assurance measures.

Learning by doing apparently does not occur as before in work processes involving information and communications technology. External experiences that act as a catalyst for reflection are changing and being eliminated to some degree by the application of new technologies. Work activities controlled by the senses of sight, hearing and touch in particular are being increasingly curtailed. At the same time, automation and the use of operating equipment, diagnostic systems and computer-controlled machinery is broadening the range of learning requirements and consequently extending external experiences and learning by doing. Although these new external experiences are based to a considerable extent on mediated and cognitively based work activities, mirroring the shift towards an information society, their relationship to sense and practice remains. They lead to knowledge from experience by means of informal learning processes.

Informal learning and learning by doing in the workplace depend very much on what sort of experiences are acquired at work, i.e. which sensual, cognitive, emotional and social processes take place. The importance of the role each of these plays is heavily dependent on the work tasks and content, the structuring of operations and company organisation, social relationships and corporate culture. In any case, it can generally be said that informal learning lacking pedagogical elements, organisation or goals runs the risk of remaining random and restricted to one specific situation. Integrating informal and intentional learning, as has been

developed and tested in learning bays, for example, promises to be successful. The emphasis here lies specifically on key qualifications and the interaction of vocational training and organisation development.

11.3. Learning bays as an example of integrating informal and intentional learning

Learning bays are learning venues within the workplace. They were developed and tested in the 1990s and now exist in over 50 enterprises. They are used for both initial and continuing training. Individual learning bay variations can differ according to work and production areas, job activities and job definition, as well as according to various social conditions and aspects of corporate culture. Common features are:

- (a) learning bays are work stations enhanced by learning equipment where authentic work tasks are processed and training takes place;
- (b) the tasks fulfil the criteria required of holistic work, and their complexity, problematic nature and variety provide good opportunities for learning;
- (c) learning bays involve group work, but the organisational form is structured according to the principles of partly independent teamwork;
- (d) learning bays are supervised by a skilled worker from the relevant company department, a qualified specialist and trainer whose main role is to provide support for processes and developments;
- (e) learning bays should also function as innovation centres in the work process, particularly for innovations in work organisation, social and methodological areas.

Group work is the typical organisational form in learning bays, for two main reasons. On the one hand, learning bays must be conceived as innovation fields for new forms of work organisation, although group work currently takes priority. On the other hand, group learning is preferred for vocational and in-company training reasons. Goals for self-organisation, self-monitoring and social development are particularly high on the agenda. However, this also means that no congruent representation of company group work exists, as learning and educational objectives derived from vocational training play a key role.

Learning bays are, therefore, characterised by a double infrastructure. On the one hand, there is a work infrastructure which conforms to the work activities, techniques, work organisation and qualification requirements of the relevant work environment. On the other hand, there is a learning infrastructure that provides additional space, equipment and personnel resources, and prepares work tasks in line with work training and vocational training criteria. Learning, therefore, is work-oriented but is not restricted to informal learning processes. Learning does not remain attached to the possible restrictions and limitations of experience. Work-related activity and reflection resulting from it interact with clear goals and the

contents of in-company training. Informal learning processes are systematically linked with intentional learning.

The traditional model of learning in the workplace is fundamentally extended by this integration of informal and intentional learning. Activity-based learning takes place, leading to the acquisition of key qualifications and the unity of occupational competence comprising specialised, social and human aspects. The high level of key qualifications acquisition in relation to specialised qualifications is illustrated in the learning bays and the learning venue combinations for in-company training in the Gaggenau plant of Daimler Chrysler (Bittmann et al. 1992, p. 57).

Key qualifications are mainly acquired through the high level of self-organisation and self-monitoring in the learning bays. Planning, execution and assessment of tasks is predominantly conducted independently by the trainees themselves. Personal responsibility and intensive interaction within the group are the main priority. Trainees act within the framework of prescribed conditions and carry these out according to their own targets and considerations. They must recognise and decide what specialist knowledge and skills are needed and which experts should be consulted on what. They do not learn by obeying and applying rules, but rather develop their abilities to solve problems independently or in groups, and thereby learn to cope with uncertainties and insecurities in work and social situations.

The learning bay is monitored by a learning bay supervisor. This supervisor is an experienced skilled worker from the relevant company department and corresponds to the traditional 'on-site trainer'. Yet the duties and responsibilities of these learning bay supervisors are hardly comparable with those of traditional on-site trainers. Their central role is to support and monitor the learning processes. The real challenge lies in imparting knowledge and proficiency using methods other than the traditional, trainer-centred approach. Instead, they must create learning situations and environments for independent learning and encourage trainees to acquire specialist, methodological and social competence more or less on their own.

Support, monitoring and coaching processes replace the conventional concepts of 'teaching' and 'instruction'. Learning bay supervisors spring into action when they are asked. They also get involved when they see that the group is not able to solve the tasks or resolve conflicts within the group independently. Here it is important to sense when the time is ripe to intervene, so that they neither interrupt independent group solution processes, nor cause damage by being too slow to step in. Lastly, the learning bay supervisor sits down with the group and with individual trainees at set times, for instance after the next activity has been planned or after quality checks have been conducted, in order to reflect upon what has been learned.

Another important aspect of the work of learning bay supervisors lies in developing and designing the workplace as a learning location or a learning bay. In this task, tension and contradictions are often unavoidable, for the activities in the workplace are subject to business criteria and calculations, whereas educational goals are set in the context of vocational training and the training system. In

addition, trainers are unfamiliar with, and unpractised in, investigating their own workplace in the search for potential learning situations. In practice, a model covering five phases has been devised for developing and designing learning bays.

The first phase analyses which tasks are to be completed and which qualification requirements and working conditions are involved. The resulting findings, taking work-related and educational criteria into account, lead into a second phase for the decision as to whether the workplace under examination should be selected as a learning bay. The structure, equipment and organisational principles of the learning bay are laid down in a third phase. In phase four the learning goals, contents and methods are decided on the basis of the working-learning situation, the training level of the trainees and the skills intended to be conveyed. The final fifth phase involves the actual planning of work and procedures in the learning bay and the preparation of a model to assess the quality of the work in the learning bay. This last phase can be subdivided into a planning phase and an assessment phase.

11.4. New learning approaches and forms result in a new learning culture

Learning bays and other decentralised forms of learning reflect a change of perspective in in-company qualification concepts. Active, participatory and process-based activities and learning approaches are taking the place of linear and hierarchical thought, behavioural and orientation patterns. The way is open for processes and developments that incorporate authentic experience and subjective interests more deeply and differentiate more clearly between various educational paths and lifestyles. This also involves a change in the relationship between teaching and learning: the focus is shifting from teaching to learning. Teaching is being conceived and conducted as a supervisory and monitoring process.

Active learning processes and approaches of this type are undoubtedly still carried out in enterprises only on a limited scale. Receptive learning will continue to be necessary in certain work situations, for example, when introducing new technology or new mechanical configurations. Furthermore, the question of how learning takes place depends to a large extent on the branch of industry, the size of the enterprise and the economic sector. Nevertheless, fundamental changes in learning culture are becoming evident in enterprises. According to Weinberg (1999, p. 88 ff.), we can take as a basis specific learning cultures which portray learning forms in the context of respective working and living environments and different personal and social dispositions. There is, therefore, a great deal of evidence to support the notion that a new learning culture is appearing in modern enterprises. The starting point is based on the willingness and ability of individuals, groups and organisation units to learn, which is essential if innovativeness, an increase in knowledge and better quality assurance are to be realised and sustained.

The new learning culture is characterised particularly by the extension and, in some cases, replacement of traditional instructional learning with constructivist and experience-based learning. The focus is on the trainee as an active and reflecting subject. The trainee discovers reality via learning and experience processes on the basis of independent activity and self-determination. The respective activity or learning situation is based on the principles of authenticity, model function, situation and social interaction that promote learning and transfer of knowledge. According to Reinmann-Rothmeier and Mandl (1999, p. 37), the following process features are characteristic of a constructivist approach:

- (a) learning involves active trainee participation. Trainees must be motivated and show or develop an active interest in what they are doing and how they do it;
- (b) trainees also steer and monitor their learning processes themselves. The extent of this self-monitoring can vary according to the situation;
- (c) learning is carried out constructively. Trainees' experience and knowledge background is taken into account. Space is given to subjective interpretations;
- (d) learning is related to the situation. It occurs in a specific context;
- (e) learning is a social activity which takes place interactively and respects trainees' sociocultural background.

A learning culture is always just a part of a more comprehensive corporate culture. In applying concepts such as the 'learning company' the aim is to create a corporate culture in which each worker is simultaneously learner and teacher, as they all work together to achieve corporate goals and visions. Corporate and individual interests must be brought into line with each other to achieve this. The corporate culture approach regards the company as a social entity with a specific culture covering the goals, messages, standards and values crucial for the staff. Here it is important to combine economic, social and personal considerations. The focus is on 'enculturation processes', i.e. processes which inspire individuals to develop an identity as the employee of a certain company. Unlike traditional organisational theory approaches this should be achieved by eliminating hierarchies, decentralisation and participation.

This can only succeed if staff play an active part in organising their work and their future by acquiring key qualifications. Learning itself and the acquisition of key qualifications assume prime importance and become the corporate culture norm. Enterprises can only acquire a new corporate culture and become learning enterprises when they establish a corresponding learning culture which has been developed by and among employees in the same way as the respective working culture (see Senghaas-Knobloch et al., 1997, p. 12).

As the individual points show, taking learning by doing into account and learning from experience are important, and could even be regarded as the most striking differences between new and traditional learning cultures. The comparison also shows that the new learning culture breaks the bounds of learning. Learning is restricted neither to specific learning locations, nor to certain procedures or

methods. Nevertheless, learning, especially learning by doing, should not be regarded as random or lacking in context. On the contrary, apart from the constructivist learning principle, which, as situation-based learning, takes up the respective learning and corporate culture, learning in networks creates reliable contexts which have an effect on learning processes and quality. This, therefore, counters the coincidental and random nature of learning by doing.

11.5. Research proposals and urgent development tasks

The following four research proposals and development tasks have been formulated from issues and problems raised by linking work-related learning back to authentic work contexts. They particularly show up faults and gaps in vocational training research. In practice, learning has been incorporated increasingly into the workplace in various forms. Now it is a question of gathering and analysing these forms in research projects and relating them to what is actually happening in practice.

10.5.1. Analysis of the connection between intentional learning and learning by doing in decentralised learning forms

Decentralised learning forms such as learning bays and quality circles have become more relevant in businesses. They stand out in the way they link intentional learning with learning by doing. A significant reason for the more widespread application of integrated learning lies in the specific learning requirements of enterprises which have undergone restructuring measures. Continual improvement and optimisation processes, customer and business process orientation and a high level of innovativeness demand the integration of work and learning. The concept of the 'learning enterprise' can be regarded as a synonym for this need for integration.

Investigations into learning forms combining decentralised, intentional and experience-based learning should basically concentrate on two different dimensions: organisational structure and didactic method. As far as organisational structure is concerned, research must analyse how decentralised learning forms are incorporated into the structuring of operations and company organisation in individual enterprises and to what extent they form a part of vocational training courses and qualification programmes. Whether new forms of work organisation such as group and project work should be classed among decentralised learning forms needs to be clarified. This indicates how vital it is to draw up a typology of decentralised learning forms to provide both a sound basis and instructions for their application and implementation. As far as didactic methods are concerned, research must ascertain whether the combination of intentional learning and learning by doing as an independent learning concept is practicable in the long

term. We can assume that learning in highly developed work processes is conceived as an experience-based and largely self-organised process, enhanced by intentional learning goals. We must analyse and implement this by devising criteria to be used for designing working environments conducive to learning.

10.5.2. Constitution, recording, recognition and certification of informal learning

Informal learning now plays an important role in the learning and work forms of restructured enterprises. Unlike other European countries, in Germany informal learning has scarcely been analysed or recorded (see Bjørnåvold 1999). Didactic-methodological concepts do not recognise informal learning as an independent form, but classify it as occupational socialisation in many cases. It generally plays no part in examination and assessment procedures, even though it is taken into account as a whole for admission to external examinations, entry to study courses for students without formal university entrance qualifications, and in practical examinations in the dual system. Procedures must be introduced to record, analyse and evaluate the results and skills demonstrated through experience-based learning processes. This will make it easier to develop a form of certification that covers informal learning directly.

When recording and recognising informal learning, we must assume that the content of experience at work depends to a large extent on work situations and learning potential. We must analyse the extent to which informal learning results in experience-based knowledge and leads to a higher level of competence. The vastly different ways in which people register and process the experience they gather by carrying out tasks in the workplace must be recorded. Simple, repetitive activities, for example, offer only low learning potential and learning opportunities. There is hardly any scope for learning by doing in this context. In contrast, varied, complex work situations with considerable learning opportunities normally offer plenty of scope for learning from experience. How people register experience depends on various factors such as personal knowledge, retention capacity and individual routine. In the same way, reflection on experience also depends on various factors, although we must differentiate between subjective and external, or objective, aspects. This has not yet been researched or analysed. Neither have the possibilities and limitations of experience-based learning in relation to personality and competence development been the subject of much research up to now.

A further important aspect lies in incorporating informal learning into training courses that go beyond traditional initial and continuing vocational training paths. This particularly refers to dual study courses in which the 'universalisation of dual training forms' comes into its own, 'i.e. the transfer of the principle of combined learning in (state) schools and (private) enterprises to training institutions right up to university level' (Greinert 1996, p. 6). Dualisation is an optimal learning and organisational form for vocational education and training. In educational theory,

work and learning are linked continually, as are learning by doing and intentional, didactic learning. Transferring this learning principle to the entire educational system is both a feasible option and a vision that should be developed further in theory and in practice.

10.5.3. **Crossover of work-related organisational development and vocational training**

Corporate organisational development and vocational education and training are two areas which are becoming more important as strategic resources, offering company flexibility and innovation in the light of heightened competition. Many enterprises are currently recognising that they can gain the edge over their competitors and in the market only with intelligent products and services, which can only be achieved through diversified quality production. Markets that demand flexible innovation processes and clearer distinctions between products and services, due to increasing differentiation and pluralisation in consumer patterns, confront enterprises with a growing need to modernise and raise qualification levels.

The growing importance of competence and key qualifications in modern business and organisational concepts could provide vocational education and training with a new strategic dimension for corporate organisational development. For, as new corporate concepts show, reorganisation and restructuring processes are not simply designed to redistribute competence from the top to the bottom, with the desirable effect of thinning out and flattening hierarchies. They also involve restructuring work organisation and redefining and adapting work-related tasks, which makes medium and long-term changes in company personnel development strategies unavoidable. This has the potential to give vocational education and training a new status in enterprises, provided that in-company qualification can hold its own in the interrelationship between technological development, changing activities and occupational skills. In a series of reorganisation processes we can trace a new form of interaction between in-company vocational training and organisational development, but this must be created consciously in the future if vocational training in enterprises is to achieve a new status.

10.5.4. **Concepts and instruments for analysing modern on-the-job learning processes**

Up to now vocational training research has not developed sound methods or instruments for recording and analysing modern on-the-job learning processes. Traditional investigation procedures, which involve methods such as document analysis, interviews and workplace observation, are unsatisfactory and do not meet the requirements of high-quality social research of modern work processes. Above all it is necessary to record the central relationships between economic, corporate and vocational education and training contents in the analysis of on-the-job learning

processes. In open work processes characterised by a relatively high level of autonomy, these relationships cannot be surveyed quantitatively. Even traditional qualitative methods based on interview and observation are hardly capable of recording working procedures geared towards improvement, optimisation and learning processes.

We can assume that the research issues and hypotheses relating to quality development are not constituted on the basis of a theory, but are themselves considered and treated as a part of theory development in the relevant field of enquiry. This inductive methodological research approach makes it possible in principle to incorporate the relevant analysis, results and findings into subsequent stages of the study. With this, in methodological terms a conception emerges which is open to the object of the research and which is suitable for recording process-like and networked on-the-job learning processes.

Bibliography

- Arnold, R. *Das Santiago Prinzip. Führung und Personalentwicklung im lernenden Unternehmen*. Cologne, 2000.
- Bittmann, A. et al. Lerninseln in der Produktion als Prototypen und Experimentierfeld neuer Formen des Lernens und Arbeitens. In Dehnbostel et al. (eds). *Lernen für die Zukunft durch verstärktes Lernen am Arbeitsplatz - Dezentrale Aus- und Weiterbildungskonzepte in der Praxis*. Berlin, 1992, pp. 39-64.
- Bjørnåvold, J. Identification, assessment and recognition of non-formal learning: European tendencies. In Dehnbostel et al. (eds). *Erfahrungslernen in der beruflichen Bildung – Beiträge zu einem kontroversen Konzept*. Neusäß: 1999, pp. 254-280.
- Dehnbostel, P. Dezentrale Berufsbildungskonzepte als Beitrag zum selbstorganisierten Lernen und zum lernenden Unternehmen. In: Schelten, A. et al. (eds). *Berufs- und Wirtschaftspädagogik im Spiegel der Forschung*. Opladen: 1999, pp. 191-206.
- Dehnbostel, P; Dybowski, G. *Lernen, Wissensmanagement und berufliche Bildung*. Bielefeld: 2000.
- Dehnbostel, P. et al. (eds). *Neue Lernorte und Lernortkombinationen - Erfahrungen und Erkenntnisse aus dezentralen Berufsbildungskonzepten*. Bielefeld: 1996.
- Dehnbostel, P. Lernorte, Lernprozesse und Lernkonzepte im lernenden Unternehmen aus berufspädagogischer Sicht. In Dehnbostel, P. et al. (eds). *Berufliche Bildung im lernenden Unternehmen. Zum Zusammenhang von betrieblicher Reorganisation, neuen Lernkonzepten und Persönlichkeitsentwicklung*. Berlin: 1998, pp. 175-194.
- Dybowski, G. et al. *Betriebliche Innovations- und Lernstrategien. Implikationen für*

- berufliche Bildungs- und betriebliche Personalentwicklungsprozesse*. Bielefeld: 1999.
- Greinert, W. D. Über den notwendigen Umbau des dualen Systems der Berufsausbildung. Vom 'Ordnungspolitischen Instrument' des 19. zum 'praxisbezogenen Qualifikationsmodell' des 21. Jahrhunderts. *Berufsbildung*, 1996, No 37.
- Nomura, M; Jürgens, U. *Binnenstrukturen des japanischen Produktivitätserfolges. Arbeitsbeziehungen und Leistungsregulierung in zwei japanischen Automobilunternehmen*. Berlin: 1995.
- Probst, G. J. B.; Büchel, B. *Organisationales Lernen: Wettbewerbsvorteil der Zukunft*. Wiesbaden: 1994.
- Pätzold, G; Lang, M. *Lernkulturen im Wandel. Didaktische Konzepte für eine wissensbasierte Organisation*. Bertelsmann: 1999.
- Reinmann-Rothmeier, G; Mandl, H. *Unterrichten und Lernumgebungen gestalten*. Munich: Ludwig-Maximilians-Universität, Institut für Pädagogische Psychologie und Empirische Pädagogik, Lehrstuhl für Empirische Pädagogik und Pädagogische Psychologie. Research report no. 60, 1999.
- Senatskommission für Berufsbildungsforschung (ed.). *Berufsbildungsforschung an den Hochschulen der Bundesrepublik Deutschland: Situation, Hauptaufgaben, Förderungsbedarf*. Weinheim: 1990.
- Senghaas-Knobloch, E. et al. *Zukunft der industriellen Arbeitskultur*. Münster: 1997.
- Sennett, R. *Der flexible Mensch. Die Kultur des neuen Kapitalismus*. Berlin: 1998.
- Springer, R. *Rückkehr zum Taylorismus? Arbeitspolitik in der Automobilindustrie am Scheideweg*. Frankfurt/ New York: 1999.
- Staudt, E. Integration von Personal- und Organisationsentwicklung in der beruflichen Weiterbildung. In Arnold, R. and Lipsmeier, A. (eds). *Handbuch der Berufsbildung*. Opladen: 1995, pp. 183-199.
- Weinberg, J. Lernkultur – Begriff, Geschichte, Perspektiven. In *Qualifikations-Entwicklungs-Management* (ed.). *Aspekte einer neuen Lernkultur: Argumente, Erfahrungen, Konsequenzen. Kompetenzentwicklung*, Vol. 4. Münster: 1999, pp. 81-143.
- Wildemann, H. *Fertigungsstrategien. Reorganisationskonzepte für eine schlanke Produktion und Zulieferung*. Munich: 1999.

CHAPTER 12

Transforming vocational curricula with work process knowledge

Nick Boreham

12.1. Changes in the European workplace

Significant changes in the nature of work have been taking place since the 1980s (Wood, 1989). These are widely interpreted as a response to fierce competition in global markets from countries such as the United States, Japan, Singapore, Taiwan and Korea. Enterprises in these countries produce higher quality goods than European enterprises, or pay their workforces lower wages, or both. The result, as the recent Competitiveness report warned, is that Europe is gradually being edged out of international markets (European Communities, 1997). In response to this, policy makers at all levels are urging industry to adopt new production concepts, especially more flexible uses of labour and new technology.

Literature on the transformation of work is fragmented, and much of it is devoted to revisiting old academic debates such as the deskilling hypothesis (Braverman, 1974). However, among the sociological debates we can find explanations for the entry of the concept of 'work process knowledge' into the vocabulary of the vocational educator. One reason is the decline of 'scientific management'. This was defined at the beginning of the twentieth century by Taylor in terms of control of the work process by managers, the use of work study to decompose activity into narrow tasks, the specification by management of the methods the workers must use to carry out these tasks, and the employment of foremen to ensure that they do so. This system, suitable for mass production with a relatively uneducated workforce, is now widely regarded as inappropriate for manufacturing the high quality customised goods that modern markets are demanding. The alternative to Taylorism advocated by governments and management experts is the 'learning organisation', which has a flat organisational structure, and relies on (partly) self-managing teams consisting of multi-skilled staff with (partly) interchangeable roles. Functions that were previously carried out in separate departments (such as planning, materials preparation, machining, quality control and maintenance) may be brought together within the same team. Many crucial decisions (e.g. on design modifications and price discounts) which were the preserve of the highest level of management in a Taylorist organisation, may be delegated to production or sales

staff. New technology is an important part of the new order. In the service sector, it enables information to be exploited more effectively. In batch manufacturing, it enables machines to be re-programmed for new products without the need for additional capital investment. It underpins continuous process manufacturing; and it has created new industries, utilising call centres, teleworking and business information services.

12.2. Work process knowledge

12.2.1. Conceptual background

The concept of work process knowledge was introduced to describe the knowledge required in transformed work situations of the kind described above. Its most explicit formulation has occurred in the context of German initiatives to modernise industry and tie vocational education and training in with the new structures. The term *Arbeitsprozesswissen* has two English translations – ‘labour process knowledge’, and ‘work process knowledge’. While the latter is more widely used, the former is a better translation of the original meaning. This emerged in connection with a number of projects carried out by the *Fundacio Centre d’Iniciatives i Recerques Europees a la Mediterrania in Barcelona* (CIREM), an organisation funded by the EU to promote economic development in the Mediterranean region. One project aimed to improve the performance of a group of hotels on the island of Mallorca, which wished to attract a more up-market clientele. It was realised that the hotels could make the desired move up-market only by developing the ambience that distinguishes high-class hotels - a personalised service for each individual guest. Consequently, a CIREM project to retrain the hotel staff, entitled ‘continuous quality improvement’, was launched under the coordination of Dr Wilfried Kruse.

The philosophy which guided this project was Japanese quality-circle methodology, in which staff were encouraged to identify and solve problems which stood in the way of the high standard of personal service the hotel group aspired to provide. Following standard quality-circle practice, staff met in cross-departmental groups to analyse the origins of the problems they had identified. This exercise led quickly to the realisation that a problem that manifested itself in one part of the hotel (e.g. in reception) might have causes and effects elsewhere (e.g. in the restaurant). It was also realised that employees working in one department of the hotel could throw light on problems that were occurring in other departments. Out of these insights developed the concept of the ‘internal customer’ - the idea that, in addition to providing a service to their guests, hotel employees needed to provide a service to colleagues in other departments. In this way, the quality circles increased awareness of the interdependency of the different departments, and the interconnectedness of the roles of the staff working within them.

On the basis of this, Kruse (1986) defined *Arbeitsprozesswissen* as:

- (a) expanded understanding of work roles in parts of the organisation other than the employee's own;
- (b) an awareness of the interdependency of the activities in different departments, including characteristics of the system as a whole such as the flow of work through the organisation, both upstream and downstream of the worker's own station;
- (c) a collective workplace culture which would promote the practice of providing a service to the internal customer.

Employees of Taylorist organisations need only the bare minimum of underpinning knowledge for their narrow tasks. There is no requirement to understand the jobs and roles of other people in the organisation, nor the overall production process, because the coordination of different functions is the responsibility of the foremen and managers. However, in functionally flexible, quality conscious learning organisations, *Arbeitsprozesswissen* is essential. The need also arises from the introduction of new technology into manufacturing. Computerised systems run many operations in parallel, so system-level knowledge is important. There is also a broadening of work roles: when employees make the transition from manual workers to supervisors of automatic processes, they typically take responsibility for managing a sequence of operations. Moreover, as computerised production processes are frequently breaking down, employees need a good understanding of what happens upstream and downstream of their own work station. Consequently, the concept of *Arbeitsprozesswissen* was applied in sectors beyond the original field of application. For example, it has been used to study training needs in mechanical engineering and scientific laboratories. At this point, the most appropriate English translation becomes 'work process knowledge', including knowledge of both the labour and the production processes.

12.2.2. Educational approaches on work process knowledge

One of the most persistent problems in the design of vocational education and training is how to avoid including 'inert knowledge' in courses - knowledge that has no direct application to work activities (Patrick et al., 1986; Jessup, 1991). This problem can be clarified by using a simple taxonomy of work-related knowledge, which distinguishes between control knowledge, conceptual knowledge and process knowledge. Control knowledge consists of scientific laws that explain natural phenomena, and conceptual knowledge consists of general ideas, each of which denotes a class of phenomena or events. In contrast, process knowledge entails understanding the sequence of operations in a dynamic system, such as the flow of information and material through stages in a manufacturing plant. It has been argued that the problem of 'inert' theoretical instruction arises when vocational training courses concentrate on control knowledge and conceptual knowledge to the neglect of work process knowledge. For example, the German network of

technical teacher training institutions (*HGTB*) has criticised the tradition in German vocational education of deriving the content of vocational courses from the engineering sciences taught to professional engineers. This assumes that the technician uses the same knowledge as the engineer, but at a simpler level. Instead, *HGTB* argues that the knowledge base of the professional engineer and the technician are qualitatively different. The former is related to the function of designing and constructing machines, which calls for control knowledge and conceptual knowledge. The latter is related to the function of supervising and troubleshooting, for which knowledge of the work process is required. By identifying the work process knowledge actually used in a given occupational situation, Pahl and Rauner (1998) argue, it is possible to define theoretical content for vocational education and training that will possess a high level of relevance.

Further studies of the knowledge used in the workplace indicate that work process knowledge is integrated with action, and has both explicit and implicit dimensions. First, the explicit dimension is a codifiable knowledge of the work process that might include:

- the life history of the manufacture and marketing of the product from raw material to retail outlet (or the delivery of the service), conceived as a cooperative activity by the members of the organisation as a whole;
- the flow of information, materials and staff through the different parts of the organisation;
- crucial connections and interdependencies between different functions within the organisation;
- the roles of workers in various parts of the organisation - not verbal knowledge of their written job descriptions, but a shared understanding of their goals and priorities;
- the division of labour - who is accountable for what, and where the boundaries lie;
- historical and comparative labour process knowledge. This element was introduced into the definition of work process knowledge because young people in training tend to understand their own experiences as the only possible form of work organisation, while the aim of vocational training should be to make them aware that there are many different ways of organising work.

Second, there is the implicit dimension - knowing by participating in the work process, a form of embodied knowledge attained only in the work situation. This might include:

- an implicit understanding of collective models of how the work gets done, gained through membership of work groups;
- being part of the pattern of 'heedful interactions' through which the work group coordinates its activities;
- being part of the social utilisation scheme for the technology which is used in the workplace.

As implied by the preceding discussion, these kinds of knowledge are useful when employees:

- work across boundaries, especially the interfaces between different trades and professions;
- adapt the service or production process to meet changed customer needs;
- move from one function to another in the workplace, in response to day-to-day crises or the introduction of a new product line.

They also help employees to cope with continual changes in the organisation of work, the assumption being that a learning organisation is engaged in a constant process of revising its procedures to meet the demands of competition or increased expectations from its clients.

Other research into work process knowledge suggests that in contexts such as engineering, it is constructed by individuals and groups through a dialectic between the kind of know-how that is learned on-the-job, and the kind of theoretical knowledge that is taught in vocational schools. This insight arose from a series of studies of work process knowledge carried out in the fields of motor vehicle maintenance (Fischer et al., 1995), production islands in German mechanical engineering companies (Fischer, 1995) and chemical laboratories (Fischer and Roeben, 1997). The research identified two crucial dimensions of the knowledge base for the engineering sector: knowledge of the technology used in the production process, and knowledge of the labour process in the organisation.

The technology-related component of work process knowledge was constructed in the workplace by a dialectic between theoretical knowledge of the concepts, laws and principles of mechanical, chemical and other relevant scientific processes, and the idiosyncrasies and unique features of the machines, material and equipment used. There are generally contradictions between the two; knowledge that is useful in the workplace is constructed by resolving these contradictions. The research suggested that this did not occur through routine activity, but by trying to solve problems such as why a standard procedure did not work in a new context. Similarly, the organisational component of work process knowledge was constructed by reconciling abstract knowledge of the labour process with the contingent facts of the lived-in workplace. Once again, there are often contradictions, which have to be resolved if the employee is to make sense out of the situation. This view suggests that work process knowledge is constructed in and through work, existing only in its use. Neither the codified knowledge recorded in textbooks, nor the habits acquired automatically on-the-job constitutes work process knowledge; but both are essential resources for generating it in the workplace.

12.3. Work process-structured curriculum development

12.3.1. Work process knowledge as a bridging concept

For *HGTB*, work process knowledge has become the main conceptual tool for curriculum development in vocational education and training. The account of work process knowledge provided above emphasises that vocational schools must work in close coordination with employers to provide an appropriate context for the desired fusion of the two ways of knowing. Bernard (1998) argues that the development of vocational curricula should not be separated from the development of new production methods. Rather, there should be a 'co-production' of new work methods and new curricula – a linking of the modernisation programmes of enterprises with the development of the curricula in their associated vocational schools.

One practical example of this is the car mechatronics project. Early in the 1990s, a survey of the European car servicing industry found that its productivity was much lower than in the US (lower by half), and varied greatly between European countries (by as much as a factor of three). These findings were attributed to differences in the division of labour in the respective workforces. In the US, automobile repairs are usually carried out by general all-purpose technicians. However, in Europe the work has traditionally been carried out by several different specialist employees, who are members of different trades (as many as 14 in authorised dealerships in Greece). Historically, there has also been a hierarchy of employees - with as many as three layers - in which the top grade of employee does the service diagnostics, a middle rank carries out specialist tasks such as engine tuning, and the lowest grade carries out routine service tasks.

The search for higher productivity in this sector involved reducing demarcations, and a corresponding change in vocational training. A European occupational profile for car mechatronics was produced, specifying a general-purpose car service technician whose role combined both the former electrical and mechanical trades. This occupational profile was obtained by a survey of the whole work process, taking into account new developments such as the increase in customer assertiveness and the introduction of new technology. The curriculum for car mechatronics is based on this framework, the fundamental aim being to ensure that trainees understand the whole work process. Pedagogical methods are designed to help students achieve a synthesis between conceptual knowledge, acquired from instructors and textbooks, and their actual experience from their employer's workshop. During the early stages of the training, they learn mechanics, chemistry, energy and data processing theory, but they also familiarise themselves with the overall organisation of the work within the company. This approach has two advantages. First, the trainees' understanding of the work process is generic - they do not come to view the particular example of their own employer as the only way

in which service work can be organised. This prepares them to cope with changes in the work organisation, or a move to a different employer. Second, it creates a context within which theoretical and practical ways of knowing can be integrated.

12.3.2. Theoretical implications

The theory of work process knowledge draws attention to the extent to which many existing strategies in vocational education and training - and indeed much research into vocational competence - is based on Taylorist assumptions. For example, it is still common to define work in terms of tasks, and work-related knowledge as the information needed for each task. Against this, Fischer and Stuber (1998) argue that work process knowledge must be a fundamental part of the vocational and technical training curriculum if it is to prepare students to adapt to more flexible ways of organising production. Based upon experience gained in a pilot project in schools for vocational training in trade and technology in Germany, they show how the transition from school to work can be managed by pre-vocational courses based on work-process knowledge.

Another significant impact on vocational education and training is the development of new techniques for identifying the theoretical component of vocational courses. A procedure for achieving this is described by Schafer and Bader (1998). It begins by defining an 'action field', which is defined as a complex of work activities. Each action field is then developed into learning fields, embodying statements of competences and summaries of the necessary theoretical content. It is important to note that:

- (a) action fields are descriptions of broad, multi-dimensional work roles in specific contexts;
- (b) learning fields (i.e. the content of the courses in vocational school) are subject to formative evaluation, including whether they capture business reality, provide generalisable learning, integrate the needs of employment with the development needs of the trainee, and provide a basis for future skills development;
- (c) learning fields replace traditional academic subjects as the basis for teaching and evaluating students, and integrate work experience with theoretical instruction.

A further and more radical development is to question the traditional structure of academic disciplines. In most vocational training, there is a tendency to accept the definition of mathematical and scientific knowledge in standard textbooks as fixed and immutable. But this is to overlook the fact that the traditional content of academic disciplines is a selection from a range of possibilities. Bernard (1998) points out that in the last few decades, new technological disciplines have developed which possess greater relevance to work than the more traditional formulations of scientific knowledge. He gives as an example the recently

developed discipline of production process structuring (*Fertigungsprozessgestaltung*). The object of this discipline is the development of laws and methods for the optimal structuring of production processes (Tempelhof and Bernard, 1985). This discipline uses a number of key concepts, such as labour sequence graphs, which model production processes involving component manufacture and assembly, and techniques for planning and organising alternative modes of production. The implication is that there are many different ways of theorising a phenomenon, such as mechanical failure, a good investment risk, or a patient's illness and its treatment. Some of these might be more relevant to practice than others - yet without necessarily being less valid as a scientific explanation of the phenomenon. On this assumption, the designers of vocational courses should carry out a wholesale review of traditional knowledge bases, seeking to identify, and where necessary formulate, new bodies of scientific knowledge with high relevance to practice.

12.4. Challenges for research

If vocational curricula are produced by coordinating the school-based development of learning fields with organisational development in the company, then there is a need for research on best practice in this complex and ambitious undertaking. Some discussion has already been devoted to what might be required to develop learning fields. However, there is also a need for research on how to make the work environment a more suitable learning environment for the construction of work process knowledge. Most workplaces were not designed to support learning on the job, but to get the job done. If we are to facilitate the construction of work process knowledge, we need to address the following problems.

12.4.1. Problems with experiencing the whole work process

Many workplaces provide limited opportunities for employees to learn about the whole work process. For example, in many organisations there is a strong division of labour which can fragment work experience and provide a constraint on the development of work process knowledge. Moreover, an over-emphasis on formal qualifications might result in employees with poor qualifications being restricted to work roles with limited potential for development. Experiments have been conducted on overcoming these problems by rotating workers between the different sub-groups, and using job-splitting techniques.

12.4.2. Problems with learning in a computerised work environment

A similar situation might be encountered with new technology, as this can make the work process difficult to observe. For example, computer controlled production processes often run in parallel, have a concealed logic and provide minimal

interfaces. Consequently, some researchers have perceived the need to make new technology more 'learner friendly', by making hidden work processes more observable.

12.4.3. Problems with providing mentoring in the workplace

Learning in the workplace depends critically on the mentoring provided by an industrial tutor, supervisor or co-worker. However, this role is the 'Cinderella' of industrial training; in many contexts, it is given low priority. Moreover, many instructors who acquired their skills on-the-job might not possess a full understanding of the work process.

The work process structuring of vocational curricula also creates problems of a theoretical kind. Learning organisations are not as universal a feature of competitive industry as might be supposed; many enterprises find a competitive advantage in Taylorism and Fordism. For example, the service sector has seen a growth in narrow, prescribed jobs (especially in the fast food industry and in call-centres). The introduction of new technology to financial services has displaced large numbers of professionally qualified employees by narrow customer-service workers who follow scripts stored in computer databases. Moreover, even in the manufacturing sector, the introduction of new technology does not necessarily entail corresponding changes in work content. Studies have shown that flexible production methods are not automatically accompanied by flexible jobs, as production functions may be integrated while jobs remain demarcated. Even flexibility has its contradictions. While some firms have achieved flexibility by multi-skilling and broadening work roles, many have taken the route of 'external flexibility' - out-sourcing work to specialist firms that employ narrowly trained staff. The relevance of work process knowledge for the latter would appear to be limited, both practically and theoretically.

The concept of work process knowledge is limited in other ways too. As earlier sections of this chapter make clear, it was developed to define the knowledge needed in the training of hotel employees, machinists and laboratory assistants. Developing work process knowledge helped them adjust to more flexible production processes, and more organic organisational structures. However, the question arises of how useful work process knowledge is for knowledge-based professions such as law, medicine, scientific research, architecture and professional engineering. For professions such as these, a work process structuring of the vocational curriculum might seem unduly impoverished. Nevertheless, problems of working across professional boundaries remain. It is possible that the most appropriate applications of the work process structuring of vocational curricula in professional fields do not occur at the stage of initial professional education, but in induction courses, re-training and continuing professional education. Research into the possibilities and limits of the concept of work process knowledge thus emerges as a field in which a great deal remains to be done.

Bibliography

- Bernard, F. Differentiating and integrating technological knowledge: towards a methodological solution. Paper presented at *HGTB Conference*, June 1998 (German language).
- Braverman, H. *Labour and monopoly capital*. New York: Monthly Review Press, 1974.
- European Communities Competitiveness Report*. Luxembourg: Office for Official Publications of the European Communities, 1997.
- Fischer, M. Technikverständnis von Facharbeitern im Spannungsfeld von beruflicher Bildung und Arbeitserfahrung. Untersucht anhand einer Erprobung rechnergestützter Arbeitsplanungs- und -steuerungssysteme (How skilled workers understand technical artifacts. The impact of vocational education and work experience). In *Schriftenreihe Berufliche Bildung - Wandel von Arbeit und Technik*. Bremen: Donat Verlag, 1995.
- Fischer, M.; Jungeblut, R; Rommermann, E. "Jede Maschine hat ihre Eigen Marotten!" *Instandhaltungsarbeit in der rechnergestutzten Produktion und Möglichkeiten technischer Unterstützung*. Bremen: Donat Verlag, 1995.
- Fischer, M; Röben, P. Arbeitsprozesswissen im chemischen Labor. In: *Arbeits-Zeitschrift für Arbeitsforschung, Arbeitsgestaltung und Arbeitspolitik*. Westdeutscher Verlag, 1997, pp. 247-266.
- Fischer, M; Stuber, F. Work process knowledge and the school to work transition. In: Scherer E. (ed.). *Shop floor control - a systems perspective*. Berlin: Springer Verlag, 1998, pp. 367-380.
- Jessup, G. *Outcomes: NVQs and the emerging model of education and training*. London: Falmer Press, 1991.
- Kruse, W. On the necessity of labour process knowledge. In Schweitzer J. (ed.). *Training for a human future*. Basle: Weinheim, 1986, pp. 188-193.
- Pahl, J-P; Rauner, F. (eds). *Betrifft: Berufsfeldwissenschaften*. Bremen: Donat Verlag, 1998.
- Patrick, J. et al. *Fault finding skills - an appraisal of training methods*. Sheffield: Manpower Services Commission, 1986.
- Schafer, B; Bader, R. Structuring professional labour processes into learning fields. Paper presented at *HGTB conference*, 1998 (German language).
- Tempelhof, K-H; Bernard, F. Methodological findings from the scientific discipline of production-process structuring and their influence on teaching methods. *Das Hochschulwesen*, 1985, No 33.
- Wood, S. (ed.). *The transformation of work?* London: Routledge, 1989.

CHAPTER 13

Learning in a social and systemic context - the learning organisation

Barry Nyhan and Michael Kelleher

13.1. Introduction

What is the relationship between learning as an individual and organisational exercise? In formal educational and training institutes, the focus tends to be primarily on developing the knowledge and competence of individuals as individuals. In this respect, therefore, key qualifications/competences are seen to be individual attributes even if they entail a capacity to relate to social contexts. However, as Hamel and Prahalad (1995), referring to workplace organisations, point out, organisations, too, have what they term 'core competences'. The 'core competences' of organisations, although based on the key competences of individual members of the organisation, are different from and greater than the sum total of the competences of these individuals. An organisation develops its 'core competences' through a collective (or organisational) learning process which promotes and capitalises on the knowledge, expertise and know-how of individuals - in other words through becoming a 'learning organisation'. This chapter explores some fundamental issues concerning the validity of the concept of the learning organisation, arguing for the necessity of this kind of learning, despite its complexity and difficulties with implementation. This form of learning is important so that workplaces can focus on developing their company-oriented 'core competences' for innovation and competitiveness while at the same time nourishing and sustaining the key qualifications of individuals from a broader lifelong learning perspective.

13.2. Contrasting views on the learning organisation concept

The concept of the learning organisation is often criticised as an idealistic model that is never realised. The view that modern capitalist companies can meet their competitiveness objectives while at the same time maintaining a genuinely developmental learning environment from the point of view of individuals' needs is contested. The argument goes that because widespread examples cannot be found

today - based on empirical evidence illustrating all of the dimensions of the theory - the conclusion is that the theory does not have validity. This view is based on a positivistic, empirical and objectivist view of reality.

A contrasting viewpoint proposes that unless we can build social systems in work organisations that support the development of individual human beings and the organisations they belong to, in the long term, society is going to lose out from an economic growth and social development perspective. It is acknowledged that it is extremely difficult to build organisations that can achieve a balance between competitiveness and social goals, and even when this balance is attained it is difficult to sustain it. All of the learning organisations that exist in a myriad of contextual forms are fragile, imperfect and partial and indeed constantly having to recreate themselves. In fact they do not exist in a static sense like a finished product at all but are constantly in a state of becoming, renewing or fading away. The different learning organisations are similar only in that they have a common overarching framework within which, and around which, working life contexts - both from internal organisational and external environmental organisational points of view - are understood.

Researchers and practitioners, belonging to a community believing in the validity of this view of learning organisations, are not necessarily put off by the fact that in certain economic conditions, such as the current one, from an empirical point of view the learning organisation notion is weak. This is in part because current economic conditions are heavily influenced by global instrumental and utilitarian pressures. The point at stake, which is central to the argument here, is to promote the values underlying this view of 'working-life' social systems, especially when these values are being challenged in the interests of short-term economic goals. Such a promotion need not be conducted uncritically. An uncritical perspective does no service to the learning organisation concept that deliberately sets out to grapple with the complexities of learning practice in the turbulent world of organisational and behavioural change.

13.2.1. Differing views on the purpose of research and knowledge development

Underlying the two perspectives put forward above are differing views on the nature of research, knowledge development and social and organisational innovation (for instance, see Cressey and Kelleher, 1999; Nyhan, 1997). On the one hand, there is the empirical or positivistic (detached), view of research - if something does not exist in a tangible and fully-fledged observable and identifiable manner it does not have reality ⁽¹⁰⁾. On the other hand, however, one has the openly declared

⁽¹⁰⁾ A similar critique of the concept of key qualifications has been made due to the tacit, personalised and contextual - and therefore nebulous - nature of these qualifications when compared with more easily observable and describable specific occupational ones.

value-laden and development/action-oriented (involved) view of research and development. According to this point of view, social and learning contexts have to be described by means of contextual interpretations, illuminations and indeed metaphors and analogies.

The task for researchers or researcher practitioners ('reflective practitioners') who are arguing from this viewpoint is to work towards depicting and building sustainable human systems, working together in a critical but supportive way with practitioners in 'developmental coalitions' (Ennals and Gustavsen, 1999). An ideal is sought after, even though it is realised that it will be achieved only in a limited way. This is seen to be the best way to progress in society on the basis that human beings are motivated by the pursuit of challenging goals. It is also realised that life is never static and, just as in sport, what might be a perfect illustration of excellence today can become a mediocre performance tomorrow. Heller (1997, p. xiv) writes that the plague of authors who select company paragons (or empirical evidence) to illustrate their argument is that great companies lose their edge. So we should learn from the best while they are good and move on, remembering that the best are never as good as they seem.

13.2.2. Learning takes place in challenging and supportive social settings

The first of two main points is that individuals learn and prosper in challenging and supportive social contexts, be they organisational or broader community settings. It is in sharing the riches of a community or organisation (and its accumulated values and know-how or its culture and tradition) that human beings learn and grow in a human and material sense. But, in turn, communities or organisations die unless they are constantly innovated and revitalised by their individual members developing new ways to shape their organisations (and their own lives within them) in 'communities of practice' (Wenger, 1998). Learning, which is the key to personal growth and prosperity, is, therefore, at once a two-way process involving the production of know-how, derived from a communal social living structure and from dynamic agents challenging, enhancing and modifying that structure (¹¹).

13.2.3. Learning at work addressing the complexity of economic and social goals in a systemic way

The second main point made here is that learning, both from a content and methodological point of view, must mirror the complexity with which people are faced in their lives in their efforts to attain human, social and economic goals. To respond to this complexity, learning must be understood and supported as a systemic and holistic activity dealing with the 'soft' human development side of

⁽¹¹⁾ See Giddens (1984) for an outline of his 'structuration theory', which attempts to resolve the dichotomy between 'structure' and 'action', seeing structure as being both input to and output of human actions.

learning and the 'hard' aspects dealing with economic competitiveness. The work place is not the only place for learning but the workplace offers an opportunity for people to strive towards learning to shape an institution to which they devote a lot of their energies.

People bring their whole personalities to work, as Wenger (1998) illustrated in his 'vignette' about what is going on in the 'claims processing' community of practice. Individuals were grappling in a cooperative way to make sense of their work, their personal career choices and the personal areas of their lives that are affected by their work or have an impact on it. Formal and informal happenings at work, therefore, provide arenas for different sorts of learning. Work organisations that support people to make sense of their work in the interest of the company and their own fulfilment can be called learning organisations. Work organisations that behave in such a way can become learning organisations for their members to become competent, responsible and fulfilled members of their current organisations. But, also in the interests of their personal career and lifelong learning goals, these people need to be capable of crossing the boundaries of these organisations and contribute to, and benefit from, other organisations and broader communities. This entails attempting to find a balance between the logic of productivity/competitiveness and the benefits for individuals in relation to their lifelong learning goals. We argue that this holistic logic of development offers the potential for the enhancement of human growth through learning that will make these organisations learning, and therefore civilising, humanising and, at the same time, efficient, places in which to work.

13.3. Exploring some concepts underpinning learning organisation theory

13.3.1. Learning organisations as complex human systems

One of the underpinning principles of the concept of the learning organisation is that of 'systems theory' which produced a body of research based on experiments focusing on the design of organisations taking into consideration the systemic interdependency between human/social and the technical aspects of an organisation. Many of these experiments took place in Norway, UK and the Netherlands during the 1950s and 1960s. Links can be made also with the work of Burns and Stalker (1961), who first postulated their typology of organic systems following lengthy studies of a large number of companies and their management styles in the UK during the 1950s. A quarter of a century later an empirical study of 110 factories in the US provided convincing evidence to support the importance of 'organic' organisations for effective research performance (Hull, 1988).

It was around the late 1980s that the term 'learning organisation' as such emerged in research literature. Hayes, Wheelwright and Clark (1988) in the United

States and Pedler, Boydell and Burgoyne (1988) in the UK developed their ideas influenced respectively by the organisational learning theories of Argyris and Schön, (1978; 1981) and the action learning theories of Revans (1982). Later on in 1990, building on and developing 'systems theory' thinking, Senge (1990) postulated that all significant learning for action is social and collective. A prerequisite for learning, therefore, is the development of 'a sense of connectedness, a sense of working together in a system and an understanding of how each part of the system is affected or being affected by other parts and where the whole is greater than the sum of the parts' (Senge 1997, p.129).

Pedler and his colleagues adopted the term 'learning company' rather than 'organisation', which they considered to be impersonal. They saw the word company as more in line with a collective approach to life (Pedler et al., 1991). Jones and Hendry (1994), however, see problems with the word 'company' with its associations with profit-making enterprises which have little relevance to public sector and non-profit making enterprises.

13.3.2. Double-loop learning

Argyris and Schön (1978) put forward the concepts of single and double-loop learning to describe learning at different levels in organisations. Single-loop learning refers to the tactics for achieving individual objectives. Accordingly, managers attempt to maximise winning and minimise the potential negative feelings of others to achieve objectives as perceived by them individually. The consequence of this approach is that managers design their working environment to maximise control over factors affecting their work and to protect themselves and their colleagues from criticism. This leads to defensive approaches to inter-personal and group relationships, limited freedom of choice and low risk-taking. This approach to learning is seen to have many limitations (Borger and Seaborne, 1982; Griffey and Kelleher, 1995). Double-loop learning, in contrast, emphasises free and informed choice and constant reflection on, and learning about, inter-group actions. Tasks are jointly controlled and there is a high freedom of choice and risk taking (see Schön, 1987, for illustrations of these models).

13.4. Meeting organisational and individual needs in a balanced and integrated way

One of the major criticisms of organisations as places of learning is that they tend to focus only on the narrow 'organisational' needs of the company to the detriment of individuals' needs. Job-specific learning that is relevant to the company's objectives is contrasted with general transferable learning, which is of benefit to individuals in a lifelong learning context. Many commentators, in particular from a formal educational perspective, argue that most of work-based learning can

contribute little to learning that is of benefit to the individual because of what they see as its narrow contextual specificity.

13.4.1. Maximising opportunities for context-based learning

The argument put forward by organisational learning protagonists, however, is that most serious learning is contextual and situated, related to a specific organisational or social reality. The capitalisation of this learning relies on its quality in relation to its breadth and depth and the competence level being developed. The quality of this learning is dependent on a number of factors but, in particular, on the values and initiatives of the members of the organisation involved. This includes the management's efforts to create 'spaces' for and support learning both in an individual and collective sense, so individuals can benefit (formally and informally) from the social situations in which they find themselves. One organisation can cultivate a dependency or what can be termed 'learned helplessness' through an over-controlling and inward-looking management policy regarding staff - a dependent learning culture. Another organisation, through adopting an open and outwardly connective approach, can promote the formation of confident individuals who can learn in this context and bring their learning with them to enrich their lives and the lives of others in different contexts.

13.4.2. Multiple stakeholders

The value of the organisational model underlying the well-known human resource theory of Beer et al. (1984 and 1985) is that it attempts to align the goals of a company's effectiveness with those of individual well-being and positive benefits for society. This theory points towards a way of meeting different (and what are often seen as opposing) needs in a balanced way. One of the key concepts underpinning the theory is that of multiple stakeholders. This means that all of those with a stake in the company have a right, based on a mutuality of purpose, to have their needs met, including employees, trade-unions, the community, government, as well shareholders and management. From an employee perspective this includes continuous learning from a lifelong learning perspective.

13.4.3. Designing challenging work tasks and supporting people to learn from them

From a learning organisation perspective, the challenge is to design and create learning environments that will get the balance right between all the complex long term and short term, economic and social, organisational (collective) and individual objectives. Stahl, Nyhan, and D'Aloja, (1993) put forward a model of the learning organisation in which organisational effectiveness and individual learning are seen as interdependent factors. According to this model organisational effectiveness provides an impetus for individual learning, while the latter in turn contributes to an increase in organisational effectiveness. The two key principles underpinning this

model are first designing a workplace in such a way that people have challenging tasks which stretch their potential, and second providing support structures and spaces which allow people to reflect on their experiences and capitalise on them for learning purposes. In this replication of the 'natural learning cycle' (Kolb, 1983), which is to be found in many organisations that may never give themselves the name of learning organisations, the work content becomes the learning content. The two become integrated. This is illustrated in a very vivid fashion in the 'learning bays' to be found in the centre of the shop-floor in many German companies, in particular in car manufacturing. Here work identical to the production areas is carried out, the main difference being, however, that learning support and a great deal of additional time for learning is built in (see the chapter by Dehnbostel in this book).

13.4.4. Promoting systemic change - at the level of values, structures and processes

In any assessment of the implementation of these strategies, it must be acknowledged that the adoption of radical transformative learning approaches is a complex process. One has to analyse deeply companies to see the extent of the changes achieved. In one intensive study of eleven European companies that claimed to have introduced radical learning organisation principles, it was found that a genuine transformative level of change, internally driven and built on radical new insights into the contribution employees can make to the company, was achieved by only five of the eleven companies examined (Docherty and Nyhan 1997; Nyhan, 1999).

It was found that the transformative change had to take place in a systemic way at all of the following three levels:

- (a) change in values and attitudes - internally generated;
- (b) change in structures and systems of working and learning;
- (c) change in work and learning processes and techniques.

Unless there were changes at all of these three levels in the organisation, substantial and lasting change did not take place. It was found to be essential that change takes place in a concerted and simultaneous manner in line with systemic change theory. In some of the companies studied it was interesting to note that the starting point for the change process was not at the level of values and attitudes - for some it was at the work and learning process level. However, they realised that in order to achieve real change they had to review their values and attitudes and revise their work and learning structures. They were learning to understand the inter-connectivity between the different steps and stages in the organisational change process.

The key driver for the change process was the change in values based on a shared vision among employees regarding where the company was going. This was internally generated through a collective and contextually oriented learning process,

drawing on the joint efforts of the members of the organisation. This also took time. In their efforts to bypass this fundamental step, some companies attempted to buy in externally generated work organisation systems (even sophisticated ones such as 'total quality assurance approaches') but without complete success. Other companies falsely assumed that through introducing radical work-based learning processes and techniques throughout the company that they would become learning organisations. It was also found in those cases that, without addressing the issues of values and structures, change remained at a superficial level.

Significant change along the above integrated lines depended on the following five elements:

- visionary leadership from the chief-executive;
- the development of a 'shared vision' adhered to by everyone in the company;
- risk-taking by management and employees (including trade unions);
- the development of a long-term strategic change and learning programme;
- a commitment to follow it through in all its time-consuming practical steps.

What is more, the study also showed how fragile human resource innovation can be. Opportunities to change can so easily be let pass by, and major gains made, often after the expenditure of enormous effort in terms of time and finances, can be lost overnight (Nyhan 1999, p.20). In a similar vein, Kotter (1995) points out, that based on US experiences, successful company transformation has to go through a series of phases that require a considerable length of time. Moving too quickly, or at a superficial level skimming over the different steps, only creates an illusion of progress. Similarly, making major mistakes in any of the phases can have a critical negative impact on the total change process.

The eight steps outlined by Kotter (1995) are as follows:

- establishing a sense of urgency;
- forming a powerful guiding coalition;
- creating a vision;
- communicating the vision;
- empowering others to act on the vision;
- planning for short-term gains;
- consolidating improvements and producing still more change;
- institutionalising new approaches.

13.4.5. Enhancing work-based learning in small and medium sized enterprises

Reduced levels of bureaucracy and easy opportunities for communications suggest that small and medium sized enterprises (SMEs) may well be fertile locations for learning organisation principles and practices. Their small size should allow these companies to share knowledge and learn together to build collective know-how. In reality, however, due to the pressures of competition and the emergence of short-term contractual arrangements, many SME employers can justify neither the

financial nor the time investment in training. Part of the problem, of course, is the lack of know-how on the part of employers of how to integrate learning with work. Most of them conceive of learning as formal teaching and have no real appreciation of the natural context-based learning processes in which people build and share knowledge, transforming knowledge from tacit to explicit. One of the solutions proposed to resolve this problem is the promotion of stronger cooperation between SMEs and innovative education and development institutions that have the capacity to introduce new learning approaches. This could be achieved through a kind of targeted consultancy process, enabling key people in the firm to integrate learning with daily work patterns without incurring large costs and losing too much time.

13.5. Conclusions

With care and planning, work organisations need not be places where people are simply preoccupied with either stressful or monotonous tasks which tax their energies without contributing to their development. Smart companies, operating in the context of farseeing and supportive societal frameworks, will attempt to ensure that, in the design and management of their companies, opportunities for learning are fostered. Reflective managers will support informal social systems, or what are called 'communities of practice', and create formal organisational infrastructures to promote learning. Efficiency and human satisfaction at work need not be polarised.

Nevertheless, it has to be acknowledged that we live in the age of company mergers where the power of shareholders is much stronger than that of the other stakeholders, in particular employees. Reasonably efficient and robust work-related social and learning systems are often cast aside in the interests of creating a bigger company. The pressure of globalisation compels companies to look at short-term utilitarian goals rather than long-term social ones (see Nyhan, forthcoming). All companies tend to get caught up in this and many of them lose the 'social capital' that they had acquired over a long period of time.

In line with the argument of Lundvall and Borrás (1997) the view is taken that in creating sustainable social and economic frameworks to respond to the challenge of globalisation it is not enough to focus merely on building isolated learning organisations, but that wide transformative social innovations are needed. Beyond the organisational dimension of systemic thinking, new forms of social innovation and wider communities of organisations operating in a collective and mutually enhancing set of inter-dependent relations are required. In placing the emphasis on building societal frameworks focusing on new forms of inter-organisational cooperation and alliances between enterprises and knowledge producers, Lundvall and Borrás (1997) talk about the need to build 'learning economies'. These go beyond the neo-liberal and neo-protectionist solutions and are able to enhance the learning capability of individuals, companies in regional or national contexts. This is

in line with the 'developmental coalition' concept put forward by Ennals and Gustavsen (1999, p. 42) in which a number of companies develop themselves in parallel, relying on the pedagogics of distributive and interactive learning, rather than modelling themselves on star examples of learning organisations.

Bibliography

- Argyris, C; Schön, D.A. *Organisational learning: a theory of action perspective*. Reading: Addison-Wesley, 1978.
- Beer, M. et al. *Managing human assets*. New York: Free Press, 1984.
- Beer, M. et al. *Human resource management*. New York: Free Press, 1985.
- Borger, R; Seaborne, A. *The psychology of learning*. Harmondsworth: Penguin, 1982.
- Burns, T; Stalker, G.M. *The management of innovation*. London: Tavistock Publications, 1961.
- Cressey, P; Kelleher, M. *Social partnership and human resource development*. Unpublished paper. Brussels: European Consortium for the Learning Organisation, 1999.
- Docherty, P; Nyhan, B. (eds). *Human competence and business development – emerging patterns in European companies*. London: Springer Verlag, 1997.
- Dreyfus, H; Dreyfus, S.E. *Mind over machine: the power of intuition and expertise in the era of the computer*. Oxford: Blackwell, 1986.
- Ellström, P-E. Integrating learning and work: problems and prospects. Paper presented at the *TSER forum network for European research in vocational education and training workshop: learning in learning organisations*, University of Evora, Portugal, November, 1999.
- Ennals, R; Gustavsen, B. *Work organisation and Europe as a development coalition*. Amsterdam: John Benjamins Publishing Company, 1999.
- Garratt, B. *The learning organisation*. London: Fontana, 1987.
- Giddens, A. *The constitution of society: outline of the theory of structuration*. Berkeley: University of California Press, 1984.
- Hamel, G; Prahalad C.K. *Competing for the future*. Harvard: Harvard Business School Press, 1995.
- Hayes, R.H; Wheelwright, S.C; Clarke K.B. *Dynamic manufacturing: creating the learning organisation*. New York: Free Press, 1988.
- Heller, R. *In search of European excellence*. London: Harper Collins Business, 1998.
- Hull, F. Inventions from R&D: organisational designs for efficient research performance. *Sociology*, 1988, Vol.22.
- Jones, A.M; Hendry, C. The learning organisation: adult learning and organisational transformation. *British Journal of Management*, 1994, Vol. 5.

- Kotter, J.P. Leading change: Why transformation efforts fail. *Harvard Business Review*, March-April 1995.
- Marquadt, M. *Building the learning organization*. New York: McGraw Hill, 1996.
- Nyhan B., Building learning organisations: putting theory to the test – lessons from European companies, *European Journal Vocational Training Journal*, 1996, No 16.
- Nyhan, B. Human resource development in Europe - at the crossroads. In Descy, P.; Tessaring, M. (eds). *Training in Europe. Second report on vocational training research in Europe 2000: background report. Volume I*. Luxembourg: Office for Official Publications of the European Communities, 2001 (Cedefop Reference Series).
- OECD. *OECD Employment outlook*. Paris: OECD publications, 1999.
- Pedler, M; Boydell, T; Burgoyne J. *Learning company project: a report on work undertaken October 1987 to April 1988*. Sheffield: Training Agency, 1988
- Revens, R.W. *The origins and growth of action learning*. Bromley: Chartwell Bratt, 1992.
- Schön, D.A. *Educating the reflective practitioner*. San Francisco: Josey-Bass, 1987
- Senge, P.M. *The fifth discipline: the art and practice of the learning organisation*. New York: Doubleday, 1990.
- Stahl, T; Nyhan, B; D'Aloja, P. *The learning organisation - a vision for human resource development*. Brussels: EUROTECNET, 1993.
- Wenger, E. *Communities of practice - learning, meaning and identity*. Cambridge: Cambridge University Press, 1998.

CHAPTER 14

The social shaping of work and technology as a guiding principle for vocational education and training

Gerald Heidegger and Graham Attwell

14.1. Introduction

The task of improving vocational education and training (VET) has, during the last decade, been taken on around the world (compare, for instance, Beynon and Mackay 1992, Layton 1992). There are different solutions to this problem, depending on specific cultural parameters, especially the degree of industrialisation. The question arises of how different countries may be able to learn from each other. The debates taking place in Germany, summarised here, increasingly take into account a closer connection between VET and human resources development (HRD).

As European countries come closer together the necessity of getting to know each other's educational systems becomes more urgent. This is particularly true the more the common labour market becomes a reality. Even if the effects of the single market are limited at the moment, however, there is another argument. There is the benefit to be gained from understanding the different processes of thought and action that are distinctly influenced by diverse educational systems. Only in this way will 'mutual learning' be possible, with the potential for shared improvements that do not run counter to respective cultural backgrounds. This has been clearly shown by the Leonardo projects 'Post-16-strategies' (Lasonen, Young, 1998) and 'Intequal' (Manning, 1997; Brown and Manning, 1998) and their successors 'Spes-Net' and 'Duoqual' (Kämäräinen, 1998). These projects aimed at improving parity of esteem of VET and general or academic education in upper secondary education. Two projects sought new overall strategies for post-16 education while the other two analysed the possibility of acquiring qualifications which transcend narrow abilities connected to restricted occupational tasks.

These aims also inspire the approach outlined below which was developed in the course of several research and development projects (Rauner et al., 1988, Heidegger et al., 1991, Heidegger et al., 1997). It begins with developments in the field of restructuring work organisation and production technology which have been

under way for more than ten years. Additionally, the approach takes into account shifts in the ‘collective mentalities’. From there on, it is possible to display the value of the ‘shaping approach’ for enriching vocational education. This encompasses, in particular, the ‘social shaping of work and technology’ as a main guideline. The theme is examined here from the particular perspective of combining general and vocational education (Young, 1988). This educational model could fit well into foreseeable changes of industrial work organisation as well as those of personal relations. By that, we hope to substantiate that the guideline of ‘social shaping of technology and work’ (Mackenzie and Wajcman, 1985) could provide, for various educational systems, an important tool for improving VET in different countries (e.g. Bates et al., 1984).

Here the connection between VET and HRD becomes especially important (Heidegger and Rauner, 1997). HRD encompasses not only the respective measures in enterprises, including the aim of creating ‘learning enterprises’, but initiatives to create ‘learning regions’, too. Indeed, there are consequences for the future structure of occupational profiles and the qualifications of VET professionals (Brown, 1997). Employing this ‘shaping approach’ it should be possible for vocational education to become one of the branches of ‘true education’, attained so far only in the academic branch. ‘True’ education is taken to mean enabling young people to develop their knowledge and competences on their own, in this way becoming self-reliant. Education should no longer be judged merely by possession of the knowledge of academic subjects (including technology), but also by know-how displayed in mastering every day tasks, whether at the work place, in the field of politics or in private life.

14.2. Earlier debates on ‘industrial culture’ and ‘social shaping’

Continuing developments in the structuring of work organisation and production technology, as well as ‘collective mentalities’ – combined in new outlooks for a different ‘industrial culture’ – could lead to the possibility of a new starting point for improving VET. As Brödner (1986) described some years ago, there are two possible paths of development for the future of industry (including services), given ‘an equal level of production technology’ - the technocentric and the anthropocentric path. According to this premise, new data and communication technologies permit a further centralisation of production planning, control and monitoring, characterised by increased Taylorisation of production and administration. Conversely, the second path involves decentralised networking of smaller, partially autonomous units within the enterprises, thus strengthening trends towards a reduction of hierarchy in production organisation. Admittedly, the main current direction is the technocentric path, which

seems to have new momentum from the strengthening of neoliberal thinking.

However, increasingly trends towards a human-oriented path are also becoming visible. In their book 'The End of the Division of Labour?' Kern and Schumann (1984) consider there were already clear indications that 'new production concepts' were beginning to assert themselves in the 'rationalisation' efforts in industrial production. For small-batch and individual job production, as well as for the task of making somewhat larger production runs, more flexible production intelligence and scope for competence and decision making are transferred back to the area of direct work. This frequently proves to be more efficient, even from a strictly economic point of view, at least with respect to the present and expected medium-term level of automation. As long ago as 1988, a 'Human-centred computer integrated manufacturing' project was carried out (under the management of Mike Cooley) within the European research and development program Esprit. For this project Rauner, Rasmussen and Corbett (1988) developed the concept of a socio-technical work system. It focuses on learning opportunities in production islands, and thus on gradually increasing the qualifications and decision-making scope of the workers, but of equal importance are the extended social contacts.

One can agree with Rosenbrock (1984) that we still live in a period where further development implies choices. As a result of data and communication technology within the framework of a 'third wave' of industrialisation, the modernisation of production is increasing by leaps and bounds today. Consequently, it is important to set our course in a direction we think is the most adequate for society as a whole to the human-centred path. It is anticipated that there will be a period where various approaches continue to exist alongside one another; that is, the two 'paths' mentioned continue to compete with (Rasmussen and Rauner, 1996).

This, however, implies that it is necessary to influence the future of work organisation and, by that, the future of the contents of concrete work tasks, too. This also means the possibility of influencing future qualifications needed at a specific work place, or rather the personal capabilities each worker can bring to dealing with their work tasks. The decisive aspect, as far as education is concerned, is that, given favourable circumstances, even the individual worker would be able to influence her or his work task, including the concomitant technology. But for that he or she needs to develop adequate abilities. This is what we mean by the new guiding principle for vocational education and training and, moreover, the potential for integration of vocational and general education: the ability to 'shape' one's own work and work organisation as well as certain features of production technology.

We deliberately use the somewhat uncommon term 'shaping' because it should transcend the activities of designing and planning (Medway, 1992). The term 'shaping' is meant to point not just to the 'mechanistic' aspects of a specific task that can be analysed by rational thinking. It should, with equal significance, also express the importance of work being an activity which contains human wishes, especially emotional ones. The latter, however, very often cannot be completely understood by

rational thinking. Here a more holistic view of working as a genuinely human activity is at stake (Layton, 1984).

In this way, when it comes to shaping the future, education becomes very important. 'Enriched' VET, comprising even more integrated general and vocational education, as well as continuing education might become especially effective where conscious shaping of future occupational work and production technology is at issue. As will be described below, and as Rauner and Martin (1988) have already emphasised in the 'Occupational profiles 2000' project, it is one-sided to assume a 'quasi-automatic' technology development, in particular with respect to the qualification requirements of the work force. Rejection of technological determinism prohibits the deriving of future qualifications from technology forecasts. Not only are such forecasts extremely uncertain, a spectrum of various forms of industrial work and work organisation appears possible for the future, particularly on the basis of social change. Rauner and Martin (1988) promote interaction as the basis for a description of the connection between production technology, industrial (or services) work and work organisation, as well as for education or qualifications. This seems an acceptable proposition.

The simplistic, though still most widespread, approach attempts to deduce the expected qualification requirements from future technology development. An extended analysis takes into account the various forms of new work organisation which could be compatible with new technological developments. However, consideration of this aspect alone still remains one-sided. The converse is also important. Existing qualifications, or those to be created, and even more so the services that can be offered by those described as having undergone 'real' education, have an effect on forms of work and work organisation. They thus influence the utilisation of technology, and they can even co-determine the direction of production technology development. They constitute an important factor when it comes to the path to be taken to the future of production and services during the period of choice. Viewing qualification development, or rather vocational education (and continuing education), as a conditionally independent variable is part of the shaping approach in a system aimed at enriching VET and integrating vocational and general education.

14.3. The 'shaping approach' as a means of developing a new curricular orientation

Looking back at developments and proposals for improving vocational education in Germany, the question arises of why these concepts failed for the most part to achieve the original goals? One reason seems to be that the foundations of the original concepts were deficient. The main point is that the idea of shaping one's own work, the work organisation and the concomitant technology was not

adequately represented. The socio-economic conditions at that time were different from those of today but important changes in the 'industrial culture' (Ruth and Rauner, 1991), already under way, were not sufficiently understood.

Sociological investigations were dominated by technocentric thinking which is currently intensifying again. The influential empirical study carried out by Kern and Schumann (1970) came to the conclusion of the 'polarisation thesis': that is, the technocentric rationalisation of industrial work would, more or less inevitably, lead to a polarisation of the qualifications needed. The need for less but more highly qualified occupations would be counterbalanced by an increasing number of unqualified jobs. While Kern and Schumann (1970) had found empirical confirmations of their theses, they had overlooked other equally important developments. These are to be found in changing social relationships which were discussed under the heading of change in values (Inglehart, 1977). These changes, however, are decisive prerequisites to the ability, as well as the desire, to influence or rather to 'shape' one's own working conditions and work content, including technological boundaries. This is increasingly important as counter-movements become stronger and stronger. In addition, the customary foundations of the concepts of integrating vocational and general education within education have their own problems. These problems gave rise to two kinds of new approaches to link general and vocational education within a vocational context.

14.3.1. Enhancing the scientific basis of vocational learning

The most influential writer on vocational learning in Germany was Blankertz (1985, originally 1963). His approach was rooted in the tradition of the specific German *Bildungstheorie* (educational theory) which is closely connected to the German school of philosophical idealism. Stressing the materialistic aspects of these arguments, Blankertz (1985, p. 121) inferred that 'the truth of general education' lies in 'special or vocational education'. However, coping with modern technology in production seemed to lead to a specific conclusion: to master new tasks on the job it was necessary to be able to deal with the scientific foundations of technology. In this way it becomes plausible to declare science (or technology) as the core of all education, even of vocational education. This doesn't seem to be true, however, if one looks at human action – especially that involving handling material things – as a fundamental human practice.

On the contrary, stressing science as the true core of education leads to underestimation of the importance of everyday tasks of human life. This seems to present another reason for the fact that people working in the vocational education system did not sufficiently accept this concept of integrating vocational and general education. Teachers at vocational schools, as well as the training personnel in companies, could not see their educational goals being adequately represented in this concept. This was especially true for the *Kollegschule* in North-Rhine-Westphalia (Minister of Education and the Arts in NW, 1972).

14.3.2. Enhancing the 'heuristics of action' as a means of enriching vocational learning

The main difference between the theoretical foundation presented here and the one mentioned above is that the latter model employs 'science' as the guiding principle for all students for at least some of their courses. That which one has to be able to accomplish at the work place is termed 'occupational pragmatics'. Accordingly, concrete occupational action is given a lower status compared to abstract thinking. The fact that many occupational tasks are still quite simple to perform is, however, an issue of explicit criticism. The reason for such a hierarchical division of labour is seen in the socio-economic foundations of current society. The whole pedagogical justification of this model is embedded in the framework of 'Critical theory' (Habermas, 1981). Although this view of society, even of the whole of human existence, is extremely important, there remains a significant question: how can education, guided by these critical principles, encourage the improvement of work, of its conditions, contents, the technological boundaries and social relationships at the workplace? There may be critical insight into the conditions that are to be improved, but what should be strengthened are orientations of how to act to improve things. In this way, the immediate interests and wishes of apprentices or future workers would be better acknowledged.

The new concept of enriching vocational education and training, as proposed here, should (and could) accomplish just this: to promote the ability of shaping one's own work as well as production technology. What is at issue here is improving vocational training by introducing 'generalising' elements in a specific way. 'Integrating' vocational and general education means bringing closer together both schemes – by altering them both. For that it is necessary to employ two guiding principles: besides 'science orientation', the second one should be (open) 'heuristics' for action. A new theoretical framework could emerge where the dialectical unity of two poles is fundamental (for the theoretical foundation of these ideas see Heidegger, 1987). According to Piaget (1976), these are in opposition to each other: acting, including handling things, on the one side; imagining, involving cognitive representations, on the other.

Heuristics for action means a flexible structure of problem solving methods where 'fuzzy' rather than strict logic applies. But even flexible heuristics cannot 'capture' the richness of the possibilities for acting, as presented by real life situations with their inherent fuzziness. What is required here is 'expertise' (Dreyfus and Dreyfus, 1986) that includes, in particular, intuition. Vocational 'propedeutics' implies taking into account the individual striving for 'know-how' which cannot be taught to any great extent (Dreyfus and Dreyfus, 1986) since it is gained from experience in many different situations. Heuristics can be an important aid (Schön, 1983). Additionally, and closely interconnected, a rational approach to the situation is of great help in many cases, taking the view that there is a problem to be solved and applying scientifically founded problem-solving methods. There remains, however, an

important remnant of the interwoven net of 'features' which cannot be divided into subproblems (Gardner, 1983). This cannot be tackled by heuristic methods because it represents the dialectical contradictories of the indissoluble interrelations of those features which, more than anything else, constitute the meaning of the whole 'picture' of the situation. Teaching can only provide opportunities to deal with complex situations so that the learners are given the chance to acquire their individual form of know how.

14.3.3. Conclusions from the two approaches

To perceive the dialectical interrelation of the two modes of action and thinking should enable one to construe a new concept of education: both, vocational (or technological) training and general education (in the customary sense) have to be transcended. Only then would it really be sensible to apply the term vocational 'education'. But in this case normal academically-oriented education (in the general school system) could rightly be called 'general education'; this also applies to theoretically-oriented technology and design education (Fensham, 1992). And only if both branches were transformed in such a manner would integrating them lead to a holistic concept of integration of vocational (especially technological) education and general education. As far as the science-oriented branch is concerned, the regulative idea of 'critique', as described above in the sense of 'critical theory', remains the most appropriate course to be chosen. It has to be confronted, however, with its dialectical opposite - the concept of 'shaping'. This contains the concept of 'technological design' but such a functionalist view has to be fundamentally transcended. What is at stake here is the transition to more holistic, less technical forms of dealing with the world, applying this not only to people but also to material things: this is the aim of social shaping of work and technology. In this way, 'shaping' encompasses aspects of creativity which are normally only credited to the fine arts. The proposed dialectical structure, representing the theoretical background for a new form of enriching vocational education and training, is guided by two interrelated regulative ideas: 'shaping' and 'critique'.

14.4. Social shaping and the perspective of an open future

An important counter-argument against the shaping approach challenges the supposition of the possibility of influencing production technology as well as the concomitant work organisation. Very often technical change, or technical innovations, are thought to be determined solely by the progress of knowledge within the technological and natural sciences. Such a technological determinism would signify that only the most effective path existed for the development of production technology, for technical progress, and it would also determine the path

to be taken to the future of work. Such a view is one-sided, as has been shown from historical studies (Kuby, 1980; Hellige, 1984; Noble, 1984). Technical development in the past has been characterised by situations where different directions could have been taken. The development of technology is also a social process (Bijker et al., 1990). In other words, technology is influenced by social conditions, both in its application and in its inner principles. As far as applications are concerned, this topic was discussed some time ago (Cooley, 1980). It seems apparent that the economic conditions of capitalism have influenced the specific way of applying technology in the production process but relating only to this would mean maintaining an economic determinism. There are, however, other societal influences that have tended to be consistently overlooked in recent discussions. According to the view of the authors cited above, that which can be considered to be a 'successful' technical solution – there is no 'right' one, though there are a lot of wrong ones – depends on cultural parameters; that means, it is also influenced by the form of human social life.

Hellige (1984) in particular introduced the concept of 'horizons of technological problem-solving' which vary during historical development. This means that the engineers themselves take into consideration only the restricted set of criteria which lies inside their horizon of thinking. This horizon, however, varies according to 'industrial culture' (Ruth and Rauner, 1991). If the shaping of technology aims at really new solutions it is necessary to overcome such boundaries. Here non-experts can show considerable imagination because they are less influenced by the 'normal' thinking of the community of engineers. Therefore, devising new technical 'outlooks' might well be possible in secondary education. At the very least, future skilled workers should be able to discuss certain aspects of technology with the engineers. The same should be true for the participation of persons as non-experts in general discussions regarding technological policies.

Speaking within the scope of a more theoretical orientation, the development of technology not only owes a debt to a 'material' logic, 'techno-logic', but at the same time to the opposite element of social 'development logic', forming a 'dialectical unit'. One cannot refer to social 'development logic' until one also assumes an 'inner logic' of development for social conditions. However, in the social field the unforeseen is a daily experience. According to Luhmann (1984), this can be attributed to a basic condition of human communication, 'double contingency'. In the case of communication between two people, this means that 'each of them knows that each of them knows that one can also act differently'.

The interaction of technology with chance results in a partially predetermined, partially unforeseeable progress that can be termed technical change. Accordingly, the interaction of social development logic with 'contingency' leads to social change. The latter takes place on a less spectacular, though no less profound scale than the former, especially since it is a question of interpretation whether one attaches greater weight to the persistent or to the changing aspects. This becomes plain

particularly for the goal of social shaping of work and technology. Rauner and Martin (1988) interpreted socially shaped technology as a unity of the elements of that which is technically feasible and that which is socially desirable, as a regulative principle at any rate. That which will be feasible is, even in the case of technology, not purely a question of forecasts because there is great uncertainty concerning change in this field. Therefore, scenario pictures of the future can mislead, as shown by some of the grotesquely exaggerated forecasts of the past generated by 'scientific futurology'.

What is desirable, however? The answer is the subject of controversy and will probably remain so. Is it, at the same time, that which is reasonable? And what is then the latter? An attempt will have to be made to obtain compromises between different wishes (Romanyshyn, 1989). This does not mean harmonious assent, but rather a restructured dissent which has to be discussed and disputed over; from there on the ability to act jointly should be possible. This perspective does not allow for objectively valid criteria for the task of shaping work and technology. Instead, teaching should aim at developing orientations for deciding on different alternatives, and to enable young people to develop their own orientations.

14.5. Social shaping as a bridge between vocational learning and working life

In order to render the theoretical considerations more concrete we shall outline some aspects of a specific shaping-oriented scenario (Heidegger et al., 1991) of integrating vocational and general education. This offers the potential of a new form of vocational education and training which stresses the importance of 'doing' in relation to 'thinking', thus bridging the customary gap to working life. It will be necessary to strive to shape the future in order to make such a scenario come true, requiring the shaping approach at the level of educational planning.

Certain measures are not only favourable but actually possible starting from the conditions prevailing today. There are activities that could be carried through tomorrow in general education and in vocational schools as well as in-company training. In fact, there already are such tendencies towards that direction in experimental models in Germany. This human-oriented scenario is in accordance with the traditions of the union movement but deviates from their accepted views of the future. However, similar ideas have for quite some time been a subject of discussion in the IG Metall union in Germany (Zwickel and Lang, 1987) where workers believe they could play an important role in fostering such a future model if they had the capacity to shape work and technology.

According to this scenario competence and intelligence should be transferred back to direct production or administration wherever it is possible. In this connection a compromise of interests between employers and employees can be worked out.

On the one hand, the employers may come to see that a creative employee at the plant is a decisive resource for production efficiency and that the employees as consumers also have an interest in efficient production and administration. On the other hand, this form of organisation complies, to a certain extent, with the demand for self-fulfilment and autonomy in gainful work, in line with the historic aim of the labour movement. And it is precisely towards this point that the line of compromise should continue to be shifted in the interest of employees. Since a non-futuristic technology scenario is assumed here - simple peripheral jobs are retained - the problem arises of offering the workers performing these jobs meaningful tasks. This is possible, within limits, because the concept of flexible work teams could be extended to all jobs – in contrast to the findings of Kern and Schumann (1984) and Manske (1997) for the restructuring of production.

Co-determination at the workplace should be taken for granted for these groups. This also encompasses participation in the shaping of technology in order to adapt the latter to the requirements of the teamwork. The wide variety of tasks performed by such work teams means that various people could acquire very different combinations of skills during their occupational life; this requires the setting up of a shaping-oriented continuing education model. The orientation of this scenario towards self-fulfilment in the domain of gainful employment, for as many people as possible, has great effects on vocational education.

Within the field of work-oriented skills, it is important to promote 'key areas of competence' (instead of merely 'key qualifications'). At the same time one cannot do without knowledge and skills in particular occupational situations. In contrast to the idealistic tradition, education in the sense proposed here not only refers to the training of skills related to science and technology. Additionally, it is equally important to create competence to act. Furthermore, it is not only important to acquire knowledge and skills but also to develop creativity and imagination; the latter aspects will become even more important, the more one takes the shaping of the future into one's own hands.

The field of social education should be given the same weight as the development of specific areas of competence. Education first of all means the development of the individual into an autonomous personality who can be independent from handed-down hierarchies. Individual autonomy is not conceivable without solidarity – although the latter, rooted in collectivity, partly represents the opposite of the former. By the same token solidarity is one of the goals of education. It requires the ability to communicate openly, in turn enabling compromises between the various interests involved, especially as a basis for joint shaping efforts. Experiments in certain companies have recognised the necessity of cooperation on the job; they aim at transforming this cooperative experience, both cognitively and emotionally, into communicative abilities by means of artistic exercises (Brater, 1984). Communicative ability must be supplemented by a readiness to be critical.

Continuing education will increase in importance but it must not be restricted to familiarising people with new duties. Independently acquiring new know-how (and 'know that') and applying it autonomously to new tasks is just as important: at issue is shaping-oriented continuing education. One could arrive at this by making use of 'quality circles', first developed in Japanese factories (Womack et al., 1990). However, in experiments in German car factories the domain of tasks assigned to those circles is widened. At issue now is the whole structuring of work, including the technical apparatus used. Quality circles transformed in such a context could be termed 'shaping circles'. They constitute a type of participatory organisational development, but one employing as much autonomy as possible for the workers concerned. Moreover, composing shaping circles means establishing shaping-oriented continuing education. The activities of those circles should be – and normally are – closely linked to concrete work tasks; these can be shaped in such a way as to constantly present explicit opportunities for further learning on the job.

14.6. Linking VET to HRD by means of the shaping approach

The previous reflections have highlighted the origins of the idea of 'social shaping' in both industrial and educational contexts. The following section develops the idea further as a principle for linking initial and continuing VET to HRD, indicating 'action contexts' that are symptomatic for putting the idea into practice.

14.6.1. Social shaping in school-based vocational learning

Social shaping can provide a pedagogical guideline for VET both in vocational schools and enterprises, the best opportunities being offered by a system of alternance between school-based and work-based learning. In vocational schools learning has to be connected to holistic tasks which make it necessary to solve problems in a group of learners. Tasks should be taken from the work experience the students have gained during their trainee periods in enterprises and subject matter should be studied as a means for solving the problem presented by the respective task. The tasks can be agreed on by the students with the teacher acting as a mediator. Her or his obligation consists in guiding the discussion, through sensible arguments, so that the emerging task gives the students the opportunity to learn the range of skills and knowledge necessary for their future occupation.

Experience from model experiments (Heidegger et al., 1997) shows that it turns out to be rather easy to construct such tasks based on the work experience of the students. Students should work in teams, either distributing different parts of the tasks among the groups or trying to solve a common problem simultaneously. This method is well known from project work in compulsory school but, to date, it has not

been employed very often in vocational schools. In any case the students should be asked to look for different solutions to the same problem. Here the shaping principle becomes most obvious. It is still customary to present to the students problems which allow for only one correct solution. This, however, is only adequate for abstract problems, most typically for mathematical problems. But it does not depict the realities of the world of work, especially if one takes into account different ways of work organisation or division of labour, respectively. When it comes, for instance, to constructing a workbench, answers are required for various questions. Should the workbench support group work/single working places arranged in a hexagon, allowing for face to face communication during work? What materials should be used? What should be the height of the table, in view of some workers being tall, others short? The above mentioned pilot scheme proved that the students are able to devise sensible solutions on their own.

14.6.2. Social shaping in in-company training

For VET in enterprises, the guideline of social shaping can be realised by means of integrative learning and work assignments (Höpfner, 1995). The principles are similar to what has been said about school-based vocational learning. The advantage in this case, however, consists in the fact that the assignments are related to real necessities in the enterprise, making the students conscious of being needed for the completion of an overarching task that gives them self-esteem. It is, however, of utmost importance that the working tasks are selected so that, at the same time, they provide as much opportunity for learning as possible. Indeed, in many cases the apprenticeship system has been devalued by the fact that often the working assignments meant nothing more than exploiting cheap labour.

In order to make the shaping principle most effective the work and learning assignments should also be designed in such a way that different solutions can be considered. When it comes to realising the tasks it will turn out, as a rule, that only the 'normal' solution will be accepted. This is even more the case when work-related learning is brought back to an authentic work context (see the chapter Dehnbostel in this book), as long as customary hierarchical work organisation prevails, and the trainees or apprentices are still more or less novices and not experts. This was also an outcome of the pilot scheme mentioned. Therefore an alternance between VET in authentic work contexts, training workshops and vocational schools is indispensable to allow the shaping principle to guide the whole VET process.

Limitations to work-based learning can be alleviated when social shaping becomes an element of organisational learning in the context of technological and organisational change. Indeed, this is the field where a close connection between initial VET, continuing training and HRD is most obviously of great value, for the workers or trainees concerned as well as for the enterprises. Unfortunately, there is little documentation on such developments in actual practice. Recent developments (Laske, 1995; Manske, 1997) point to the possibility that technocentric solutions are

again gaining ground. This would mean that the advantages of self-reliant workers improving their work through shaping circles are still not made use of sufficiently by the companies. But empirical evidence at least shows that the importance of combining continuing vocational training (CVT) and HRD is acknowledged (Odenthal and Nijhof, 1996).

14.6.3. Implications of the principle of social shaping for occupational or professional profiles

Economic, technological and organisational change has for a long time, forced many people to change occupation. Some argue that this process is accelerating, due to globalisation, although the rate of growth in societal productivity is, compared to former periods of rapid growth, still below average. In any case the qualifications required for new jobs have been growing. To change occupation nowadays often requires extensive retraining. This is where the idea of key qualifications, as proposed by Mertens (1974), has its roots. Although Mertens considered mainly the adaptation of the workforce to changing conditions he, too, had in mind the question of how to strengthen the self-reliance of the workers in this process of what is now called lifelong learning. Here the principle of social shaping of work, organisation and VET and continuing training can provide a useful orientation. Key qualifications have not only to endow people with the abilities to adapt to new circumstances, but to enable them to influence their career pathways. It seems to be adequate to define 'shaping ability' to be the core of the whole field of knowledge and skills which is denoted by the term key qualifications.

It seems possible to prepare workers for several changes of occupation during their working life through VET aiming at as broad occupational profiles as possible. In Germany, a proposal (Heidegger and Rauner, 1997) to transform the existing system of nearly 400 occupational profiles (*Berufe*) provided through the 'dual system' (apprenticeship in enterprises combined with vocational school) has met some interest as shown by corresponding model experiments. The idea is to reduce the number of profiles to about 100 'occupational core profiles'. The graduates of these new apprenticeships should be able, relying on their shaping abilities, to 'shape' their career pathways ('biographical competence') while, at the same time, being in a position to meet new requirements on the labour market.

14.6.4. The role of sectoral and regional networking in promoting social shaping

In order to further 'social shaping' as a guiding principle for changing work, organisation, VET and HRD, interplay between all the actors in the field is necessary. In particular, sectoral and regional networking turns out to be an indispensable precondition and tool for promoting social shaping. 'Regional VET dialogue' (see Deitmer and Gerds in this book) can contribute to interplay between initial and continuing VET and HRD so that a bridge is provided between the

interests of the employees and those of the employers. Sectoral collaboration is necessary in order to narrow the gap between VET and HRD policies of different enterprises in the same sector. At the same time, a field of experimentation is provided by regional ‘training and development partnerships’ that involve VET providers of different kinds. In such contexts the role of VET providers is to render support for learning and experimenting that is related to reshaping work processes towards more synergetic networks. This has been demonstrated by a pilot scheme in the German State of Lower Saxony.

14.7. Conclusions

The guiding principle of ‘social shaping’ has been derived from earlier debates on ‘industrial culture’ and genuine aims of education in the context of post-16 strategies for vocational education and training. It has been shown that a new curricular approach can be developed aimed at bridging the gap between vocational learning and working life. It has been demonstrated how VET and HRD can be linked in this way. In particular, on the basis of the previous exploration on ‘action contexts’, it is possible to draw the following conclusions:

- (a) the idea of ‘social shaping’ is a genuine bridging principle that links the educational potential of work-related learning both within school-based settings and workplace-based contexts;
- (b) the principle has been implemented in school-based contexts that have had an appropriate didactic openness for social shaping and in workplace contexts that have had a readiness for shaping-oriented partnership arrangements;
- (c) a broader dissemination of the idea (in particular in work organisations) requires a new kind of commitment to link formal training provisions and non-formal organisational learning with development measures in organisational contexts;
- (d) this can be strongly supported by embedding VET provisions and HRD in sectoral and regional innovation networks.

In this context, it is important to realise that VET professionals play a key role in educating and training the workforce of the future, passing on their own skills, cultivating innovation and developing implicit work-based knowledge. The constant complaint heard from employers in every country in Europe is that teachers and trainers are out of touch and do not understand the use of modern technology. Although short updating courses, periods of work practice and lifelong learning for VET professionals can help alleviate this problem, it will still remain if vocational education and training remains reactive to technology. It is only by changing the aim of VET itself that such a position can be overcome. If skilled workers are to play a role in shaping technology then they will have to have new skills and competences. VET professionals should play a major role in fostering those skills

and competences within the future work force. They should also play a critical role in guiding and facilitating the workplace processes needed for shaping to become a reality. This in turn implies new forms of education for those VET professionals.

These conclusions emphasise the role of VET professionals as 'change agents' and as bridging actors. In this respect it is worthwhile to draw attention to the heritage of the Europrof project that from 1995-1998 examined the theme 'Training of new VET professionals' (Brown, 1997; Attwell, 1997). The Europrof concept for developing an integrative competence-base for VET professionals put an emphasis on:

- (a) integration of domain-specific expertise and pedagogic expertise into an integrative framework for pedagogics of VET;
- (b) integration of didactic shaping of learning environments and contextual shaping of working and learning contexts with expertise on HRD;
- (c) integration of practical competence development in domain-specific pedagogy of VET and development of a research culture in pedagogics of VET.

Currently, the heritage of Europrof is being capitalised upon by several follow-up activities that are exploring the institutional options and practicalities for promoting the core ideas. At the same time the issue of supporting 'VET professionals' has been chosen as a key issue for the future activities of Cedefop in order to promote knowledge development and knowledge sharing in the field of VET research. In particular, these activities include the development of new tools and instruments for knowledge sharing among dispersed communities of practice. In this context, dissemination of knowledge on appropriate practice in 'social shaping' becomes a vehicle for building such communities and for shaping new knowledge sharing environments.

Bibliography

- Attwell, G. Towards a community of practice for vocational education and training professionals. In Brown, A. (ed.). *Promoting vocational education and training: European perspectives*. Tampere: University of Tampere Press, pp. 3-11, 1997.
- Bates, I. et al. (eds). *Schooling for the Dole? The new vocationalism*. London: Macmillan, 1984.
- Beynon, J; Mackay, H. (eds). *Technological literacy and the curriculum*. London/New York/Philadelphia: The Falmer Press, 1992.
- Bijker, W.E; Hughes, T.P; Pinch, T.J. (eds). *The social construction of technological systems. New directions in the sociology and history of technology*. Cambridge (Mass.): The MIT Press, 1990.
- Blankertz, H. *Berufsbildung und Utilitarismus. Problemgeschichtliche Untersuchungen*. Weinheim/München: Juventa, 1985.

- Brater, M. Künstlerische Überungen in der Berufsausbildung. In: *Projektgruppe Handlungslernen: Handlungslernen in der beruflichen Bildung*, Jungarbeiterinitiative, Wetzlar, 1984, pp. 62-86.
- Brödner, P. *Fabrik 2000. Alternative Entwicklungspfade in die Zukunft der Fabrik*. Berlin: Sigma, 1986.
- Brown, A. (ed.). *Promoting vocational education and training: European perspectives*. Tampere: University of Tampere Press, 1997.
- Brown, A; Manning, S. (eds). *Qualifications for employment and higher education: a collaborative investigation across Europe*. Tampere: University of Tampere Press, 1998.
- Cooley, M. Architect or Bee. The human/technology relationship. Slough: Langley Technical Services, 1980.
- Cooley, M., Creativity, skill and human-centred systems. In Göranson, B; Josefsen, I. (eds). *Knowledge, skill and artificial intelligence*. Berlin/Heidelberg/New York, 1988, pp. 127-137.
- Dreyfus, H.L; Dreyfus, S.E. *Mind over machine*. New York: The Free Press, 1986.
- Fensham, P.J. Science and technology curriculum. In Jackson, F.W. (ed.). *Handbook of research on curriculum*. New York: Macmillan, 1992, pp. 789-829.
- Gardner, H. *Frames of mind: the theory of multiple intelligences*. London: Heinemann, 1983.
- Gorz, A. *Wege ins Paradies*. Berlin: Rotbuch, 1983.
- Habermas, J. *Theorie des kommunikativen Handelns*, Vol. 1: Handlungsrationalität und gesellschaftliche Rationalisierung, Vol. 2: Zur Kritik der funktionalistischen Vernunft. Frankfurt: Suhrkamp, 1981.
- Heidegger, G. *Dialektik und Bildung; Widersprüchliche Strukturierungen in Kognition und Emotion*. Weinheim: Juventa, 1987.
- Heidegger, G; Adolph, G; Laske, G., *Gestaltungsorientierte Innovation in der Berufsschule. Begründungen und Erfahrungen*. Bremen: Donat, 1997.
- Heidegger, G. et al. *Berufsbilder 2000, Soziale Gestaltung von Arbeit, Technik und Bildung*. Opladen: Westdeutscher Verlag, 1991
- Heidegger, G; Rauner, F. *Reformbedarf in der beruflichen Bildung, Gutachten im Auftrag des Landes Nordrhein-Westfalen*. Düsseldorf: M WTV, 1997.
- Hellige, H.D. Die gesellschaftlichen und historischen Grundlagen der Technikgestaltung als Gegenstand der Ingenieurausbildung. In Troitzsch, U. König W. (eds). *Lernen aus der Technikgeschichte*. Düsseldorf: VDI, 1984.
- Höpfner, H.D. *Integrierende Lern- und Arbeitsaufgaben für ein handlungs/gestaltungsorientiertes Lernen im integrierten Bildungsgang*, Berlin: IFA, 1995.
- Inglehart, R. *The silent revolution. Changing values and political styles among western publics*. Princeton: Princeton University Press, 1977.
- Kämäräinen, P. Mit welcher Art von Kooperation können europäische 'Laboratorien' zur Lehrplanentwicklung im Bereich der Schlüsselqualifikationen beitragen? In

- Europäische Berufsbildungskonferenz, Grundlagendokumente.* Wien, BMUK, 1998, 21-32.
- Kern, H; Schumann, M. *Industriearbeit und Arbeiterbewußtsein. Eine empirische Untersuchung über den Einfluß der aktuellen technischen Entwicklung auf die industrielle Arbeit und das Arbeiterbewußtsein*, Part I and II. Frankfurt/M: Suhrkamp, 1974.
- Kern, H.; Schumann, M. *Das Ende der Arbeitsteilung? Rationalisierung in der industriellen Produktion: Bestandsaufnahme, Trendbestimmungen.* München: C.H. Beck, 1984.
- Kuby, Th. *Vom Handwerksinstrument zum Maschinensystem. Nachforschungen über die Formierung der Produktivkräfte.* Ein Beitrag zur Techniklehre. Technische Universität Berlin. Berlin: Techniklehre. Technische Universität Berlin, 1980.
- Laske, G. *Eine Musterbranche stürzt ab Werkzeugmaschinenbau in den USA und in Deutschland.* Bremen: Donat, 1995.
- Lasonen, J; Young, M. (eds). *Strategies for achieving parity of esteem in European upper secondary education.* Jyväskylä: Institute for Educational Research, University of Jyväskylä, 1998.
- Layton, D. (ed.). *The alternative road: the rehabilitation of the practical.* Leeds: University of Leeds Centre for the Study of Science and Mathematics Education, 1984.
- Layton, D. Reconceptualising science education for tomorrow. *Journal of the Third World, Science, Technology and Development Forum*, 1992, No 10.
- Luhmann, N. *Soziale Systeme. Grundriß einer allgemeinen Theorie.* Frankfurt/M: Suhrkamp, 1984.
- Mackenzie, D; Wajzman, J. *The social shaping of technology: how the refrigerator got its hum.* Philadelphia: Open University Press, 1985.
- Manning, S. (ed.). *Qualifications with a dual orientation towards employment and higher education.* Berlin: WIFO, 1997.
- Manske, F. Der Einfluß von Facharbeitern auf Technik und Organisation - zur Machtposition von Facharbeit in der deutschen Industrie. In Laske, G. (ed.). *Lernen und Innovation in Industriekulturen*, ITB-Workshopbeiträge. Bremen: ITB, 1997.
- Medway, P. Constructions of technology: reflections on a new subject. In Beynon J; Mackay H. (eds). *Technological literacy and the curriculum.* London/New York/Philadelphia: The Falmer Press, 1992, pp. 65-83.
- Mertens, D. Schlüsselqualifikationen, Thesen zur Schulung für eine moderne Gesellschaft. *Mitteilungen aus der Arbeitsmarkt- und Berufsforschung*, 1974, Vol. 7, No 1.
- Minister of Education and the Arts in NW. *Kollegstufe NW, Strukturförderung im Bildungswesen des Landes Nordrhein-Westfalen*, Heft 17 A. Ratingen/Düsseldorf, Henn, 1972

- Noble, D.F. *Forces of production - a social history of industrial automation*. New York: Knopf, 1984.
- Odenthal, L; Nijhof. W.J. *HRD roles in Germany*. De Lier: Academisch Boeken Centrum (Studies in Human Resource Development), 1996.
- Piaget, J. *Die Äquilibration der kognitiven Strukturen*. Stuttgart: Klett-Cotta, 1976.
- Rasmussen, L; Rauner, F. (eds). *Industrial cultures and production: understanding competitiveness*. London: Springer, 1996.
- Rauner, F. *Elektrotechnik Grundbildung, Überlegungen zur Techniklehre im Schwerpunkt Elektrotechnik der Kollegschole*. Soest: Soester Verlagskontor, 1986.
- Rauner, F; Martin, W. Berufe 2000. Ein Projekt zur Zukunft der Berufsbildung. In Heidegger, G; Gerds, P; Weisenbach K. (eds). *Gestaltung von Arbeit und Technik - Ein Ziel beruflicher Bildung*. Frankfurt: Campus, 1988, pp. 227-261.
- Rauner, F; Rasmussen, L; Corbett, J.M. The social shaping of technology and work: human centred CIM systems. *Artificial Intelligence and Society*, 1988, Vol. 2, No 1.
- Romanyshyn, R.D. *Technology as symptom and dream*. London: Routledge, 1989.
- Rosenbrock, H.H. Zur Neuausrichtung der Technologie. In IG Metall (ed.). *Technikentwicklung: Gestaltung ist machbar*, 9. Frankfurt/M: Arbeitsheft der IG Metall zur Humanisierung des Arbeitslebens, IG Metall. 1984.
- Ruth, K; Rauner. F. *Prospects of anthropocentric production systems and industrial-cultural variability*, FAST-Study. Brüssel: Commission of the European Communities, 1991.
- Schön, D. *The reflective practitioner: how professionals think in action*. New York: Basic Books, 1983.
- Womack, H.P; Jones, J.D; Roos, D. *The machine that changed the world*. New York: Macmillan, 1990.
- Young, M. *Beyond vocationalism: a new perspective on the relationship between work and education*. London: Centre for Vocational Studies, University of London, Institute of Education, 1988.
- Zwickel, K; Lang, K. Gewerkschaften 2000. *WSI-Mitteilungen*, 1987, Vol. 40, No 8.

CHAPTER 15

Promoting learning in and for organisational contexts - the development of key qualifications/ key competences

Barry Nyhan

15.1. Introduction

15.1.1. Context

People live and work in multi-community and multi-organisational contexts. They are constantly crossing the boundaries between these contexts and today have more temporary or transient memberships of organisations (e.g. through temporary work contracts) than in the past. They have to be able to contribute to, and learn in and from, the organisations and communities they join. They have to understand the contexts and manage themselves in relation to these contexts. People need to learn how to deliberate, to make judgements, to make decisions, to be assertive or listen (to be angry or to hold back). They need to learn how to act responsibly and appropriately. They have to take responsibility for their own development in a lifelong learning context. This requires a range of personal, professional and technical competences, which are mainly learnt in the act of responding to contextual circumstances and demands in specific life situations.

15.1.2. Key qualifications - broad based and deep-level competences

The human attributes that underlie people's ability to act in this way have been termed 'key qualifications' or 'key competences' ⁽¹²⁾. These entail broad based and deep level competences such as the abilities: 'to handle new situations'; 'to take initiatives'; 'to analyse and solve problems'; 'to learn in formal and informal situations'; 'to work in a team or social setting'. The concept of 'key qualifications'

⁽¹²⁾ Even though there are different culturally based theories and understanding underlying the use of the terms 'key qualifications' or 'key competences' (or 'core competences'), as treated here in an organisational context, they are taken to refer essentially to the same reality. Thus 'qualification' has a much broader meaning than that of a formal diploma or certificate. The term 'competences' is preferred to 'competencies' to indicate a deep level of competence necessary to master a broad and complex 'action-field' as distinct from a series of narrowly defined 'competencies'.

or 'key competences' is often taken to refer only to personal or social competences. However, the notion of key qualifications put forward in Part 1 of this publication should be understood as a series of interlinked and interdependent human competences, which in coming together in a balanced way, give a person 'a capacity for undertaking complex actions'. 'Key qualifications', therefore, refer to the possession of a 'self-organising' or 'self-steering capacity' to deal with the different but interdependent aspects of a human action, comprising integrated cognitive, social, business and technological dimensions.

The people who possess these 'key qualifications' have the ability to 'manage themselves' in relation to situations involving economic and social change in personal or workplace contexts. (In this sense the notion of 'key qualifications' is very close to the concept of 'employability' and can be seen to underlie the capacity for lifelong learning. As a follow on from this, the 'key qualifications concept' as put forward in Part 1 should be seen as an overarching framework for thinking about the nature of the competences required by people today and about the prerequisite contextual learning settings within which these competences are learnt and developed.)

The 'practical knowledge' underlying key qualifications or key competences can be defined as: 'an understanding of the situations in which one finds oneself and dealing effectively with their interdependent, business, social and technological elements'. (This could be linked to a saying of Einstein 'Man must not so much understand the world, as find his way in it'.) The requirement for 'key qualifications' is not just for young people. Every stage in a person's life brings its own unique challenges and the need to respond to situations appropriately through making sound judgements and acting accordingly.

15.1.3. Contextual nature of learning

A central point in relation to way in which people learn 'key qualifications' is that by virtue of their contextual and practical nature, they can only be learnt in social 'practice' or 'live' organisational settings (just like when an individual is learning to swim). They cannot be learnt in 'formal teaching settings' in the way, for example, that theoretical knowledge and formal or procedural skills can be learnt. Learning 'key qualifications' presupposes a social or organisational learning setting in which people are given the space and supported to develop and use these competences. Organisational contexts which support learning for the development of key qualifications or competences can be referred to as learning organisations or learning-oriented organisations. In learning organisations, working and learning are integrated.

15.1.4. The focus of this chapter

Below this chapter discusses the nature of key qualifications/competences in more detail before going on to examine the organisational learning environment

necessary to develop these competences. This chapter draws heavily on the results of a European research project, dealing with manufacturing and process companies, which examined how competences were developed in and for organisational contexts. (See Docherty and Nyhan, 1997 for the complete study; Nyhan, 2000 for an extended summary; and Nyhan, 1999 for an abbreviated summary).

15.2. The nature of key qualifications/key competences

15.2.1. Capacity to relate to the 'total picture' and carry out a complete complex task

An outstanding feature of the 'key qualifications/competences' required by workers in modern companies is the capacity to understand and handle social/organisational and technological complexity. This kind of worker is able to relate the specific tasks in which he/she is engaged, at any moment in time, to the tasks being carried out by other members of the organisation, in a way that takes account of the 'total picture'. This person therefore needs to have a helicopter view of the organisation and have a mental model of how the different parts of the system interrelate.

This is closely related to the notion of '*Handlungskompetenz*', which refers to the 'action-competence' necessary to be able to carry out a complete complex task or a related series of tasks. This entails the ability to conceptualise, plan and execute all aspects of a complex piece of work (comprising a 'complete job' or 'long cycle work') in an autonomous manner making links between one's role and actions with the tasks to be performed by others.

This can be exemplified in the case of a French company, Aluminium Dunkerque. This was one of the companies examined in the study of Docherty and Nyhan (1997) referred to previously. Here worker development was conceived in terms of progressively moving along different levels of complexity within 'a field of related jobs', instead of learning compartmentalised jobs related to discrete functions. One begins by carrying out normal operations regarding different stages of the work process from start to finish, while gradually improving the depth of one's theoretical and practical knowledge, thus learning to handle variance and thereby attaining complete mastery of a range of complex tasks.

15.2.2. 'Managing oneself in role'

The concept of 'managing oneself in role', developed by Reed (1985), is useful in understanding the key competences demanded of modern workers. Reed points out that social scientists normally use the term 'role' as a way of describing a person's expected behaviour. He refers to this as one's 'sociological' role - the role assigned to someone by means of a job description, job title, etc. This is the objective dimension of role. The counterpart to this - the subjective aspect of role,

'how I behave in practice', is determined by a person's own judgement in a particular situation. This is one's 'psychological role', which has to be 'managed' by means of an individual's internal control system. As circumstances are constantly changing, a role in this sense is never static. An analogy can be drawn with a yachtsman, who in order to follow a definite course, has to constantly adjust the steering to take advantage of the prevailing winds.

15.2.3. Personal effectiveness

Another term used to describe the holistic competence profile of the modern worker is 'personal effectiveness'. People who are personally effective in their working lives have the ability to organise themselves to respond to any task they are called upon to do. They bring all their skills and resources together and apply them to meet a specific situation. Personal effectiveness relates to 'attitude' - the internal driving force in a person. Two main characteristics, 'a sense of initiative' and 'a sense of responsibility', mark an action by someone who is personally effective. Initiative refers to a person being enterprising or a 'self-starter'. Pure initiative on its own, however, is not enough. It has to be balanced by responsibility. This means a person is not just 'doing his/her own thing', but is making the right choice, implementing appropriate actions and taking other people into account. Initiative enables a person to act as an individual, while responsibility relates him/her to others, to the group and the organisation (AnCO, 1984). Drucker (1992) foresees a swing towards regarding responsibility and not power as the most important variable within modern organisations.

15.2.4. Integration of formal and practical knowledge

The holistic nature of key competences entails an integration of formal and practical knowledge in responding to specific contexts. The attributes and characteristics of formal and practical knowledge are as follows.

Formal knowledge:

- theoretical knowledge;
- understanding of general principles;
- understanding of technological principles and processes;
- objective analysis;
- logical thinking;
- abstract thinking.

Practical knowledge:

- making a judgement about the situation in hand;
- dealing with the situation;
- knowing how to take up one's role;
- understanding the social context;
- making technical decisions;
- knowing in doing;

- knowledge-based on intuition;
- knowledge-based on experience.

This form of knowledge in practice or knowledge in use is described by Eraut (1997), as being 'personal' as distinct from 'propositional' knowledge. According to Eraut, propositional knowledge is codified knowledge that is given foundational status by incorporation into publicly recognised diplomas. Personal knowledge on the other hand 'is constructed from personal experience and reflection. It includes propositional knowledge along with procedural and process knowledge, tacit knowledge, and experiential knowledge in episodic memory. This allows for representations of competence, capability or experience in which the use of skills and propositional knowledge are closely integrated.' (Eraut, 1997, p.552).

This distinguishes an experienced worker, an expert with personal knowledge, from the new worker, a novice possessing, in the main, propositional knowledge (Dreyfus and Dreyfus, 1986). The above division of knowledge is similar to the one outlined by Göranson and Josefson (1988). According to them, professional knowledge is divided into the three categories of propositional knowledge (similar to formal knowledge), practical knowledge and knowledge of familiarity. The last of these is knowledge gained from examining the experience of others.

15.3. Integration of different competences

In line with the integrative frameworks within which workers' roles and responsibilities have just been formulated, the competence profiles of the workers studied by Docherty and Nyhan (1997) can be understood along four interdependent and interconnected axes. Overall competence can be presented as an amalgam of four different kinds of competences present to varying degrees - cognitive, technological, business and social. Each competence dimension must be seen in the context of the other three dimensions.

The competence profiles and organisational-learning environments of the five companies examined in the above-mentioned study are briefly reviewed below. The companies are:

- (a) Bord na Mona - a semi-state owned peat production company in Ireland;
- (b) Aluminium Dunkerque - a French aluminium plant;
- (c) Autoplastique - a pseudonym for a French company manufacturing plastic components for the automobile industry;
- (d) Audi/VW - a German car manufacturing company;
- (e) Cadbury - a British chocolate factory.

15.3.1. **Business – social – cognitive competences**

Bord na Mona laid special emphasis on business and social competences. For Bord na Mona this meant, in particular, financial management skills because an ‘understanding of basic finance was seen as central for the success of the team’. Broad business management skills, such as cost management, forecasting, planning and risk taking, were also seen as essential.

15.3.2. **Cognitive – social – technological competences**

The cognitive - social - technological range of competences were central to the notion of worker competence in the German company Audi/VW.

15.3.3. **Social - cognitive competences**

In Autoplastique workers developed key competences to promote ‘collective intelligence’. The two types of key competences needed to share and contribute to ‘collective intelligence’ were of a cognitive and social nature. Cognitive competences related to abilities involved in the creation of new know-how and abilities associated with being able to anticipate and react, for example in formulating a problem or in taking action. Social competences related to the ability to share knowledge and know-how, including tacit and formalised knowledge, and the possession of effective communication and cooperation skills.

15.4. **Integrating working and learning - the ‘learning organisation’ concept**

Many of the companies in the study saw themselves as fulfilling the criteria of a ‘learning organisation’. A ‘learning organisation’ can be described as an institution that deliberately uses strategic and everyday tasks as opportunities for the enhancement of organisational effectiveness and the continuous development of the competences of individual employees. The two dimensions, organisational effectiveness and individual competence, are seen as interdependent (mutual causal) factors. Efforts to attain organisational effectiveness provide an impetus and a reason for individual learning and competence development, while the latter in turn contributes to an increase in organisational effectiveness.

If this approach is implemented in an idealised situation, all employees/workers learn as a result of being assigned challenging tasks and through being assisted to reflect continuously on those tasks, so as to learn from them. The work content, therefore, becomes the learning content, as work and learning become part of a continuous improvement spiral having an impact on the competence level of individual workers, the learning of work groups or teams and the collective performance of the total organisation.

The key pieces of evidence, which show that a company is trying to implement the above framework, are:

- (a) employees have a sufficient level of control over the execution of their work tasks;
- (b) they are supported by management to use these work tasks as opportunities for continuous learning and competence development.

The manner in which work is organised ensures that all individuals learn continuously.

15.5. Learning processes to develop competences

15.5.1. Stages in competence development programmes

The implementation of a practical learning programme is one of the pillars of a learning organisation. The companies studied varied considerably in the ways in which they envisaged the steps in an overall development process. Some of the companies decided to implement extensive preliminary training or pilot development programmes. The purpose of a preliminary training programme was to bring people up to a basic level of technological or social skills, so that they could participate in a more specialised work-focused development programme. The emphasis in preliminary programmes was more on individual skills and learning,

Table 1. **Stages in competence development**

STAGES IN COMPETENCE DEVELOPMENT	COMPANIES
1. Preliminary training	Aluminium Dunkerque Bord na Mona
2. Pilot development programmes	Bord na Mona
3. Work place learning	All companies

Table 2. **Learning incentives**

LEARNING INCENTIVES	COMPANIES
Formal career ladders	Aluminium Dunkerque
Financial rewards for learning	Cadbury
Recognition and portability	
Standard based assessment	

often following a formal pattern. Pilot programmes on the other hand had more of an organisational focus and gave companies the chance to try out and refine their proposals before implementing them on a wide scale (Table 1).

Aluminium Dunkerque and Bord na Mona carried out preliminary training. Prospective employees in Aluminium Dunkerque underwent 1100 hours of general training comprising scientific, technical and social topics and skills. This training was carried out in collaboration with the regional bodies before the start up of the plant. Bord na Mona focused on equipping its existing workforce with cost-management skills which were essential for effective performance in the autonomous teams envisaged. As regards pilot development programmes, Bord na Mona introduced its new forms of work on an experimental basis and subject to joint management-union monitoring.

15.5.2. Learning incentives

The standards-based assessment systems utilised by Aluminium Dunkerque and Cadbury were used as a basis for career progression within the firms. Aluminium Dunkerque went one step further in gaining recognition by external public training and professional bodies of company assessments, thereby assisting 'competence portability' and job mobility. Cadbury established links between its internal assessment procedures and the UK national vocational qualifications (NVQ) system. The two companies introduced a financial award system based on the development of new skills - a concrete expression of their belief in the value of competence development (Table 2).

15.5.3. Learning approaches

In general terms, most of the companies surveyed tended more towards what can be termed 'informal learning' rather than formal training as a predominant approach. Informal learning according to Autoplastique refers to the 'learning effects of how work is organised'. Formal training did play an important role, however, as we have already seen, for example with regard to preparatory courses, and many of the enterprises utilised standardised courses to meet individual technological skill development needs.

Before proceeding to provide illustrations of what the companies meant in practice by informal learning approaches, it is worthwhile examining the relationship between learning processes and work processes. Informal learning implies that people learn as a result of being given, or taking, opportunities to learn in the course of their work. This can only be realised if certain conditions are in place, the principal one being that workers can exercise a degree of control over how they plan, execute, evaluate and reflect on the work they have to do. The work environment on the shop-floor can promote or hinder learning, therefore, depending firstly, on the degree to which workers' autonomy is fostered, and secondly, on the manner in

Table 3. Uses of informal/formal learning approaches and support measures

LEARNING APPROACHES	COMPANIES
Informal learning	Audi/VW, Bord na Mona, Autoplastique
Line managers as learning agents	Bord na Mona, Aluminium Dunkerque
Fellow workers as mentors/coaches	Autoplastique
Formal learning	Audi/VW, Aluminium Dunkerque, Cadbury
Modular approach	Cadbury
Self-instruction	Cadbury, Aluminium Dunkerque
Assistance of external consultants and training bodies	Aluminium Dunkerque, Cadbury
Joint assessment	Aluminium Dunkerque, Cadbury

Table 4. Specific characteristics of the learning approaches

COMPANY	LEARNING APPROACHES
Audi/VW	'Learning oriented flexible manufacturing cells' (Decentralised work-based training) 'Cognitive learning strategies' (Heuristic rules) 'Leittextmethode' ('Guided discovery learning texts')
Aluminium Dunkerque	Start up phase: planned on-the-job learning according to eight stages in a job. Continuous learning programme based on a review of one's performance in real work situations.
Autoplastique	'Cooperative learning strategies' Learning as a by-product of the work of the project team One-to-one learning (based on a learning contract – 'contract de qualification') Coaching (<i>tutorat</i>)

which company management provides work-based learning frameworks such as 'learning circles'.

As can be observed in the figure above, the work place of many of the companies in this study tended to favour local control (and decision-making) by the workers. The related learning frameworks that were in place meant that the informal learning processes were supported by a high degree of planning and structuring. One of the exceptions was Bord na Mona where learning occurred in the teams principally as a result of being given full responsibility for how they undertook their work - 'the learning environment, which emerged, was a very informal one'. It was a question of being thrown in the deep end. Workers received a limited number of preliminary lessons, but in the context of the crisis, which the company was going through, they were forced to make it largely on their own.

15.5.4. Informal and formal learning approaches

The specific use of informal and formal learning approaches implemented by the five companies covers a wide spectrum displaying rich diversity (see Table 3 below). In the Audi/VW company, for example, special 'learning-oriented flexible manufacturing' cells situated in the real work environment are used. Learning methods include the use of 'cognitive learning strategies' such as 'heuristic rules'. This compares to the approach adopted by Volvo where 'workplace pedagogics' refers to learning to understand and work in terms of cognitive wholes (Table 3).

The informal learning strategy put into operation by Aluminium Dunkerque initially entailed 'planned on-the-job learning'. Following on from this was a continuous learning programme based on the review of one's performances in 'real work situations'. Learning in teams was coordinated by middle managers with the assistance of internal training facilitators and outside consultants. What were termed 'cooperative learning strategies' were used by Autoplastique. This meant learning in one's project team, where learning was seen as a by-product of teamwork. One-to-one learning approaches based on a 'learning contract' (*contrat de qualification*) and coaching (*tutorat*) were also used (Table 4).

With regard to formal learning, Cadbury followed a modular training approach to assist the development of cross trade technical skills at craft level. Self-instruction approaches were available in Cadbury and also in Aluminium Dunkerque. The assistance of external consultants and training bodies was central to Cadbury's strategy as well as a number of other companies. The modular programme in Cadbury's and the initial first line management training programme were designed by external agencies. As already described, local public training authorities played a very important role also in the Aluminium Dunkerque programmes. In the latter company progress in learning was carried out on a joint basis. This meant that competence was assessed jointly by the front line supervisor, the employee and the external consultant.

15.6. Conclusions

15.6.1. Competence profiles

The competence profiles of the employees of the companies featured in this study should be understood primarily in relation to the context of the particular enterprise in which they were working, and only secondarily in relation to formal public qualification profiles. Employees were, at the same time, being shaped by and shaping this context. In the first place, the demands on the company to establish working patterns to enable them to respond to competition in a globalised market-place determined the kind of competences required of the workforce. Secondly, the companies needed to devise effective 'long-term' strategies to respond to, and indeed have an impact on, the environment (or anticipate changes in the environment). This required individuals to play a part in building the 'collective knowledge' or competence of the company and at the same time reshaping/enhancing their own competence profiles (Nonaka and Takeuchi, 1995).

15.6.2. European qualification/ competence profiles

In relation to the qualification/competence profiles emerging from the study, it could be argued that there is a 'European way' of emphasising the development of a professional or occupational identity, as exemplified in the German approach to '*Berufe*'. This approach can be situated midway between the individualistic 'job' orientation of the US (short-term and project-based and lacking the notion of professional identity, in line with a flexible unregulated labour market) and the corporatist job-for-life (although now changing) perspective of Japan (in line with the notion of the clan, family or cohesive group and based on the internal flexibility of the company). The challenge for European players (social partners, enterprises and government) in the industrial, business and vocational education and training areas is to find a way to modernise companies so they can compete in the global market, while at the same time not to lose sight of local, national and European 'societal values', built on notions of individual identity and membership of a wider social group or community.

15.6.3. How learning takes place

Although much of the learning in the companies examined is grouped together under the heading of 'informal learning' it would be a mistake to see this as haphazard or unplanned learning. (However, there is a certain truth in the statement that the best way to improve learning in a company might be to change the organisational culture and then the learning would look after itself). The key feature of the learning approaches of the companies studied, was the planned provision of opportunities for collective and individual reflection on ways in which the company could improve its performance, benefiting in the long run both the company and the individuals' lifelong learning and development needs. In many cases these

reflections led to focused on-the-job learning solutions based on ‘the reflection-based learning cycle’ with for example an expert teaching a less experienced person, but it also included the introduction of formal learning (training) programmes where appropriate. The reason why the predominant learning approach in the companies is called ‘informal learning’ is to highlight the importance placed on ‘contextual learning’, that is learning embedded in the working process of the company as distinct from formal context-free knowledge. Much of this knowledge is often referred to as company-specific knowledge, because it is often seen as not having any benefit to the individuals in a personal career development sense. However, in fact this learning did provide individuals with ‘personal knowledge’ (Eraut, 1997) (or ‘key qualifications/competences’) which built up their specific occupational and general competences and promoted their ‘employability’ in modern labour markets

15.6.4. Relationship between learning ‘key qualifications’ and learning for ‘active employability’

Learning ‘key qualifications/competences’ in and for organisational contexts can be seen as closely related to developing ‘employability’ in the sense of enhancing people’s confidence, their ability to take initiatives, to adapt to situations and, in general, have a feeling of being self-managing resourceful people. This can be portrayed as an ‘active view of employability’. This is very different from another interpretation of ‘employability’ that can be described as ‘passive employability’. That is characterised mainly by a willingness to adapt in a passive manner to every change in the economy or demand of the labour market and/or to behave in such a way, due to being constantly under the threat of losing one’s job. The active sense of employability focuses on the preparedness of people for a world and labour market that has changeable and somewhat contradictory features. This entails the ability to manage themselves in different types of organisational contexts. One of these is the workplace in which they find themselves. The other is the wide organisational context (societal, technological and labour market environment) in which they have to live and work. This calls for a ‘self-organising capacity’ of individuals in relation to different organisational contexts or social systems.

The acquisition of ‘employability’, however, does not mean leaving people on their own to find their way through the world of work, picking up ‘employability’ skills as they go along - a sink or swim approach which shares some of the characteristics of the ‘passive employability’ described above. Developing ‘employability’ means providing them with support in the form of active labour market policies and challenging learning opportunities at work. The alternative is to see the development of people as subject to the changing context of the external market, with companies choosing to ‘up-skill’ or ‘down-skill’ as the market demands. If this approach is taken to its logical conclusion, learning becomes a contingent, instrumental factor with no inherent value of its own and undesirable consequences for society in the long term.

Bibliography

- Docherty, P; Nyhan, B. (eds) *Human competence and business development – emerging patterns in European companies*. London: Springer Verlag, 1997
- Dreyfus, H; Dreyfus, S.E. *Mind over machine: the power of intuition and expertise in the era of the computer*. Oxford: Blackwell, 1986
- Eraut, M. Perspectives on defining 'The learning society'. *Journal of Education Policy*, 1997, Vol. 12, No 6.
- Göranzon, B; Josefson, I. *Knowledge, skill and artificial intelligence*. London: Springer – Verlag, 1988.
- Nyhan B. Trends in competence development in European companies. In Sellin, B. (ed.) *European trends in the development of occupations and qualification – findings of research, studies and analyses for policy and practice*. Luxembourg: Office for Official Publications of the European Communities, 2000 (Cedefop Reference Series).
- Nyhan, B. Building learning organisations: putting theory to the test – lessons from European companies. *European Journal Vocational Training*, 1999, No 16.
- Nyhan, B. (ed.). *Developing people's ability to learn - a European perspective on self-learning competency and technological change*. Brussels: European Interuniversity Press, 1991
- Reed, B. *Professional management*. London: The Grubb Institute, 1995.
- Stahl, T; Nyhan, B; D'Aloja, P. *The learning organisation - a vision for human resource development*. EUROTECNET: Brussels, 1993.

Cedefop
(European Centre for the Development of Vocational Training)

Transformation
of learning
in education and training
Key qualifications revisited

Pekka Kämäräinen, Graham Attwell
and Alan Brown (eds.)

Luxembourg: Office for Official Publications of the European Communities

2002 – VI, 254 pp. – 17.5 x 25 cm

(Cedefop Reference series; 37 – ISSN 1608-7089)

ISBN 92-896-0130-2

Cat. No: TI-43-02-284-EN-C

Price (excluding VAT) in Luxembourg: EUR 25

No of publication: 3025 EN

This book provides a new perspective on European approaches to 'key qualifications'. Currently, there is a strong similarity between these and the more recent European discussion on 'new basic skills'. The book provides insights into different aspects of these debates.

The first part of the book examines different approaches to 'key qualifications' in Europe. The second part provides examples of cross-cultural knowledge transfer at the level of policy development in Europe. The third part explores new issues for educational policies and related new developments (i.e. uses of ICT in education and training, assessing non-formal learning and the role of regional innovations). The fourth part looks into the educational relevance of work-related learning. The fifth part links the discussion on key qualifications to developing learning in organisational contexts.

Throughout, the book highlights attempts to facilitate the transformation of learning cultures in education, training and working life. The framework for key qualifications provides essential ideas for reshaping vocational curricula and learning environments.

Pekka Kämäräinen

Transformation of learning in education and training

Key qualifications revisited



European Centre for the
Development of Vocational Training

Europe 123, GR-570 01 Thessaloniki (Pylea)
Postal address: PO Box 22427, GR-551 02 Thessaloniki
Tel. (30) 310 490 111, Fax (30) 310 490 020
E-mail: info@cedefop.eu.int
Homepage: www.cedefop.eu.int
Interactive website: www.trainingvillage.gr

Price (excluding VAT) in Luxembourg: EUR 25

3025 EN



OFFICE FOR OFFICIAL PUBLICATIONS
OF THE EUROPEAN COMMUNITIES

L-2985 Luxembourg

ISBN 92-896-0130-2



9 789289 601306 >