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New Steel Industry Challenges

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Global Political Economy (GPE) Research Group

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The aims of the project are to:

1. Promote Lifelong Learning within the European Steel Industry
2. Support workers' adjustment to new ways of working.
3. Promote equal opportunities.
4. Support workers' adjustment to new technologies.
5. Provide workers with transferable skills.

In meeting these aims the project undertook the following:

1. Mapped existing qualifications using new and existing research to ascertain the level of need in new and transferable skills.
2. Developed transnational qualification modules comprising new and transferable skills.
3. Developed an on-line training programme.

The duration of the project was three years, from December 2000 to November 2003.

The research for the Reports was undertaken by: Peter Fairbrother, Dean Stroud, Amanda Coffey, Jan Clark, Jenifer Daley, Nikolaus Hammer and Steve Davies, with contributions from all partners.

The Reports are:

1. New Steel Industry Challenges
2. The Internationalisation of the World Steel Industry.
3. The European Steel Industry: From a National to a Regional Industry.
4. The Changing European Steel Workforce.
5. Skills, Qualifications and Training in the German Steel Industry: A Case Study
6. Skills, Qualifications and Training in the Italian Steel Industry: A Case Study
7. Skills, Qualifications and Training in the Netherlands Steel Industry: A Case Study
8. Skills, Qualifications and Training in the Polish Steel Industry: A Case Study
9. Skills, Qualifications and Training in the British Steel Industry: A Case Study
10. Future Skill Needs in the European Steel Industry
11. Training and Qualifications in the European Steel Industry.
12. The Question of pan-European Vocational Qualifications
13. Equality and Diversity in the European Steel Industry

New Steel Industry Challenges

Introduction

The New Steel Industry Challenges Project (NSIC) is funded under the Leonardo da Vinci Community Vocational Training Action Programme (**UK/00/B/F/pp-129 016**), to address challenges currently faced by the European steel industry. The project began on 1 December 2000 and concluded on 31 January 2004. The aim of the project is to identify the skill needs of workers in the industry and develop focused teaching and learning materials to address the needs identified, particularly with regard to new and transferable skills (see appendix one for an outline of future skill needs identified from research conducted as part of the NSIC project).

The European steel industry is undergoing considerable restructuring, which is occurring at a number of levels and in a number of ways. The restructuring process involves changes in patterns of ownership; the reorganisation of managerial hierarchies; the introduction of new technologies; significant developments in production techniques and business strategies; and, transformations in recruitment strategy and work organisation, including out-sourcing, team working and related developments. These changes have implications for the composition of the steel industry workforce and raise important questions about workforce skill profiles at national and European levels. As a result of these developments, it is not clear what skills employers seek or what the conditions might be for the recruitment, retention and upskilling of the workforce. These are the broad themes addressed by the project.

The project has the following aims:

1. To promote Lifelong Learning within the European Steel Industry
2. To support workers' adjustment to new ways of working.
3. To promote equal opportunities.
4. To support workers' adjustment to new technologies.
5. To provide workers with transferable skills.

Three broad sets of activity guided the project:

1. A mapping of existing qualifications using new and existing research to ascertain the level of *need* in new and transferable skills.
2. The promotion of transnational qualification modules comprising new and transferable skills, including the development of an on-line training programme.
3. The investigation of equality and diversity in the European steel industry, including the development of an equal opportunities strategy and promotional materials.

The project partnership comprised eleven partners from eight countries. They were:

ACAS (UK)
ASTRA (Lithuania),
Buro fur Organisationsentwicklung und Berufsbildung (Germany),
Cardiff University Regeneration Institute (UK).
Federation Europeenne des Metallurgistes (Belgium),
IDEC (Greece),
Istituto Per la Cultura e la Storia d'Impresa (Italy)

London North Learning Skills Council (UK),
Solidarność (Poland),
Steel Partnership Training (UK)
Talentis (Netherlands),

The SPT was the lead partner (http://www.steelpartnershiptraining.org.uk/).

This report outlines the conceptual framework and methodology that informs the work conducted as part of Work Package One - the research element - of the NSIC project. The following six sections structure the report:

1. Debates about Skill
2. The Steel Industry and Skill
3. Methodological Considerations
4. Outcomes
5. Bibliography
6. Appendices

Debates About Skill

There are a number of debates about skill, which define the space of different theoretical and conceptual approaches to the meaning of skill and the discussion of skill issues (Spenner 1990). These debates include discussions of the distinctions between the skills people possess (and how they acquire them) and the skills that jobs require. Related to which are discussions concerning the social construction and social valuation of skill and notions of skill supply and demand (for examples of these various debates see Cockburn 1983, Spenner 1990, Rosenbrock 1990, Green and Ashton 1992). What is particularly relevant to the NSIC project about these debates, are the implications they have for the ways in which research may be carried out to identify skill needs. Indeed, there is a significant literature on methodological approaches to the measurement of skill (Vallas 1990, Spenner 1990, Stasz 2001). This section engages in a limited way with the debate on skill, in the context of the social relations that define work and employment. Moreover, there is discussion of the implications of these debates for the ways in which the research was conducted on the NSIC project.

The focus of the NSIC project is on skill and work and employment, within the particular context of the European steel industry. One of the difficulties in discussing skill is that there are a number of competing conceptual frameworks that have been used to define and discuss skill and skill issues (see, for example, Stasz, 2001; Spenner, 1990; Vallas, 1990; Green and Ashton, 1992). The interest in these frameworks arises out of the changes in work and employment relations that have occurred over the last few decades. In part, this interest is associated with the recognition that in the context of work and employment change it is necessary to consider the skill profiles of workforces with reference to recruitment, retention, employability, training and performance.

In discussing these developments, commentators point to a range of changes that are taking place in relation to work and employment, which have manifest implications for skill supply and demand, covering skill needs, shortages, deficiencies, gaps and so on (see, for example, Green and Ashton 1992, Haskel and Holt 1999). Technological change, the internationalisation of product chains and markets, developments in managerial organisation and focus, and the

reorganisation of work processes, all impact on understandings of what skill is and the way skill needs, are identified and tackled by different groups, for example, unions, employers and governments (Stasz 2001, Vallas 1990, Berryman 1993). Such developments have stimulated policy makers to propose 'new' skills frameworks (Stasz 2001: 385) and theorists to debate the meaning of skills in the current economic order (Vallas 1990).

For the purposes of the NSIC project it is important to know what commentators refer to when they discuss skill and skill needs. The first questions to address then, are 'what is skill?' and 'how might we understand a skill need?' Second, in light of the project aims, it is important to ask 'how might skill be measured and assessed?' This discussion lays the foundation for the analysis that informed the project.

What is Skill?

There is a long-standing debate about the nature and character of skill. Skill has been defined in a number of competing ways, and hence it could be considered a rather nebulous concept. In general, skill has been defined in terms of practical abilities, cleverness and dexterity and/or as an attribute requiring knowledge, coupled with readiness and dexterity. Following on from this broad perspective, questions arise as to whether skill is innate - a practical ability and cleverness that exists within the individual mind - or whether it is outside the individual and recognisable as an acquired knowledge and/or ability. Whilst a coherent evaluation of the complexity of this debate is beyond the scope of the current study, these broad considerations do provide a useful starting point for analysis.

In a very useful account on skills and work, Stasz (2001) identifies four broad skill areas:

1. Academic or cognitive skills: knowledge about broad subject areas;

2. Generic skills: problem solving, communications or working in teams;

3. Technical skills: specific skills needed in an occupation; and

4. Work related skills: motivation, volition and dispositions (Stasz 2001: 386)

These differing areas indicate the complexity that is involved in defining skill. Other commentators draw attention to similar ranges of skill areas (Spenner 1990, Vallas, 1990). Distinctions also derive from definitions of skill and competences, the former 'encompasses both manual facilities, including dexterity, and conceptual ones, including relevant knowledge and understanding' and the latter is a 'practical demonstration of skills, knowledge and understanding in a work setting', which relates to job performance (Johnson and Winterton 1999: 5-6). The important point that arises from this consideration is that while analytic distinctions can be made about different types of skill (and, indeed, competences), it is likely to be the case that there is a complex inter-relationship between these areas (and definitions) of skill, in any particular industry or occupation. The task is to keep these distinctions in mind (such as debates that suggest that competences define skill or that they are in fact distinct from one another) when carrying out the study of the skills profile of the European steel industry.

In terms of this study, it seems most useful to discuss skill as something acquired and that derives from a process of learning. This definition takes skill to be an acquired knowledge and understanding, 'a holistic knowledge of processes and contexts' (Johnson and Winterton 1999

p.5). In this way, it is possible to link the acquisition of skill with the training and learning processes (both formal and informal). This relationship is most evident in the way that workers are categorised as skilled, semi-skilled or unskilled (for a discursive discussion on these features, see Penn, 1999). Skilled workers are more generally considered to be craftworkers, whose training (or learning) is spread over a significant period of years. Semi-skilled workers require a more limited period of training and unskilled workers no formal training (Woodward 1965). Such understandings lead us to believe that learning or training corresponds with the manual or mental input (or skill) an individual will be able to apply to a task and, say, produce a good. In actual fact however, such definitions are problematic and, in practice, often arbitrary (For a review of recent developments, particularly in the service sector, see Grimshaw *et al*., 2002).

Such definitions have been constructed over decades, and are often rooted in negotiations between employers and workers (usually via trade unions). In this respect, it could be argued that there is a social basis to skill definition that distinguishes between different social groupings in workforces, according to designated criteria. This recognition may be linked to qualifications; it may also implicitly be linked to gendered definitions of work and work relations, so that traditionally the skills acquired by women workers are often valued less (in the form of wage levels) than those acquired by men (Cockburn 1983, Penn, 1999). Such distinctions may be used to justify the distinctions and segregations often evident among workforces.

This understanding might be extended to include understandings of skill and skilled work as subject to the strength of occupational groups to protect a real technical skill that produces demonstrable results' (Collins 1979: 132-3). Occupational groups might defend (or hide) the content of a skill to maintain the status and standing of practices. In the same way the status and standing of a skill might also be monopolised by controlling who will be trained (Collins 1979). There may be an

> …artificial delimitation of certain work as skilled, the purpose of this delimitation being the reservation of certain kinds of work for those who have also acquired the label 'skilled', thus ensuring for them high wages, better chances of employment or some other advantage' (More 1982: 109).

Nonetheless, it is important to remember that skill is also a category that has real content (knowledge/ability), even if in some respects the content of skill is sometimes ambiguous and difficult to define. Perhaps one of the most reliable way of measuring, or at least one of the most acceptable and recognisable way of defining skill, is through qualifications. Qualifications as a proxy measure for skill may tell us something about skills that are acquired through learning.

Skill recognition is often equated with formal qualifications and credentials. One consequence may be that such formal recognition may encourage simplistic and de-contextualised conclusions to be drawn about an individual's skills and competences. More benignly, qualifications can be considered as a proxy form of skill and competence recognition. It must be remembered however, that is not always possible to read as unproblematic the actual skills levels from the qualifications attained by an individual or indeed the qualifications required for a particular job or grade of work (Fuller and Unwin 1999). Nonetheless, skill needs in the steel industry are changing and company recruitment strategies now focus largely on the recruitment of more highly educated (skilled) workers, for which can be read more highly qualified workers.

Changing skill requirements

Two reports by the Commission of the European Communities (1984, 1985) forecast that the occupational structure of the steel industry's labour force will develop to include a higher proportion of multi-skilled workers, technicians, engineers and managers. It was also forecast that the number of semi-skilled workers and craftsmen would decline, although this is more related to a general decline in the number of people employed in manufacturing than to changes in occupational structure. Nevertheless, as the ILO (1992) report highlights:

> [it is] interesting to note... that a general rise in the average level of education of the steel industry workforce has been registered in the EEC countries in recent years (p. 38).

Indeed, as more computer controlled systems come into operation, then more highly skilled personnel, both operational and maintenance, as well as computer programmers and systems analysts are required (Moinov 1990). In the steel industry, for example, as the number of new technological innovations increases, the occupational structure of the industry is developing to include an increasing number of people with high level maintenance skills. The expansion in the use of automated and computerised equipment means a greater demand for maintenance workers skilled to keep the machinery working properly and avoid costly breakdowns (Moinov 1990). This means that not only will more individuals with maintenance skills work in the steel industry, but that such skills might come to be valued more highly.

Of course, it might also be that 'in major new installations, when computer control is acquired along with other advanced equipment, there may be significant labour implications, since the advanced units generally have lower labour requirements than the units they are replacing' (ILO 1992: 37). However, evidence from the US suggests that the introduction of computer controlled systems does not necessarily result in a major displacement of labour, primarily because of the reasons stated above and the increase of maintenance workers (ILO 1992). More generally, it is likely to be the case that as industries restructure and reorganise, then the industry skill profile (and skills needs and requirements) will also shift (Grimshaw *et al*. 2002, Penn 1999). In the context of de-layering, work process re-organisation and new areas of work activity (such as market-focused activities in former state regulated/owned industries) then established training programmes may prove inadequate and/or informal on-the-job training may no longer be sufficient for up-skilling a workforce (Grimshaw *et al*. 2002). Indeed, such developments open up broader debates in a number of ways about the supply of adequately skilled labour in industries, such as steel

The steel industry, like other manufacturing industries, suffers particularly from problems of skill shortage and attracting adequately skilled individuals and young people of the desired calibre to the industry. Related debates focus on skill gaps and skill deficiencies that are experienced by different sectors of the economy. Two points can be made:

- Skill deficiencies are often conflated with skill shortages, but refer to an optimal level of skill in the working population, as opposed to employers' actual demand for skills (Green and Ashton 1992).
- Skill gaps refer to situations when existing members of the workforce do not possess the skills to complete their work in an effective way (Green and Ashton 1992).

Further debates concern themselves with skill needs and the anticipation of future skills needs (Haskel and Holt 1999). By skill needs, the reference is:

- To skill shortages and anticipating problems with the supply and demand of skills in a population;
- And, to the identification of skill needs and requirements of (or skill gaps in) a workforce that derive from the changing requirements of an industry, such as the steel industry.

These distinctions provide a reference for the analysis of sectoral skills gaps and needs. Not only are these assessments rooted in restructuring processes that are underway, but also they have implications for training programmes.

The Steel Industry and Skill

Traditionally, the steel industry has been organised in terms of a layered set of skill gradations, ranging from unskilled labourers, to operators and to staff, principally qualified engineering and technical staff. However, over the last two decades this conventional picture of the steel industry has been qualified, following technological change and innovation and the increased marketisation of the industry.

Until quite recently steel production was organised along traditional lines, with a small number of highly qualified workers (specialists and managers) controlling a much larger number of unqualified - at least formally - workers. However, organisational restructuring towards a flatter, more functionally flexible, team based work force has coincided with demands for a more highly skilled workforce and an organisational culture that promotes and values credentials and qualifications.

More often than not, this means an increasing demand for more highly *qualified* individuals. However, in the steel industry the number of workers without any specific qualifications comprises a very high proportion of its personnel. In a 1997 survey of 33 UK firms representing five sectors within the steel industry, 45 per cent of workers were found to possess no qualifications at all (Fuller and Unwin 1999). However, if we look more closely at the relationship between the poor levels of qualifications of steelworkers and their skills content profile, the picture is far more complex. Qualifications held do not indicate, except indirectly and with possible inaccuracy, the skills demanded at work. Indeed, not only does this approach have implications for training and learning within the steel industry – both in terms of skills within the industry or transferable skills – but it also signals a failure to grasp the complexity of what skill is and what it actually means to be skilled.

Indeed, it might be that the skills profile of steelworkers is severely underestimated, simply because as a group of workers they lack formal credentials. A credentialist perspective of steelworkers' skills fails to properly contextualize a workforce skill profile. For instance, older workers' skills might not be credentialised in a formal way, even though they might be highly skilled individuals. Moreover, extensive work place training does not always result in formal qualifications. Thus, it is difficult to measure steelworkers' skills and competences. Indeed, it is perhaps more useful to consider how skills and credentials – especially those acquired through in-house training – might be formally recognised and acknowledged by employers more widely (Fuller and Unwin 1999).

The focus of the NSIC project is on the relationship between the skills possessed by workers and skills required by workers. This gives an analysis of skills needs, which is built upon to provide an analysis of areas of training needs. The approach that we have followed is to develop an analysis of skill needs that provide added-value to the range of information already available, particularly from the *Steel and Metals Industry NTO Development* (SINTO 2000) Projects.

Methodological Considerations

In assessing and evaluating skill profiles (and thus skill needs), two broad approaches are evident: an economic approach and a socio-cultural one (Stasz 2001; also see Spenner 1990 and Vallas 1990).

> *Economic view of skills*: 'an attribute that is amenable to quantitative measurement and has objective character independent of the observer' (Stasz 2001: 387). This perspective matches skills with job descriptions (an analysis of tasks to develop entry tests), defining discrete sets of skills to match jobs. Most research focuses on levels of academic (school) skills (nation-wide) and link with economic performance – policy decisions emerge from findings. In this approach, researchers tend to rely on employer/ee surveys, focusing on skill requirements. An advantage in such approach is that it lends itself to aggregate comparisons, upon which to develop policy. However, survey responses can only generalise to population if random probability sampling is employed. Further, such approaches are weakened by the fact that employers may have normative views about jobs and skills, which are far removed from actual requirements. Employers and workers often disagree about skill requirements. (Darrah 1992; Scriber and Sachs 1990).
>
> *Socio-cultural views of skill*: 'shift the focus of enquiry from individuals to interactive systems or social settings that are larger than the behaviour and cognitive processes of a single person (Stasz 2001: 387). These social settings are broader than the behaviour/cognitive process of one person. The assumption is that the social setting is an integral to skill formation and acquisition, and not just a context for skill. Socio-cultural understandings raise serious questions about trying to understand skills form an economic perspective. This is because workers *in situ* might use unconventional methods (skills) to complete task (for example, judgement of capacities instead of maths). Such studies question the value of credentials, which indicate what performance might be like, although this is often less important than working knowledge (experience). These approaches relate to specific situations, practices, jobs, work groups, organisational arrangements and are combined with broader understanding and information.

The important point to note about these research perspectives and methods is that they yield different kinds of evidence about skill needs and industry requirements. The approach adopted by the *New Steel Industry Challenges* Project was to conduct a detailed empirical examination of skills needs via cross national case studies, supplemented by an analysis of the Company training provisions, on the assumption that these programmes are aimed at meeting skills gaps and future needs (see Rainbird (1996) and Krzeslo, Rainbird and Vincent (2000), for a useful discussion on cross-national and cross-cultural case study methodology). The claim is that this approach provides a value-added dimension in the identification of the skill needs; namely how do employees understand and experience the skills gap in the context of their work and

employment, and a relatively rapidly changing industry. In this respect the approach should be assessed as an exploratory methodology, opening up issues, not only for education and learning development, but for further investigation, thereby complementing established studies that use competence and economistic understandings, models, measures and methodologies (see, for example, SINTO 2000, Mansfield and Mathews 1985, Johnson and Winterton 1999, Leman, Winterton and Winterton 2000, Cheetham and Chivers 1998, Haskel and Holt 1999).

Three forms of data were collected: documentary data on the steel industry and the substantive topics covered by the reports; aggregate data, principally quantitative data; and case study, in the main qualitative data. Following a discussion of the inter-relationship between this data, details of the quantitative and qualitative data will be presented.

1. Overview

In line with developing a socio-cultural perspective of the skills profiles of the European steel industry, the partnership sought to build up a detailed account of the ways that 'different aspects of the social setting (for example, tool use, work organization, cultural norms) shape skill requirements and skill learning' (Stasz 2002: 388). The task facing the partnership was to present such an account for the European steel industry as a whole.

The approach that was followed was to develop a picture of the working context from the perspective of those working within it. Whilst, the intention was not to develop these accounts in an occupationally focused way, as is the case in many studies (hairdressers – Billett 1996; circuit board assemblers – Kleifgen and Frenz-Belken 1996; technical jobs – Barley and Orr 1997), the purpose was to identify the skills gaps and skills needs for the industry as a whole. To achieve this aim, the research drew on both existing analyses of skill profiles in the steel industry and complemented this with research on the following:

- The restructuring of the steel industry, drawing attention to changing ownership patterns, supply chains, market relations, technological change.
- This macro-analysis was complemented by a consideration of the educational systems in each country and the intersection between training and learning programmes in the industry and these systems.
- This structural analysis was supported by the aggregate data on the socio-demographic material on the steel workforces and a series of selected case studies of steel plants and their workforces.
- The result was a socio-cultural view of the skill profiles of the European steel industry.

2. Aggregate data

The overall objectives guiding the study were formulated in the following way:

a) To provide a comprehensive perspective of the skills profile of steel workers in different EU countries:

   - by defining and identifying qualification and training in terms of a core selection of 'best practice' skills,
   - by identifying the gaps in qualifications (and also in the data),
   - to determine educational and teaching needs,

- to inform generic teaching programs to address specific needs in the steel industry.

b) To indicate potential issues with regard to equality and diversity by extracting from the data and highlighting notions of socio-economic status, details of occupational hierarchy, and considerations regarding gender, age, ethnicity, and disability.

Data was collected on gender, age, qualifications, occupational status, ethnicity, and disability for 15 EU countries: Austria, Belgium, Denmark, France, Germany, Greece, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Spain, Sweden, and the UK. The data is based on an extensive search of online and other sources. This data collection took place over a twelve-month period in the context of analytical work aimed at exploring the changing needs of the European steel industry and the relationship with skill formation and lifelong learning. The industrial coverage allows for the data to be used comparatively or in conjunction with similar data (if necessary). The occupational and social detail allow for an informed discussion of these issues within the steel industry that goes beyond broad, aggregated distinctions that may be imprecise and misleading.

Much of the data was obtained from national sources, since the online sources proved inadequate. The International Iron and Steel Institute (IISI) online proved to be an invaluable source of data on employment, consumption, production and exports, both worldwide and within the EU. The remainder of this note gives the background against which the data collection exercise took place, an indication of the various responses, and details of the character of the data: nature, strengths, weaknesses. It also provided an indication of particular points to bear in mind within the context of follow-up work.

a. Project partners were contacted and asked to identify data or an indication of the source of data and to supply this information to the research team. The project team was not biased in terms of the data source, as long as the data were available in some form. The detail requested included data and cross tabulations, where possible, on gender, age, ethnicity, qualifications, employment status and income.

b. Data were requested for the 'steel industry' at the company or industry level, whatever was available. Although many countries/sources responded to the request, some proved fruitless, as the data was 'not available' or what was available was not useful. As a result, it was not possible to corroborate the authenticity of the data received by comparison from various sources.

c. Where data were received, the submissions varied in terms of time coverage, detail, and classifications/definitions employed. In the process of preparing the data, it became apparent that significant differences between the countries related more to different definitions of similar concepts and different ways of reclassifying national data rather than true differences in the economies. However, given that there were some uncertainties about the extent to which the industry classifications and/or definitions employed were comparable across countries, direct comparisons have been limited to age and gender. Furthermore, where there remains a doubt as to aggregation/disaggregation, a note has been made to this effect. Every effort was made to present the data in the tables using the original definitions received.

d. Comparisons over time remain an issue. The steel industry in countries worldwide has been experiencing significant change and the difference in data from one year to the

next can be quite significant (see, for example, IISI data, http://www.worldsteel.org/trends_indicators/figures_19.html). The focus is on data from 1999 to 2002 (where available), but the point made in respect of change is worth bearing in mind.

e. There are also differences in the sources of the data. The original source of data received from some partners is uncertain. Accordingly, the usual precautions attending the use and interpretation of secondary data should apply. Particularly in the case of some countries, such as Sweden, data is best interpreted as indicative rather than precise.

f. Not all sources provided a detail of the industry classifications included in the data; some provided an aggregation of classifications, while others just stated 'steel industry.' To address this problem, some of these sources were asked to review the data and provide disaggregated data or detailed explanations, where possible. A favourable response was not forthcoming in all cases, due more to availability of the detailed data than to the willingness of the organisations and individuals to supply the information. To enable some comparison data for code 27 (manufacture of basic metals) of the International Standard Classification of Occupations (ISCO) was used.

g. Due to the absence of a standard qualifications framework across EU countries, a range of tables have been designed using qualifications frameworks from various sources. This has been done for various sub-groupings of ISCO 27, partly due to data availability but more importantly to highlight the trends within and across the various sub-groups. Due to the nature of these qualification frameworks, one problem is that peculiarities or significant features within the data (say, with issues of equality and diversity) may be obscured because the qualifications categories are very broad.

3. *Case Study data*

The second stage of the research focused on a set of case studies aimed at developing an understanding of skill requirements, recognition and value. The focus was on selected plants to exemplify different practises and arrangements in the partner countries, as well as to fill out the detail of skills, qualifications and training provided by the aggregate data analysis. The core methodology involved interviews with managers, unions, workers at different levels of the steel works, on aspects such as career histories, skill qualifications, skills recognition.

Five sites were studied:

Wales (UK): Trostre - Corus plc
Italy: AST - Thyssen Krupp
Poland: Huta Zawiericie – Impex (now CMC Metals)
Netherlands: IJmuiden - Corus
Germany: Duisberg - Thyssen Kruppp

A set of research instruments were developed. These included:

1. Interview schedules:

    a. Company staff (eg. Training manager) – overview of company position

    b. Plant HRM Manager

    c. Plant Production Manager

    d. Union Officer – present the union policy and involvement

    e. Steelworkers: selected by function: team workers, team leaders, clerical, maintenance, technologists/engineers

    f. Experts: for example, national union training officer/college-university trainer

    This provided a core group of interviewees. Where possible others were interviewed and the interview schedules adapted accordingly (for example, an equality and diversity schedule was developed for interviewing women on gender issues).

    2. Fieldnotes:

    Detailed fieldnotes were kept of all field visits and these constitute a rich data source for the reports and analysis.

    3. Documents:

    a. Documents were collected from each site, although the quality and quantity was variable. Where appropriate we utilised this material in providing context for each work situation as well as confirming data gained by other means.

    b. Documents were also collected from other sources, and partners were helpful in identifying sources for this material.

There were five stages to the case study research

1. Collection of publicly available documents from key informants.

2. Interviews with key informants.

3. Panel interviews with five groups of workers (25 workers in total).

4. Observation of each plant and a report on the work process and worker involvement. It may be necessary to have two tours of the plant to make sure that everything is understood. Where possible a map of the plant should be obtained or drawn up.

5. Observation of the steel community that supports the plant, looking at residential dispersion (key informants, access to training resources and facilities. The aim is to develop a picture of the accessibility to these facilities by steelworkers.

The procedure involved the following tasks:

1. Each interview was written up as a fieldnote report, with appropriate quotation from the interview, so that a clear picture of the coverage and content of the interview is given.

2. Each interview was taped, with agreement from interviewee and these tapes were transcribed and where appropriate translated.

3. Notes were taken during each interview, to provide an immediate record of the interview as well as a back-up for the tape record.

4. Given the nature of the research the field researchers kept a diary type record of observations during field research, ideas to note, suggestions, with each entry marked by date and place, so that everything could be documented.

5. The Cardiff research team undertook the process of writing up each case and assembled draft reports for the research partners, as preparation for the other work packages. The Cardiff research team completed the writing up of these studies.

Outcomes

The data collection provided the base for analysing the skills gaps and needs within the European steel industry. A socio-cultural perspective of skills needs was developed. This data and the associated analysis laid the foundation for the development of the teaching modules. In addition, this data, and particularly the fieldwork, provided the foundation for the report on equality and diversity (Working Paper No. 14).

The project is divided into a number of work-packages, which were designed as inter-related units that built upon each other, facilitating seamless progress towards project outcomes. The aims and coverage of each work-package are as follows:

Work-package 1 – Existing skill profiles within the European steel industry were mapped utilising existing qualification data and new research in order to establish the level of need for new and transferable skills

Work-package 2 – Modules for a new trans-national qualification were developed reflecting the skills needs identified by work-package 1.

Work-package 3 – An on-line training programme was developed, utilising materials developed by work-package 2.

Work-package 4 – New qualification modules were piloted using both paper based and on-line methodologies. The modules were fine tuned in the light of piloting.

Work-package 5 – This package was on-going throughout the duration of the project. Research was conducted into the age profile and gender and ethnic composition of

the European steel industry workforce. A strategy was developed for addressing any equal opportunities imbalances identified, and equal opportunities policies mainstreamed within the trans-national qualification modules.

Work-package 6 – This package was on-going throughout the project. Information about the project, and the new trans-national qualification modules were and will continue to be made available to potential users of the new qualification. The initial stages of dissemination focused on demonstrating the need for the qualification, and how this will meet the needs of the industry. In the latter stages dissemination the focus was on gaining support for the introduction of the new qualification, and the benefits of a trans-national approach.

Appendices

Appendix 1

The following is an outline of the substantive areas of European steel industry future skill needs identified from the research conducted as part of the *New Steel Industry Challenges Project*:

Future Skills Needs in the European Steel Industry

Introduction

The future skills needs of the industry are complex, based in the complex history of the industry over the last decade. Work and employment relations are in a process of change. These developments cover the socio-demographic composition of the workforce, work organisation, managerial hierarchies, technology, and market demands, including the emergence of complex production and commodity value chains.

The future skills deficit is twofold. First, there is an impending problem due to the massive decline of staff over the last twenty years, which paradoxically results in an ageing workforce. In this respect, the industry faces problems relating to both recruitment and retention. Second, there is a shortfall in skills associated with the transformation of the industry from a state-owned, state regulated and relatively stable industry to one where there is increasing emphasis on down-stream activity and meeting customer needs. Such developments have implications for current training facilities and the types of programmes offered as well as the mode of delivery. One consequence of these developments is the need for long-term training planning to meet the skills deficits that are both evident at the current moment as well as those that are emerging.

The report comprises two sections. In section one the core features of work change are identified. Section two examines the training needs that are emerging.

Section One: Skill Needs

On the basis of the research, involving analysis of aggregate data from across Europe and the completion of the five case studies, the following observations may be made:

Context

The world steel industry has undergone significant change over the last two decades. On the one hand, steel companies are becoming internationalised; on the other hand, steel companies are increasingly operating in a more competitive context. In Europe the industry operates in sets of regional blocks or clusters, particularly for production, but also for trade. The argument presented is that the European steel industry is on a cusp, moving from a largely nationally-based industry to one where the major companies are transforming into major steel multinationals, with a strong regional focus. As these changes proceed then it is likely that the occupational skill profile of the European steel workforce will come to the fore, as will questions about labour mobility and employability.

Socio-demographics

The starting point for an analysis is the current composition of this workforce. Although the available data is limited it is clear that the prevailing feature of the European steel workforce is that is aged and largely manual and male However, the changes in process are likely to create the conditions for a recomposed steel workforce. If this is so then questions will be raised for this industry in relation to gender, ethnicity, generation and occupational and qualification profiles. There are the beginnings of a generational polarisation, with the possibility of a feminisation of sections of the workforce over the next two decades. Accompanying these changes there is likely to be an increased emphasis on high skills and formal qualifications.

***Work Organization, Skills and Qualifications*:**

The case studies revealed a process of change underway, with reference to work organisation, managerial hierarchies, and employment relations. In every case, forms of work organisation in the steel industry are changing. The principle features of the prevailing skills profile and gaps are:

1. ***Teamworking Skills***: One common feature is that team working has either been introduced or is in the process of being established. However, there is considerable variation and confusion about what is meant by team working. The outcome is that while there is a push in all companies to reorganise workforces in relation to forms of team working there is considerable variation and unevenness in its implementation. These needs are recognised by the EU based companies who have developed a range of teamworking training programmes.

2. ***Commercial and Market Skills***: There is an emerging emphasis in the steel industry on down-stream and commercial activity. This contrasts with a past situation where steel plants were locally and nationally based, producing basic products, which would be further worked on by purchasers of steel goods, such as the automobile industry.

3. ***Qualifications***: Qualification profiles vary across the industry and from country to country. Young workers increasingly are recruited with educational qualifications (secondary school) and have an experience of formal education routes in a way that older workers do not. Where a workforce is relatively old it is very likely that operators will have few formal qualifications and they will have very limited experience outside the industry. For all workers much learning appears to be on-the job, learning from others, although this is becoming difficult with the changes taking place in the industry and with the changed outlooks on education. There is evidence that firms restrict the opportunities for some workers to gain formal qualifications that would enhance the employability of workers outside the industry.

4. ***Training provision***: The organisation and operation of training varies from country to country and plant to plant. In part this is a reflection of the complex relationships between training provision and requirements and national education systems; in part, it is a reflection of different understandings of the nature and importance of training. However, in all cases very different provisions existed for different categories of workers, with managerial staff and young workers catered for in various ways, and older production workers relatively neglected.

5. ***Equality and Diversity***: Little consideration thus far has been given to issues of equality and diversity by steel companies. In fact, it is often the case that diversity is not recognised, and certainly not over the range of dimensions, which include generation, gender, and ethnicity/immigration. There is certainly no discernible debate on matters of equality and diversity taking place within the industry. What is likely is a continuation of differentiation in terms of skills, qualifications and status. There is little qualitative evidence of attention being paid to the recruitment, employment experiences, training or retention patterns of women and ethnic employees, or older workers.

Section Two: Training Needs

On the basis of these analyses the following substantive training needs have been identified:

1. ***Generic skills*** - particular to the industry: Given the technical and work organisation changes taking place in the industry there is a relatively limited approach to training and developing the skills of workers. Usually the training occurs on a 'when required' to get a job done basis, rather than as part of a broader commitment to staff development. There is a case for accessible, computer based on-site educational packages to broaden the skill base of the workforces.

2. ***Coaching and mentoring skills***: Given the extent of team working, the variability of training provision and the undeniable practice that much learning takes place informally (and often in the form of experienced workers guiding the less experienced) there is a pressing need to systematically develop coaching and mentoring skills. In the absence of such skills bad practice is likely to become embedded in the work process.

3. ***Health and safety awareness***: With the technical and work related changes taking place in the industry health and safety issues also change. There is limited evidence that these issues are being addressed in a pro-active way.

4. ***Team working skills***: There appears to be a need for the enhancement of skills to enable the team to up-skill and work as an integrated group. Such skills become more important as the industry reorganises, in particularly along the lines of High Performance Work Systems, which some managers advocate and which are relatively common in some sections of the steel industry in the US. While this pattern of work reorganisation raises pressing questions for trade unions and workforces, it may be worth considering learning and training developments that focus on the team itself.

5. ***Information technology skills***: The industry is computer based and increasingly so. In a number of plants workers learn by sitting next to already experienced workers and then, when deemed ready, try the operation themselves. More generally, the spread of Information Technology forms of working are likely to become increasingly embedded in the steel labour process and all workers are likely to be exposed to these developments to different degrees.

6. ***Problem solving skills***: The changes taking place in the industry in relation to supply, work process, transport, customers and the advent of team working place a premium on problem solving skills. Although there is no evidence of this type of training in the

plants studied to date, the need for such training is becoming increasingly important. These are the type of skills that (especially if accredited that would enhance the employability of workers).

7. ***Customer and market awareness***: As the steel industry restructures and increasingly focuses on down stream activity, there is an importance in enhancing customer awareness, particularly where quality is an issue. There is evidence that these types of awareness programmes, involving visits and other activity are being introduced for specific sections of the workforce. There is an argument that this should become a feature of work awareness for all employees. Logically, if this case is accepted then it also means that there may be a value in developing learning programmes to enhance the awareness of the workforce about production activity in different parts of an integrated plant or in relation to steel suppliers where the plant is involved in finishing activity.

Equality and Diversity: There are specific equality and diversity dimensions to all of these training needs. A primary consideration should be the systematic collection and collation of workforce data. Training programmes must be grounded in the assumption that the steel workforce is not homogenous, but is diverse and differentiated in a number of critical ways. Equal access to training programmes, skills upgrading and formal qualifications must be located within the context of existing inequalities and future diversity.

Appendix 2

The following is a detailed list of the principal sources investigated, with a brief note of the results in each case:

1. Eurostat, EUROFER. General aggregated statistics, mostly on production, consumption, trade and related information.
2. Eurostat, Sigrid Fickinger – D1 Steel Statistics: Data collection, validation, estimation, publications (Questionnaire 231 and 234 - New Data Bank Steel (Oracle)). Data on total labour force and employment by age and broad occupational categories over an average of 10 years, 1990 to 2000 for ECSC (i.e. 27.1) only. Data are only consistently available from 1993 for most countries and from 1995 for those countries that joined the EU then. Data source advised that where countries do not submit data, estimates are made, which may lead to inaccuracies as in the case of Finland which still needs to be amended. There are also discrepancies with similar data from other sources that have not been reconciled – this has been noted on the output.
3. International Iron and Steel Institute (IISI). General aggregated statistics on world production/consumption/demand, etc. Some information obtained on numbers employed and major producers at the EU country level .
4. ILO, International Steel Statistics Bureau Ltd., Steel and Metals Industry National Training Organisation (UK), ECSC Cordis. No data.
5. OECD. Potentially useful descriptive empirical work. Small amount of data (bit outdated – 1990/1) on employment by broad occupational status, for 4 countries.

6. Country specific data from individual national sources:

Steel Statistics: Availability by Country.

COUNTRY	SOURCE	CHARACTER: coverage/date/strengths/weaknesses	LEVEL: Industry/Co., etc.
Austria	Statistik Gov	Total by gender/ position. December 1999.	Industry. ISCO 27
Belgium	Report (ONS)	Age, gender, position. 2nd Qrtr. 2000. (S) sub-categories of age and others. (W) no detail or information on other variables.	Industry. ISCO 27
Germany	Report – Statistisches bundesamt	Age, gender, nationality, qualification. 30/6/99. (W)No sub-categories or cross-tabulations of variables.	Industry. ISCO 27
Greece	Report	Broad discussion of qualification & training.	Wire company.
Italy	Report	Various reports. (S) Background details (W) aggregate data	(Broad) Industry
Lithuania	Astra Machinery – Vidmantas Tutlys	Employment by gender 1995/9. Broad data on qualification by gender. Qual. & skills needs. % and total sector employment by gender,95/97-99. (S) detailed narrative. (W) not specific to steel; no cross-tabulations of variables.	Metalworking/machinery industry
Netherlands	CISY-HRS-PSA-IDP Weiland	Gender. December 1999. Some detail for the 'Social Unit.' (W) Little detail, no definitions.	Industry/company.
Poland	Sekretariat Metalowcøw (Adam Ditmer).	Age, occupational status. 2000.(S) some cross-tabulations. (W) Little detail.	Industry. ISCO 27
Portugal	Report	Gender (potentially). Quarterly 2000.	Broad sectoral groups
Sweden	Report – statistical office (SCB)	Gender: wages/hrs. Age, ethnicity, occupational status. 2000. (S) various cross-tabulations of variables. (W) No qualification data. Missing values not clearly identified.	Industry. ISCO 27
UK	Sheffield report.	Qualifications in broad terms by job description.	Industry.
UK	Database – Data Archive	QLFS. Very detailed. Steel statistics may be extracted for a wide range of variables and cross-tabulations. (W) Requires long hours to extract.	Industry. ISCO 27

7. Company–specific data: Company Annual Reports. All company data came from annual reports provided by the respective companies: ThyssenKrupp, Thssen, Corus, British Steel, Koninklijke Hoogovens, Arbed, Ispat, Rautaruukki, Voest Alpine and Duferco. Information extracted for production and employment as well as employment costs and turnover. The problem with this data was that the information was not consistent across companies. More significantly, too, in some cases there was not enough information to isolate the ' Steel Division' figures for each company (for companies that also had say, 'Automotive' and 'Aluminium') so the figures might not be directly comparable between companies. Additionally, differences (apparent or real) in definition may prove significant. One company (Arbed), for example, specified that the unit of measurement was 'tonnes' (metric) as against 'tons' (imperial), whereas most companies did not specify. Moreover, currency variations made it impossible to compare across companies with respect to items denominated in currency, such as employment costs and turnover.

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