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IAG Report 4/2011e

Standards in education and training for safety and health at work

– European perspectives, promising developments and examples of good practice –

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Summary

Standards in education and training for safety and health at work

How important are standards for education and training in occupational safety and health?

That was the question explored by participants from 19 countries at the DGUV Academy in Dresden from 6 to 7 July 2007.

The presentations and discussions addressed the factors that led to educational standards being developed at the European level and the activities involved, plus real-life examples from the international and national spheres. Particular attention was given to standards of competence for training programmes for lecturers and trainers.

The event was staged by lead organiser, the European Network Education and Training in Occupational Safety and Health (ENETOSH), in cooperation with the European Agency for Safety and Health at Work (EU-OSHA).

This report is based on the results of this conference. It covers the conference contributions, some of them revised, plus three additional papers.

Kurzfassung

Standards in der Aus- und Weiterbildung zu Sicherheit und Gesundheitsschutz

Welche Bedeutung haben Standards für die Aus- und Weiterbildung in Sicherheit und Gesundheitsschutz?

Dieser Frage gingen vom 6. bis 7. Juli 2007 Teilnehmer aus 19 Ländern in der DGUV-Akademie in Dresden nach.

Vorgestellt und diskutiert wurden die Hintergründe und Aktivitäten zur Entwicklung von Bildungsstandards auf europäischer Ebene sowie Praxisbeispiele aus dem internationalen und nationalen Bereich. Ein besonderes Augenmerk wurde hierbei auf Kompetenzstandards für die Qualifizierung von Dozenten und Trainern gelegt.

Die Veranstaltung wurde unter Federführung des Europäischen Netzwerkes Aus- und Weiterbildung in Sicherheit und Gesundheitsschutz (ENETOSH) und in Kooperation mit der Europäischen Agentur für Sicherheit und Gesundheitsschutz am Arbeitsplatz (EU-OSHA) durchgeführt.

Der vorliegende Report basiert auf den Ergebnissen dieser Konferenz. Die Konferenzbeiträge wurden überarbeitet und aktualisiert sowie um drei weitere Grundlagenbeiträge ergänzt.

Résumé

Les standards dans la formation professionnelle initiale et continue dans le domaine de la sécurité et de la santé au traivail

Quelle est l'importance de la standardisation dans la formation professionnelle initiale et continue dans le domaine de la sécurité et de la santé au travail ?

Telle est la question sur laquelle se sont penchés des participants venus de 19 pays, réunis les 6 et 7 juillet 2007 dans l'Académie des DGUV à Dresde.

Cette manifestation a permis de présenter, de replacer dans leur contexte et d'examiner les activités visant à une standardisation de la formation au niveau européen, ainsi que des exemples tirés de la pratique internationale et nationale. L'accent a été mis à ce propos sur les standards de compétence nécessaires à la qualification des instructeurs et animateurs de formation.

La réunion avait été organisée par le Réseau européen pour l'éducation et la formation à la sécurité et la santé au travail (ENETOSH), en coopération avec l'Agence européenne pour la sécurité et la santé au travail (EU-OSHA).

Le présent rapport repose sur les résultats de cette conférence. Les interventions faites lors de la conférence ont été partiellement remaniées et complétées de trois autres contributions de base.

Sumario

Estándares para la formación y la capacitación en materia de seguridad y protección de la salud

¿Qué significado tienen estándares para la formación y capacitación en materia de seguridad y protección de la salud?

A esta cuestión se dedicaron el 6 y 7 de julio del 2007 en Dresde los participantes de 19 países en la Academia-DGUV, una institución del Organismo de Seguros y Prevención de Riesgos Profesionales.

Se presentaron y debatieron aquí los fundamentos y las actividades dedicadas al desarrollo de estándares educativos a nivel europeo, así como ejemplos prácticos tomados del ámbito internacional y nacional. Especial atención se puso aquí en los estándares de competencia para la cualificación de docentes e instructores.

El acontecimiento fue realizado y auspiciado por la Red Europea para la Formación en Salud y Seguridad (ENETOSH) y en cooperación con la Agencia Europea para la Seguridad y la Salud en el Trabajo (EU-OSHA).

El presente informe se basa en los resultados de esta conferencia. Las ponencias presentadas durante la conferencia han sido parcialmente revisadas y completadas por tres artículos básicos.

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Foreword

The European Council Lisbon Declaration (2000) enhanced the status of education and training in Europe, as was also reflected in the EU Community Strategy on Health and Safety at Work 2002-2006. The Strategy defined education and training as key factors for the development of a true prevention culture in Europe. The Community Strategy 2007-2012 also calls for safety and health to be integrated into all phases of education and all areas of society by 2012.

Tools that make European education and training structures more transparent and easier to compare are an important element in this process. Such tools include the European Qualifications Framework (EQF) and the European Credit System for Vocational Education and Training (ECVET). Within this context, the topic of educational standards and their function in terms of quality assurance in education and training are also the subject of discussion.

As companies become increasingly internationalised and worker mobility becomes ever more important in Europe, there is an incremental need in the area of safety and health to be able to compare educational courses and to ensure mutual recognition of qualifications.

This need prompted the 7th Training & Innovation event to consider the significance of educational standards for education and training in safety and health in 2007 already. Particular consideration was given to standards of competence for lecturers and trainers.

The Training & Innovation events have been taking place in the Academy in Dresden since 2001. Originally, Training & Innovation was a methods workshop for safety and health trainers, focusing on innovative teaching and learning methods. Under the aegis of the European Network Education and Training in Occupational Safety and Health (ENETOSH), the objectives of the event were expanded to take in the aim of promoting integration of safety and health into education and training as a whole. Providing innovative impetus for education and training in safety and health and a lively exchange of experience within the network are the hallmarks of the Training & Innovation event, which has now developed into an International platform for training in occupational safety and health and beyond. Since 2004, the event has been held in cooperation with the European Agency for Safety and Health at Work (EU-OSHA).

The 7th Training & Innovation was attended by 80 participants from 19 countries, from Finland to South Africa and from Spain to Turkey.

This report presents almost all of the papers, some of them revised, given at the 7th Training & Innovation plus three additional papers. It is divided into two sections, as described below.

Section I is comprised of papers examining the development and implementation of educational standards from different perspectives. In addition to the European view and a

more fundamental, critical view *(Cammarota, Copsey, Volmari, Bollmann)*, this section features trendsetters in the vanguard of the development of standards in vocational education and training at the national or European level *(Ward, Anderka, Goertz, Hale/Bianchi)*. Particular attention is afforded to the development and implementation of standards of competence for teachers and trainers *(Koch, Kici, Craes, Äyräväinen/ Bollmann/Körbler/ Swuste, Steig, Swuste)*. Most of these papers are directly related to safety and health.

Section II presents examples of good practice in education and training in safety and health, which set standards themselves, observe meta-standards or prove that educational processes can be quality-assured using standards. These papers are arranged according to the different levels of the education system. Thus, there are papers concerning general education and initial vocational training *(Fister, Cardell, Joyce, Ulk, Ahioğlu/Akça/Güven/Kapusuz)* and papers from the areas of continuing vocational training *(Kämäräinen, Gold, Schütte/Pickert)* and higher education *(Salminen, Ceglarek, Stacey, Wattendorff)*.

Once again, a sincere thank you to everyone who helped make the event a success and made this report possible.

Special thanks to THEATER interaktiv, who ensured that the 7th Training & Innovation was also a resounding success in terms of the methods used.

Ulrike Bollmann

Section I

Development and implementation of educational standards

1 Integration of safety and health into education and training – the European perspective

1.1 Education and Training in Safety and Health: The European Dimension

Antonio Cammarota, European Commission

Introduction

On behalf of the European Commission, I would like to express my sincere thankfulness to the organisers of this event for the invitation to attend and the opportunity to address such a wide range of experts and stakeholders on the most recent developments of the debate at European level on education and training in safety and health.

My first step will consist in trying to give a picture of the current situation in the area of safety and health at work, based on the results of the evaluation exercise conducted by the Commission in the framework of the preparatory work for the establishment of the European strategy on health and safety at work for the period 2007-2012 [1].

The situation in the area of safety and health at work

These results reflect a mixed picture of the situation in the European Union. On the one hand, and based on extrapolations from data collected by EUROSTAT for the period 2000-2006, the rate of fatal accidents has fallen by 19% during the period covered by the former strategy [2]. Similarly, the rate of workplace accidents leading to absences of more than 3 days has diminished by 24%.

On the other hand, if we consider the current situation, we are still facing a dramatic picture: 2,9 to of the workers in the EU-27 had an accident at work with more than 3 days off work and 5580 workers died in a fatal accident at work in 2007.

And it goes without saying – occupational illnesses and accidents keep being a heavy burden on European economy and society.

Some other interesting data are available from the "Fifth European Survey of Working Conditions", conducted by the Dublin European Foundation for the improvement of living and working conditions in 2010.

According to this survey, still 24 % of workers in the EU say that they perceive their job as putting their health at risk.

It also needs to be mentioned as an important result of the evaluation exercise conducted by the Commission the fact that occupational hazards are not being reduced in a uniform way.

For instance, they are still high

- for certain categories of workers (young workers, workers whose jobs are insecure, older workers and migrant workers);
- for certain types of companies (SMEs, in particular, have fewer resources to put complex systems of worker protection in

place, while some of them tend to be more affected by the negative impact of health and safety problems);
- in certain sectors (construction, agriculture, fishing, transport, health care and social services).

At the same time, certain types of occupational illnesses are becoming more and more common (musculoskeletal disorders, infections and illnesses associated with psychological stress).

Furthermore, a number of challenges in the field of health and safety are continuing to grow in importance. These include:

- the demographic change with the ageing of the working population;
- new employment trends, such as the increase in self-employment, the outsourcing and sub-contracting, the fragmentation of working life;
- the increasing presence of migrant workers in the European work market;
- the emergence of new risk factors (violence at work, including sexual and psychological harassment, and addictions).

The European policy on health and safety at work

Against this mixed background, the Commission decided to relaunch the European policy on health and safety at work, by defining the Community strategy for the period 2007-2012.

This strategy identifies a number of levers for change, in particular with regard to:

- improving, simplifying and better implementing existing legislation;
- fostering the development of coherent national strategies;
- stimulating the research (in particular, by better identifying and assessing potential new risks);
- mainstreaming OSH into other substantive policy areas.

This new strategic framework focuses on the need to consolidate a culture of risk prevention, by combining a variety of policy instruments (legislation, social dialogue, economic incentives and mainstreaming) and developing partnerships between all the actors involved.

The main idea behind this approach is that fostering a common preventative safety and health culture is the fundamental basis for improving OSH performance in the long term.

Building and maintaining a preventative safety and health culture require making use of all available means to increase general awareness, knowledge and understanding of the concepts of hazards and risks and how they may be prevented or controlled.

In this regard, it is clear that legislation, while being the back stone and driving force for further improvement, is not sufficient on its own to produce changes in attitudes and behavioural patterns.

It needs to be complemented by other policy tools and interventions designed to reinforce the impact of regulatory provisions and provide the suitable context for practical application and enforcement.

In particular, a strategy aimed at promoting a general preventative culture must address all parts of society and go beyond the workplace and the working population.

What is a preventative safety and health culture?

We can refer to several definitions, more or less formalised, more or less detailed, more or less complete. I would like to mention here just two of them.

The first is a quite formalised definition from the 2006 ILO Promotional Framework Convention on OSH:

> *"A culture in which the right to a safe and healthy working environment is respected at all levels, where governments, employers and workers actively participate in securing a safe and healthy working environment through a system of defined rights, responsibilities and duties, and where the principle of prevention is accorded the highest priority."*

The other, perhaps more informal but in my view very comprehensive definition, comes from an opinion delivered by the Advisory Committee on Safety and Health at Work in 1997:

> *"A culture which places a value on protecting health in the various situations of life …, in which risk prevention is a basic attitude and is second nature, and in which the monitoring of risks to health and safety is recognised as a basic element of life for everybody."*

In any case, it is clear that we need to change people's attitudes to health and safety and foster changes in behavioural patterns if we want to promote a genuinely common preventative safety and health culture at European level.

The role of education, information and training

This is the place where education, information and training are expected to play a major role in improving OSH performances.

I would like to mention here three main priorities:

- incorporating health and safety aspects into general Member States' vocational and occupational training policies;
- developing effective education, information and training strategies at all levels of society, and last but not least
- these strategies should be able to address all target groups.

Who is involved?

Of course all the OSH operators and players in the field, although the approach, the resources used, the skills and the responsibilities may differ, according to the target groups – but also citizens in the broadest meaning of the word.

In any case, education and training should not be restricted to the prevention of occupational hazards, but should extend to cover all areas in which an individual, whether child or adult, is likely to be faced with, or play a part in creating, risks or dangers.

Education, information and training should

- start from early age;
- be present during the whole education cycle;
- continued and more targeted during the working life.

Levels of action

We can distinguish different levels of action. First of all, at company level. As you well know, according to the EU legislation on safety and health, in particular the framework directive 89/391/EEC, employers are directly responsible for safety and health at the workplace, in particular as regards the identification of risks involved in the accomplishment of work tasks and the establishment of prevention measures, including continuing training at work.

Effective information and training policy should be at the centre of a system approach at company level to the management of health and safety, which should be considered as an inclusive, not a separate topic. This policy should provide training for all grades of workers throughout all their careers, and include in particular:

- the initial training for young people learning a trade or starting work;
- the training for workers' representatives with a specific role in the management of safety and health;
- the training for all people involved in the decision making process in fields of management, design, organisation and marketing which may affect safety and working conditions.

Other priority areas of intervention are:

- The general education in risk prevention for children and young people: Good habits need to be taught as early as possible; safety training should therefore begin in childhood in order to establish basic preventive reflexes, and then continue for the rest of the life. Several initiatives have already been developed in the Member States, but we need to move forward and to consistently mainstream this aspect of health and safety culture in the education and training policies at national and European level. Target groups are here, for example, not only children and young people at school, but also teachers that need the necessary training and appropriately integrated teaching programmes.

- Education and training in risk prevention in vocational training establishments and universities: This area covers target groups such as specialists in the prevention of occupational risks (health and safety practitioners, labour inspectors, insurance inspectors, occupational medicine specialists and occupational hygienists), and other professional profiles such as engineers or architects whose activity may affect safety and working conditions. These specialists should of course receive training corresponding to the tasks which they will be called upon to execute, their level of responsibility, the nature and seriousness of the risks encountered, etc.

  But it also covers young people undergoing vocational and technical training. The importance of this aspect is underlined by accident statistics indicating that for young people aged under 26 the frequency

of accidents may be 1.5 times as high as normal.

- Continuing training: This should be the golden rule of a genuinely common prevention culture. It should involve all workers throughout their careers in order to keep up with developments in prevention techniques, risks, technology and regulations.

In this regard, the Member States are called on to make wider use of the possibility offered by the European Social Fund (ESF) and other Community funds of developing training projects in the field of health and safety at work for employers and workers.

Community action in this area also involves the activity of consultative bodies such as the tripartite Advisory Committee on Safety and Health at Work (ACSH), which had released an opinion on this subject and had been working at the establishment of guidelines on the specific OSH knowledge and skills required for the development and implementation of a genuine culture of OSH prevention.

The issue will also be discussed as a topic in the framework of the 5th EU/US Joint Conference on OSH (Cascais, Lisbon, 7-9 November 2007) and the following 6th EU/US Joint Conference (Boston, 22-24 September 2010). These events will give both parts the opportunity to exchange views and experience on subjects such as OSH Knowledge Management, the development of standards of competencies, curricula, recruiting models, national programmes, etc.

In turn, the Commission may consider in the future the case for a new Community instrument such a recommendation in this area to foster the development of training programmes at all levels of education and in all fields of activity.

References:

[1] *European Commission:* Improving quality and productivity at work: Community strategy 2007-2012 on health and safety at work, COM(2007) 62 final

[2] *European Commission:* Adapting to change in work and society: a new Community strategy on health and safety at work 2002-2006, COM(2002) 118 final

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1.2 Educating and training of young people at school, college and the workplace: results of recent Agency activities

Sarah Copsey, European Agency for Safety and Health at Work (EU-OSHA)

Introduction

- One young EU worker is seriously injured every minute [1];
- One young person is killed at work in the EU every other day [2];
- A hairdressing apprentice reacted to the products she had to use; her hands came out in cuts and blisters so that she could not even grip a knife and fork, and she had to give up the job...

Young people are more at risk of harm from work for a variety of reasons. They lack experience and maturity, they lack awareness of risks, they lack skills and training, they may be unaware of their rights and employers' duties regarding health and safety, and they may be reluctant to speak out about problems and keen to please their new employer. They will be at risk where their employers do not provide them with adequate training, supervision and safeguards or give them unsuitable jobs. Therefore, to improve the safety and health of young workers it is essential to look at both at the education that pupils and students receive prior to starting work and at the workplace.

From the EU-OSHA – Risk Observatory

The data

A forthcoming EU-OSHA Risk Observatory report, 'Young workers in figures' demonstrates how both the occupational safety and health (OSH) of young workers is at risk and that they tend to be more exposed to risks than older workers. The sources of information for the report include statistics from Eurostat, the Labour Force Survey and the European Working Conditions Survey as well as Member State literature [3].

Eurostat statistics from 1996 to 2004 tell us that young workers aged 18 to 24 had the highest non-fatal work-related accident rate of all age groups over this time period, and the rate of decline in accidents in this young age group is slower than for other ages [4]. In addition, data from the 1999 Labour Force survey reveals that Europe's young workers

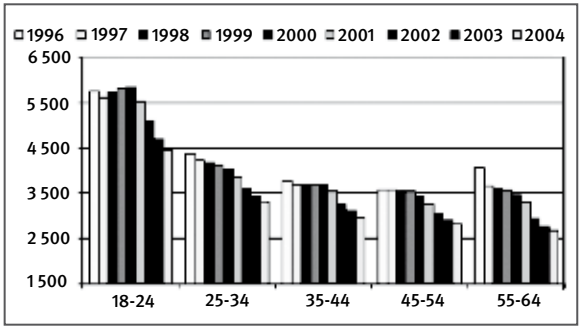


Figure 1:
Non-fatal work related accident rate per age group [4]

also report suffering health problems related to their work, including skin problems, infectious diseases, pulmonary diseases and cardiovascular diseases.

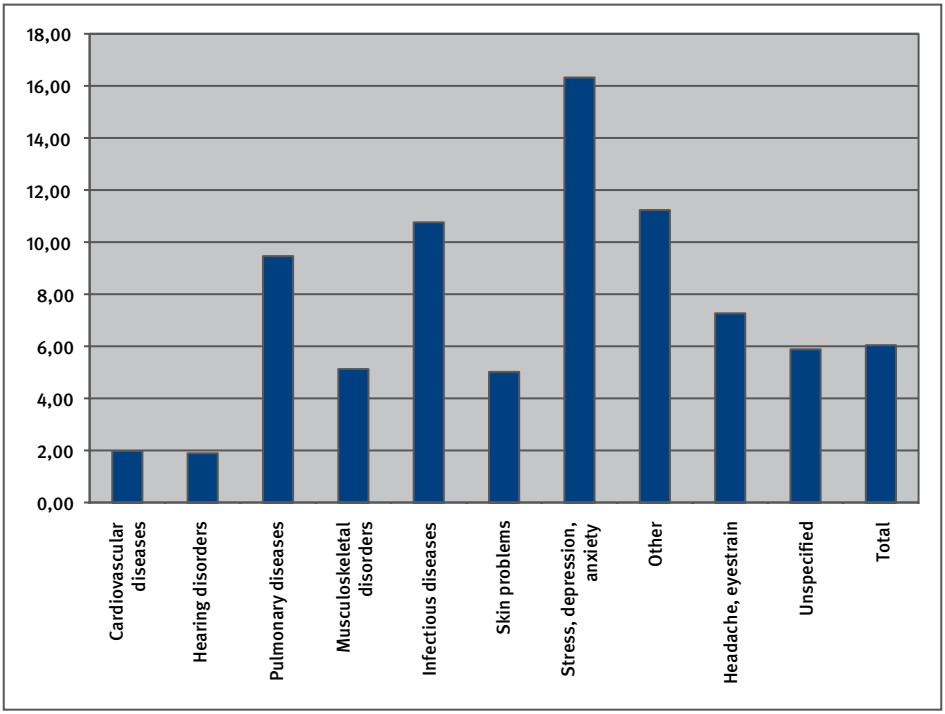
That workers are already reporting work-related health problems at a young age is less surprising when we look at self-reported exposures to hazards [5], where we see that young workers are more likely to be exposed to poor working conditions than older workers. For example, they are more exposed to noise, fumes, vibrations, heat and the cold, and to handling dangerous substances [6].

The Risk Observatory's conclusions

The conclusions that can be drawn from this analysis of work-related accidents and ill health among young workers by the EU-OSHA Risk Observatory include the following:

The risks to workers are influenced by: the sectors they work in; being more likely to work under certain employment conditions such as temporary work and shift work; being given 'heavier, dirtier' work; gender segregation in jobs etc.; being less likely to have access to rehabilitation services.

Figure 2:
Work-related health problems of young workers [5]



These findings suggest actions such as:

- targeting sectors where young people are most likely to work, including the service sector;
- targeting employment agencies;
- giving attention to OSH training in 'female' jobs in vocational training;
- targeting work accident reduction policies to young workers and targeting actions to the hazards they are most exposed to;
- including young worker issues in shift work guidelines;
- refocusing rehabilitation and employability policies for injured workers to include young workers;
- developing suitable training methods, e.g. for young migrants;
- training labour inspectors regarding risks to young workers;
- mainstreaming OSH into education;
- mainstreaming youth into OSH prevention.

Good practice examples

During 2006 the Agency coordinated a European campaign, 'Safe Start' to raise awareness and to promote the health and safety of young workers. It included a good practice awards competition and the following examples featured among the winners.

Temporary workers – Manpower/Axo/Arcelo – Belgium

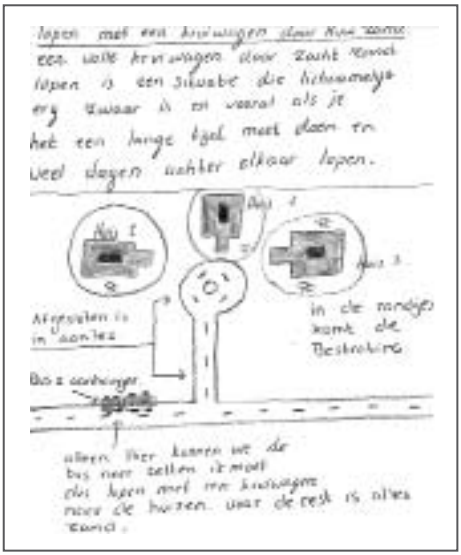
Temporary work agency Manpower, steel company Arcelor and Mutual insurer AXA worked together in this example. Temps must know Arcelor safety rules before they can take up employment, but it was found that the Arcelor safety rules were difficult to learn and that there was a 30% assessment failure rate. Also it was questionable how well the rules were subsequently remembered by those passing the assessment. At AXA young workers developed a new tool for training at Manpower. The new tool featured a self-paced e-learning, a step-wise approach, illustrations and quizzes. The training incorporated a final computerized multiple-choice test. Those passing receive a 'safety passport' giving them entry to Arcelor. The pass rate rose to 100%, and there were no accidents to temps in the Arcelor plant in 2005-2006.

This training initiative is backed up by measures that are in place in Arcelor for new starters. There are illustrated 'job descriptions' covering tasks, tools, machinery, risks, site jargon etc, which were developed together with Manpower. Each new worker is assigned a coach – an experienced worker. Temporary and permanent staff are treated equally with the aim of having temporary workers fully involved. The company maintains close communication with the temporary work agencies it uses, including through regular meetings and accident report exchanges. A safety charter between temporary employment agencies and Arcelor has been developed and signed by all the directors concerned, which is part of consolidating and demonstrating commitment from the top.

'Do you have a good idea?' The Dutch approach for young workers in the agricultural sector – musculoskeletal disorders – Stigas

The context of this example was a tripartite agreement on the reduction of musculoskeletal disorders (MSD) in agricultural sector. One of the projects under this programme

Figure 3:
Solution at a real workplace



was dedicated to young agricultural workers. The objectives included: to transfer knowledge to students about health and safety in the workplace; and to encourage students to submit ideas for solution to problems concerning physical risks by means of a contest.

In a partnership approach SOLLT, experts on transferring knowledge to teenagers, worked with STIGAS, experts on preventing MSDs in agriculture. Students were given two days of classroom training and a homework assignment to propose a solution at a real work place. Three to four students worked in a team and the results of the homework were entered into a competition. Twenty two agricultural schools and 300 students took part, generating 42 concrete ideas for solutions to problems. Well developed and presented solutions were received despite the students being 'non-academic'. The approach enables students to spot and solve problems themselves and the resultant solutions are often simple. Some employers subsequently implemented the solutions. Seventy eight percent of the students carried out the homework assignment and 83% of teachers reported that they found the lesson to be good. Both the Dutch Government and the education sector want a continuation of the project. One prize winning solution proposed laying the path of a landscaping project at the start of work as opposed to the end of the project, to make pushing wheelbarrows through the site easier. The employer was happy to adopt this idea.

Apprentices teach apprentices – Westfalen-Weser-Ems AG – Germany

Westfalen-Weser-Ems AG found that most accidents to apprentices were occurring during their first year practice period of basic skills. The company introduced an additional component of safety training whereby second-year peers pass on their own experiences of workplace safety and health by making a presentation to the first years. To prepare their presentation or demonstration the second years start by discussing safety issues in their day-to-day work with their instructors and safety engineers and identifying topics from own experience of incidents or accidents. In groups of two or three they are given three months to develop a 30 minute presentation, during which time they can obtain help and support from the safety unit and other company institutions. They make corrections to their project after presenting it to their instructors. Then they present their project to the first-years in a session that includes a discussion following the presentation. In addition, there is an annual fair where

all the projects are presented to the company, including to the safety professionals and works council representatives. The results of the apprentice projects are fed back into the risk assessment update process. The value of the exercise is not only a credible means of explaining safety to new apprentices, but also the communication of safety issues to company departments through new channels.

After the first year of this training project accidents had been reduced by 40% and serious accidents by 88%. In addition it is a low cost, simple approach.

Success factors in prevention

The Agency has reviewed and analysed a number of good practice examples of preventing risks to young workers, and there are a number of common success factors that can be identified in these cases. These success factors include:

- Mainstreaming youth into prevention actions.
- Basing actions and interventions on risk assessment, and ensuring actions are implemented and monitored.
- The importance of learning from experiences of mainstreaming OSH into education, as recommendations regarding effective teaching of OSH in education are also valid for the workplace, such as:
  - using a balance between theory and practice;
  - using suitable teaching resources and methods;
  - the requirement for training for supervisors, mentors and trainers in their role and in OSH;
  - partnership.
- The effectiveness of using peers including more experienced young workers and the use of older, experienced workers as mentors. This provides a positive experience for new and more senior colleagues.
- Ensuring a close link to working life.
- Having young people examine and solve real work problems.
- Feeding the results of such student work back into the real workplace risk assessment and prevention process. This makes the exercise meaningful for youngsters and is of value to employers.
- Making OSH an integral part of doing the job right – at work and in vocational training.

OSH in education curricula – Member State activities

To underpin OSH education in schools and colleges it is necessary to formalise it in curricula requirements. A report published by the Agency in 2009 reviews how the Member States are including OSH and risk education in their national curricula. The report shows that there is considerable Member State progress and activity in this respect at both primary and secondary education levels in terms of both implemented and planned actions. Actions to include OSH in education at the curriculum level include:

- Statutory requirements
- Voluntary curricula
- Guidelines and resources to support the statutory requirements and voluntary curricula
- Formal recommendations
- National guidance and resources in cases where no curricula have been set
- Promotional campaigns to support the above [7].

Cooperation activities on education at the European level are resulting in a convergence in the core subjects and learning objectives being implemented in schools across the Member States. Risk education and OSH are generally not treated as a stand alone subject, instead opportunities are being taken to incorporate them into the learning objectives of other relevant subjects in school curricula, such as science teaching, physical education, health education and citizenship. To develop OSH and risk education aspects of curricula a strong partnership approach is often taken involving bodies such as OSH Authorities, Government Education Ministries and Curriculum Authorities. Many innovative resources have been produced at national and regional level in the Member States.

In some Member States, such as Sweden, integrated approaches are being taken, whereby the teaching of risk education is linked to a safe learning environment and also the health of the pupil at school. Some initiatives are supporting the promotion of risk education in schools at the same time as supporting schools to improve the safety in school buildings. Pupils may be actively involved in school safety issues, for example, through the designation of pupil safety representatives and pupil involvement in hazard spotting in schools.

It is recognised that teachers need training in how to deliver risk education, and if they do not have such training and risk education is just one option on the curriculum to choose from, they may be reluctant to attempt to teach it and opt for a topic that they feel more comfortable with, even if they have been provided with good resources. Therefore training programmes are needed for existing teachers and OSH and risk education teaching needs to be included in trainee teacher courses. This is the topic of an Agency study finalized in 2011 [8].

The greatest challenge is to mainstream OSH into university education in order to reach future engineers, architects, medical professionals, business professionals, managers etc.

The mainstreaming of OSH into university level courses is the least well developed area for various reasons, which include the lack of direct national government control over university teaching. Actions to include OSH in relevant courses such as engineering or business studies are therefore ad hoc, often dependent on the interest of individual professors or particular advocates within professional bodies. Professors need convincing of the need to include OSH in courses. They also need relevant materials. Nevertheless there exist some examples of good practices, for example, in the area of engineering and the Agency published a report with a collection and analysis of such examples [9].

Conclusions

To sum up, there are many factors both regarding education and the workplace that interact to influence the safety and health of young workers. Therefore, to improve the occupational safety and health of young people it is essential to both mainstream OSH into education and to mainstream the OSH of young people into workplace prevention activities at all levels. Activities and experiences to mainstream OSH into education can inform workplace practices, such as

training. Equally, innovations in workplace training can inform practices for mainstreaming OSH into education. A strong cooperation between those involved with workplace safety and those involved in education will facilitate progress to improve young worker safety and health. Networking to exchange experiences and share resources is particularly useful.

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1.3 Development of a common European competence profile for teachers and trainers

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Introduction

I saw the first competence framework or standard in 2003. It was the traditional type of framework, listing the necessary competences for a teacher engaging in eLearning. It was daunting: page after page of detailed "should be able to" statements. This first encounter did not open to me the opportunities that competence frameworks can actually provide.

Later, having worked with issues related to teacher and trainer competences, as well as being involved in projects aiming at building a European competence framework, I came to see the benefits of competence frameworks. In this article I will report on the work done to construct a European competence framework for teachers and trainers in initial vocational education and training [1]. I will also reflect on the pros and cons of competence frameworks.

Cedefops' project Defining VET Professions

The objective of making European Vocational Education and Training (VET) globally competitive and attractive has brought a focus on VET professions, particularly those of VET teachers and trainers. At EU level there is a consensus that more efforts are needed regarding VET teachers and trainers. Both the 2004 and 2006 joint interim reports for Education and Training 2010 and Maastricht Study underline the importance of teachers and trainers for the overall quality of Education and Training systems [2 to 5].

In addition to the recognition of the key position of teachers and trainers, studies point to the fact that the teachers' and trainers' work is becoming more and more complex [6 to 8]. A lot of pressure for change is directed at the educational institutions of today. There are many reasons for this need to change. First and foremost, the operational environment of the institutions is undergoing such dramatic change that the institutions must come out and begin to seek new operation models. Here the question is not only about changing concepts of learning but more about societal, organisational and technological factors. These give rise to new competence requirement for teachers. The teaching and training profession could also be seen as political jobs as they have to adapt to changes in educational policies and reforms. Further, the decentralisation of education systems in Europe has meant greater autonomy and better opportunities for the VET teachers to influence VET provision (curriculum, planning, methodology, content, etc.), but at the same time more pressure and work for the teachers and principals.

The above developments mean that we need motivated and highly qualified VET professionals who can cope with the constant changes and commit themselves to continuous professional development. Finding these well-qualified and motivated teachers and trainers is hampered by the fact that in many countries these professions are not attractive or sufficiently recognised. Further, the initial education of teacher and trainers

does not necessarily equip the individuals with the required skills and competences, and there are severe shortcomings regarding their continuous professional development.

One of the tools envisaged to help in this situation is a competence framework for VET professionals. The project "Defining VET Professions" carried for Centre for the research and development of vocational education and training in Europe (Cedefop) hopes to contribute to the development of a common European competence framework for the VET professions.

The attitudes to competence frameworks in Europe are twofold. Many countries are in the process of drawing up unified qualification requirements for VET teachers and trainers and can thus benefit from a common European framework. On the other hand, in countries that have formal qualification requirements and competence-based curricula, there is discussion and debate on whether standards in the form of qualification frameworks should be implemented or whether they hamper the autonomy of teacher education institutions [9].

The project has drawn up competence frameworks for central VET professions in initial vocational education and training (IVET) and continuing vocational education and training (CVET). The basis has been interviews with these professionals that explored into the activities and the knowledge and skills required. The competences are described as the levels of responsibility and autonomy in the different roles. In initial VET the activities and competences of three IVET profiles have been explored, namely teachers, trainers and principals [10].

One of the results of the project has been the revelation that the distinction between teachers and trainers is becoming more and more blurred. Teachers' and trainers' activities have gone to resemble each other. However, the training of these professional groups are a world apart: teachers are in many countries educated within higher education while trainers mostly either have a much lower level training or are not trained at all.

Some of the concerns and challenges that affect all three professions are the increase in administrative tasks and responsibilities, the significance of networking and need for more training in the area of quality assurance. A big challenge is the integration and embedding of a quality assurance culture into the workplaces and institutions. The administrative burden in turn takes a lot of time away from e.g. pedagogical development. Finally, the significance of networking outside the organisations became very clear in the interviews. Of particular concern is the low activity in international cooperation. More attention needs to be devoted to the efforts to internationalise VET institutions and other training organisations. All staff, principals included, need an understanding about the international dimension and need the skills to operate in an international surrounding.

What can a competence framework be used for?

A competence framework can be defined as a generic description of the skills, knowledge and wider competences that teachers and trainers and other professionals should possess to enable vocational education and training at a high level. Competence

frameworks can serve as tools for quality assurance, development of skills, knowledge and personal competences. They can also serve as a basis for initial and continuing VET teacher education and training and tool for recognising and validating informal and non-formal learning. The competence framework helps the professionals to:

- reflect on their professional effectiveness
- determine and prioritise areas for professional growth
- identify professional learning opportunities
- assist their personal and career development planning
- assist in assessing and developing institutional competence

The last point above refers to the fact, not to be forgotten, that a competence framework is not necessarily a description of the competences required by all individuals. The competences in a framework are not necessarily all performed by the same person. Instead, it is more likely that this range of activities will be carried out by a team of people.

On an EU level, a common European competence framework is necessary because the training and qualification requirements in VET vary greatly in Europe; we have countries where the requirement for becoming a VET teacher is a Master's degree and countries where there are no qualification requirements. Furthermore, the trainers in enterprises are doing more and more of the training today, but in most countries there is no initial training available for them. Consequently the competence level of trainers varies not only from country to country, but from enterprise to enterprise. A competence framework can steer developments and decision-making in a direction of better and relevant education for educators.

Last but not least, in addition to raising the professionalism of the VET professions, a European competence framework can be a valuable tool for increasing the esteem for both vocational education and training and its professionals. The esteem arises from making transparent the complexity of their work and the versatility of the professional competences that they need to successfully carry out their work.

Can competence frameworks work contribute to the development of education and training?

We should be careful when we build competence frameworks. A lot can be gained from common competence frameworks, provided that these are relevant and focus on critical contents. A framework that is up-to-date and innovative will most likely contribute to teacher and trainer education in a positive way and be welcomed as a useful tool both by policy makers, teacher educators as well as local authorities.

But competence frameworks or standards are not automatically beneficial. Too stringent frameworks can have a stagnating effect, preventing innovation and development. They can even be a hindrance to authentic and relevant curricula. Furthermore, in teacher education they can complicate the individualisation of studies, where the students' individual capabilities, prior learning and experience as well as learning styles should be taken into account [11]. This is also

in conflict with the ideology of institutional competence where teachers and trainers can specialise and together improve the competence profile of the whole organisation and develop a wide selection of learning opportunities for the students.

All in all, even if my first encounter with competence frameworks, described in the beginning, was not very positive, you can tell from this article that I have warmed up to these frameworks. If we use them well and in a responsible manner, they can contribute very much to promoting a European area of education and training. Such an area would be known for its high-quality education and training for all its citizens, regardless of where they live, how old they are and what their economic circumstances are.

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1.4 Educational standards as an instrument for quality development?

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The term "educational standards" is on everyone's lips. But what are they? This paper investigates the origins, justification and purpose of educational standards, with a particular focus on the link between the development of national, European and international educational standards. On the basis of a critique of educational standards, their significance for initial and further training in safety and health is examined.

What is a standard?

A standard provides a basis for measurement. We are mainly familiar with the concept from the field of technical standards. One example is the CE mark (Conformité Européenne), which indicates product safety and is used by a manufacturer to confirm that a product conforms to the relevant EU directives and meets the main safety and health requirements laid down in these. The main purpose is to facilitate free movement of goods within the European Economic Area by achieving technical harmonisation of products. But conformity of the product with the current European directives does not enable any conclusions to be drawn as to its quality: the CE mark is not a quality seal. Nevertheless – with certain defined exceptions – it is a necessary prerequisite for a product to be circulated or commissioned [1].

What is an educational standard?

If we interpret the meaning of educational standards from a historical perspective, e.g. in terms of the development of early modern curriculum theory, it is possible to see the development of modern state schooling as a process of ongoing standardisation ever since the 17th century. Thus, for example the "Schulmethodus" of *Andreas Reyher* (1601-1673) published in 1642 introduced, amongst other things, compulsory schooling, regulated the subjects and divisions into classes, prescribed the textbooks to be used, laid down rules for teaching methods and school discipline and established a marking scheme. To this extent the "Schulmethodus" represented the first modern-day standardisation of basic school teaching in Germany [2]. Thus educational standards are nothing new – schools consist of standards and what is surprising is that we are expected to come up with new ones nowadays [3]. The view of standards as inherent structural elements in day-to-day education contrasts with current calls for "new" educational standards.

The origin of the "new" educational standards

The call for "new" educational standards has to be seen in the context of the development of European education policy and its structural impact on national education systems.

With the Maastricht Treaty of 1992, the EU received explicit but strictly limited powers in the field of general and vocational education [4]. Because of the importance of vocational training for building up the Single Market and the general economic and social development of the EU, the objectives and skills for this sector were more comprehensively

defined. The spectrum ranges from promotion of mobility and exchange of experience to facilitation of access to vocational training in Europe. The Green Paper on mobility published by the European Commission in 1996 and the Communication "Towards a Europe of Knowledge" that appeared one year later paved the way for a subsequent phase of European cooperation in the field of education. In particular this involved defining the goals of a European educational space. Further milestones in EU education policy include the Bologna Declaration (1999: The European Space for Higher Education), the Copenhagen Declaration (2002: Enhanced European Cooperation in Vocational Education and Training) and the Maastricht Communiqué (2004: Future Priorities of Enhanced European Cooperation in Vocational Education and Training). However, the lynchpin for the development of European education policy is the European Council's Lisbon Declaration of 2000, which considerably upgraded the status of education policy within the EU. The core statement made in the Lisbon Declaration is that the EU should "become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion". Since then, the Lisbon process has served to provide general legitimisation to activities in the field of education as well. Against this background the specific future goals of the system of general and vocational education were formulated, indicators and benchmarks agreed on and an annual reporting process launched. All these declarations and agreements are, however, not decisions made by the EU and its bodies but rather agreements between member states. Education is one of the areas of policy within the EU in which the member states have retained sovereign rights. Intergovernmental cooperation between member states is based on the Open Method of Coordination (OMC), and important instruments include non-binding recommendations and guidelines issued by the Commission to the member states [5].

This is precisely where the "new" educational standards come into play: as so-called "softer policy tools", education standards serve the purpose of creating a European education space and tackling the deficits in national education systems identified by OECD studies [6]. The main task of educational standards in this context is to ensure the quality of initial and further training. An excellent example of the new educational standards is the European Qualifications Framework [7].

At the conference of ministers of education in Maastricht in December 2004, a decision was made to develop a European Qualifications Framework (EQF). This move came in response to a call from the European Council in the year 2000 in Lisbon to improve the transparency of qualifications and promote lifelong learning in order to achieve the goals laid down in the Lisbon partnership for growth and employment. The EQF serves above all as a neutral reference point and translation device for comparing qualifications from various different initial and further training systems and strengthening cooperation and trust between those concerned. The EQF applies to general and vocational education, which are regarded as equally important from the point of view of lifelong learning. The EQF supports these by facilitating recognition of qualifications between different national systems and between

general, tertiary and vocational education in order to promote mobility. Application of the EQF is voluntary [8]. The basic principle on which it operates is the creation of equivalence and correlations between qualifications by drawing up a common, neutral framework that is not derived from one particular national education system but rather represents a "third" element. The EQF builds on the Bologna process, which for the first time in the context of European educational co-operation achieved a structural impact on national education systems [9].

The European Credit Transfer System for Vocational Education and Training (ECVET), on which work has been carried out since 2005, corresponds to the EQF and is similar to the existing European Credit Transfer and Accumulation System (ECTS) in making it easier for individuals to combine initial and further training provisions offered by different countries [10].

Types of educational standards

Standards can take the form of minimum, standard or maximum requirements, but they are usually formulated as minimum standards. When defining the minimum requirements of learning content, learning results or resources for teaching and learning, reference is often made either implicitly or explicitly to a differentiation made in 1995 by the American historian *Diane Ravitch* between:

- "Content standards" (or curriculum standards), which "describe what teachers are supposed to teach and students are expected to learn. They provide clear, specific descriptions of the skills and knowledge that should be taught to students".

- "Performance standards", which "define degrees of mastery or levels of attainment. They answer the question: 'How good is good enough?' Performance standards describe what kind of performance represents inadequate, acceptable, or outstanding accomplishment".

- "Opportunity to learn standards", which "define the availability of programs, staff, and other resources that schools, districts, and states provide so that students are able to meet challenging content and performance standards" [11].

Characteristics of educational standards

The European Qualifications Framework provides a prism through which the central characteristics of the "new" educational standards can be examined. Three of these characteristics will be looked at in greater detail here:

(1) The principle of learning-outcome orientation

One typical feature of the "new" educational standards is the fact that they are largely oriented towards learning-outcomes. What is crucial is no longer where and for how long one has undergone a learning process but rather what one is capable of doing and in what way. The orientation of the EQF towards learning-outcomes is intended to overcome the main obstacle in the European educational space – the link between qualifica-

tions and existing training and employment systems. "Translation" of qualifications required is made possible with descriptors such as "knowledge", "skills" and "competence" that are divided into eight hierarchical competence levels ranging from simple basic competence to highly complex ones [12]. In terms of the "new" educational standards, it can, in fact, be said that there has been a paradigm shift from input-orientation to outcome-orientation. At system level this means that an attempt is being made to run the education system in terms of objectives and intended effects and not primarily in terms of input or processes. In other words, the focus is on the usefulness of education, which can also be portrayed in international or federal terms [13].

Critics of learning-outcome orientation point out that the "new" educational standards represent a break with modern European educational tradition, in which learning content, learning processes and learning results are co-ordinated in the curriculum and described in such a way as to achieve particular more far-reaching societal standards or standards aimed at development of an individual's personality. Furthermore, learning-outcome orientation contradicts the principle of professional profiles defined in initial and further training systems. This applies in particular to countries with a tradition of vocational training such as Austria, Germany and Switzerland [14]. However a much more serious objection is that successful learning in itself does not allow any conclusions to be drawn regarding the factors or the quality of the factors that led to that success. Standards define or operationalise what is desired, or required and is measurable in terms of the results of organised learning. But they leave open the question of what this depends on – the highly complex structure of conditionality or causality [15]. Educational standards based primarily on learning results are thus open to criticism for being insufficiently complex – in other words on grounds of reductionism.

(2) The principle of competence-orientation

The EQF is based on the concept of competence derived from the Anglo-Saxon tradition and rooted in cognition theory. A competence is understood here as being an individual disposition displayed in a performative situation, in other words in the way in which practical tasks are coped with [16].

It is important to stress that competencies cannot be directly observed and do not represent an objectifiable quantity. They are a sort of generalisation of what is required in terms of observable behaviour. It is not possible to draw a direct link between actions and the disposition underlying these. In addition, determining what is meant by competence is always related to individual realisation and can only be described in conjunction with a desired and observable manifestation of behaviour (performance). In addition, what is meant by competence results from decisions in which socially selective interests always come to the fore (legitimisation) [17].

The performative concept of competence in the context of educational standards contradicts the generative concept used in vocational education [18]: there is disagreement with regard to the principle of subject-related competence versus the principle of profes-

sionalism. Subject-related competencies as contained in new standards are contrasted with broad-based practical vocational skills. A cognitive concept of competence based only on learning results, with differentiation according to levels and priority given to testing procedures, is rejected. Contrasted with this is the concept of practical vocational skills as being a combination of specialist, social and personal skills. According to the principle of profession, the entire spectrum of competencies including those acquired via practical vocational skills should be included [19].

(3) The principle of quality-orientation

The primary purpose of the "new" educational standards is seen as being improvement of quality and quality assurance at all levels in the education system in national and international comparative terms.

However the link between standards and quality should not be taken for granted. The higher the claim to quality, the more limited the scope for standardisation appears to be, given that high standards of quality are all about particular, unique, individual characteristics. The stricter the requirements for standardisation, the more quality considerations are pushed into the background. Standards aim at equality, quality aims at differentiation. Thus the risk of uniformity and levelling down is inherent to the idea of standards [20].

If the purpose of standardisation is seen in terms of quality, then this confuses ends and means [21]. Standards represent the operationalisation of the assumed purpose of educational activities, i.e. they are a means rather than an end. The end, the purpose, precedes the standard in each case. The standard per se does not legitimise anything. Thus standards have a structural legitimisation deficit.

Nevertheless, standardised goals are not entirely irrelevant for educational quality: on the one hand they prepare the ground for practical, targeted educational measures, and on the other hand they operationalise the criteria for the success or failure of prior teaching and learning. However, congruity of the competencies measured does not say anything about the quality of the preceding teaching and learning process. As long as we do not know, for example, anything about the causal links between school programs on the one hand or on the other hand teacher competencies and lesson planning and the (central) quality assurance instrument of "educational standards", fulfilment of a standard "only tells us one thing, namely that the standard has been fulfilled, and nothing more than that!" [22] The formulation of standards thus runs the risk of claiming to be something it is not, or of becoming self-referential (on this see *Paul Swuste* in this report) [23].

Standards for initial and further training in safety and health

The first educational standards for initial and further training in the fields of safety and health already exist in the form of the EurOSHM standard for occupational safety and health professionals (on this see *Andrew Hale* and *Giancarlo Bianchi*) and the ENETOSH standard of competence for instructors and trainers in safety and health (on this see *Arja Äyräväinen* et al.). In addi-

tion there are national occupational standards, as for example in the UK, or standards for the integration of safety and health into general and vocational training, as for example in Ireland and Denmark (on this see *Ian Ward*) [24].

Keeping in mind the remarks made above on the subject of educational standards, we can say here that:

(a) Merely ensuring learning outcomes does not go far enough, given the complexity of learning and teaching. Safety and health have a particular role to play here, inasmuch as they are a fundamental prerequisite for teaching and learning to take place. A healthy and safe learning environment is required, as is a high-quality working environment for the teachers involved.

(b) The compatibility of the performative definition of the term with the model of practical vocational skills needs to be clarified. This is necessary to ensure that definitions of competencies in the field of safety and health remain capable of being linked to current educational standards at European and national level.

(c) There needs to be clarification of the conditions under which protection of safety and health contributes towards the quality of education. Are the Lisbon goals sufficient to legitimise them or do safety and health have to be examined as a pedagogical issue if they are to contribute to the quality of school, university or vocational education in the future [25]?

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2 Development of standards in vocational education and training

2.1 Standards Setting in the UK

Ian Ward, ENTO

Introduction

In the United Kingdom standards have been developed to improve performance in a majority of job roles. These are known as the National Occupational Standards.

What are National Occupational Standards?

National Occupational Standards (NOS) are agreed statements of competence, which describe the work outcomes required for an individual to achieve the standard expected of them in work.

The National Occupational Standards can reflect generic areas as well as specific areas.

The Standards are industry-led, which means they arise from the collective experience of occupational experts. The standards are not imposed by academic organisations, training providers or indeed government on an occupational area. Instead the sector or occupational area facilitates their creation by the industry itself. The employers in a given area work with professional or trade bodies to create the relevant National Occupational Standards.

The sector is supported by a technical consultant/organisation, experienced in the writing of occupational standards, to define its standards of competence through a great deal of consultation with people who actually do the job.

Competence means 'the ability to get things done' or outcomes. To be more specific, it means the ability to get things done to the right standards as recognised by employers. It is not about 'going through the motions.' It is about getting results.

Starting with the question 'What is the occupation for (or what is it there to achieve)?' the sector will gradually build up a total picture of all the activities and the outcomes which result.

In other words the foundation of the National Occupational Standards is the workplace itself. The development is rooted in what people actually need to be able to do and know in their jobs and that is the basis for the whole national occupational standards system.

On the face of it 'competence' appears to be a simple idea. Subsequent experience in developing the National Occupational Standards, however, has shown that defining competence in generic terms can be a complex process. Nonetheless there is clear merit in developing qualifications, which are based on what people actually have to be able to do at work.

The National Occupational Standards are regularly used to develop qualifications and the standards are structured into sensible groups of activities called 'units' to aid this.

Each unit is broken down into 'performance criteria', which are the fundamental measures of whether the job has been done to the right standard, and 'knowledge requirements', which detail the knowledge and understanding needed to perform the job effectively.

Put them all together and the units create a suite of National Occupational Standards. Before the National Occupational Standards are finalised, they are field-tested, piloted, refined and undergo widespread consultation. They have to be endorsed by industry and employers. That is what makes them credible.

Because National Occupational Standards form a ready-made, nationally agreed set of competencies, they can be deployed to support individuals and organisations to:

- Become a learning organisation
- Enhance the skills of management
- Gain external recognition through Quality Marks
- Improve customer care
- Make the most of the staff
- Plan the organisation's operations
- Re-organise the organisation or department/s
- Set and achieve quality standards
- Set standards for recruitment, performance and development for both individuals and teams.

Specific applications for the National Occupational Standards can include:

- Appraisal schemes
- Learning and development programmes
- Definitions of work standards
- Job descriptions and person specifications
- Organisational planning
- Objectives for training
- Specifications for what teams must achieve

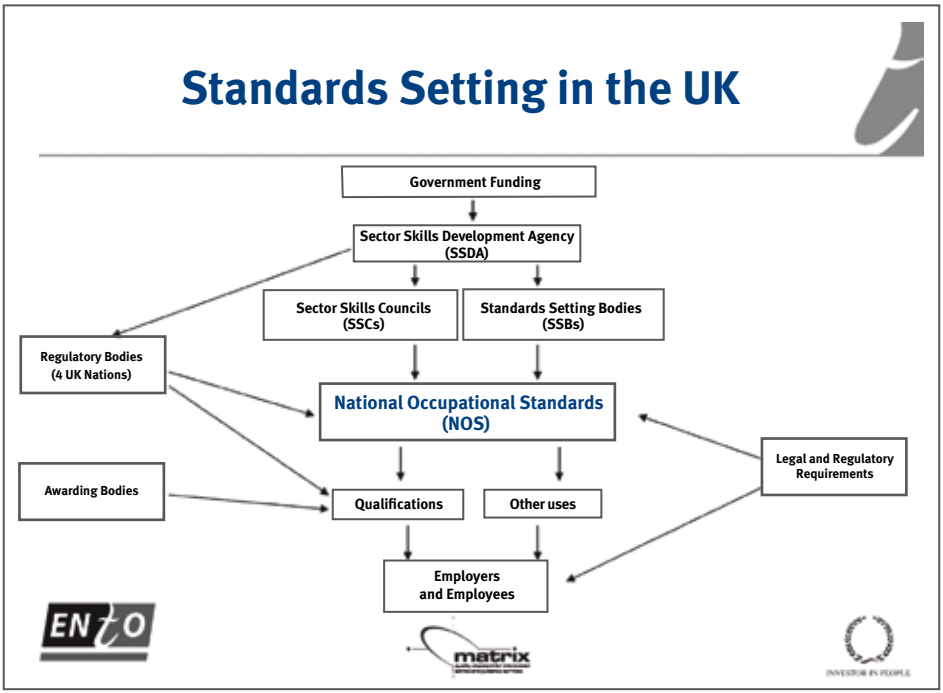
The approaches inevitably overlap and some organisations use the National Occupational Standards in more than one way to achieve their goals around productivity, better focus and developing competent and better-motivated staff.

So, while the development of relevant and credible vocational qualifications may have been the primary purpose for creating National Occupational Standards, once the standards exist they are recognised as being a versatile and adaptable tool, which can be applied in a variety of circumstances.

Developing National Occupational Standards

The development and maintenance of National Occupational Standards in the UK is the responsibility of Sector Skills Councils and Standards Setting Bodies, funded and coordinated by the Sector Skills Development Agency using Government Funding.

Figure 1:
Standards Setting in the UK



Sector Skills Development Agency (SSDA)

The roles and functions of the Sector Skills Councils and other standard setting bodies are funded, coordinated, and supported by the Sector Skills Development Agency.

Sector Skills Councils and other approved Standard Setting bodies:

- Represent specific industry and occupational sectors
- Define the nationally recognised occupational standards and take forward a strategic and focused agenda for skills development within their sector
- Bring together employers, unions, government, practitioners, and education and training providers
- Serve all organisations from the private, public and voluntary sectors of the economy

They have four main goals:

- Reduce skills gaps and shortages
- Improve productivity, business and public service performance
- Increase opportunities to boost the skills and productivity of everyone within the sector
- Improve learning supply to the workforce

Regulatory Bodies:

These Government sponsored bodies must approve all National Occupational Standards as conforming to the required criteria and that they are capable of assessment. They represent each of the 4 UK nations: England, Northern Ireland, Scotland and Wales.

The National Occupational Standards for Health & Safety

The National Occupational Standards for Health and Safety are widely imported into other suites of national occupational standards and mapped to qualifications and development programmes. The Standards have a critical role to play in raising standards of practice and awareness of health and safety in the workplace to reduce the number of incidents and accidents. Health and safety awareness also has a role to play as an employability skill. The suite has three parts which are:

1. Standalone units

Unit	Title
HSS1	Make sure your own actions reduce risks to health and safety
HSS 2	Develop procedures to safely control work operations
HSS 3	Monitor procedures to safely control work operations
HSS 4	Promote a healthy and safe culture in the workplace
HSS 5	Investigate and evaluate health and safety incidents and complaints in the workplace
HSS 6	Conduct a health and safety risk assessment of a workplace
HSS 7	Make sure your own actions within the workplace aim to protect the environment
HSS 8	Review health & safety procedures in workplaces
HSS 9	Supervise the health, safety and welfare of a learner in the workplace

2. Practitioner units

Unit	Title
HSP 1	Develop and review the organisation‘s health and safety strategy
HSP 2	Promote a positive health and safety culture
HSP 3	Develop and implement the health and safety policy
HSP 4	Develop and implement effective communication systems for health and safety information
HSP 5	Develop and maintain individual and organisational competence in health and safety matters
HSP 6	Identify, assess and control health and safety risks
HSP 7	Develop and implement proactive monitoring systems for health and safety
HSP 8	Develop and implement reactive monitoring systems for health and safety
HSP 9	Develop and implement health and safety audit systems
HSP 10	Develop and implement health and safety emergency response systems and procedures
HSP 11	Develop and implement health and safety review systems
HSP 12	Contribute to health and safety legal actions
HSP 13	Influence and keep pace with improvements in health and safety practice
HSP 14	Develop and implement systems and procedures within the workplace to minimise environmental impact of the organisation

3. Regulator units

Unit	Title
HSR 1	Identify the plans and priorities of the regulatory authority for work related health and safety, and contribute to them effectively
HSR 2	Inspect duty holders, worksites and activities for the purposes of work related health and safety regulation
HSR 3	Investigate work-related accidents, incidents, ill-health reports and complaints for the purposes of health and safety regulation
HSR 4	Plan and gather evidence for the purposes of work related health and safety regulation
HSR 5	Enforce statutory provisions and brief a prosecutor for the purposes of work related health and safety regulation
HSR 6	Enforce statutory provisions and present guilty pleas in Magistrates’ Courts for the purposes of work related health and safety regulation
HSR 7	Draft and serve notices or other statutory enforceable documents for the purposes of work related health and safety regulation
HSR 8	Influence health and safety duty holders and others for the purposes of work related health and safety regulation
HSR 9	Improve work related health and safety through promotional activities

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2.2 Europeanisation of vocational training: "EuroB" – A project by Volkswagen Coaching GmbH, supervised by researchers from Kassel University's Vocational Training Institute

Christoph Anderka, University of Kassel

Introduction

The "Europeanisation of vocational training" ("Europäisierung der Berufsbildung" or "EuroB") project developed strategies and methods with which to describe the content of German training programmes in line with the European Qualifications Framework (EQF). The content of the training programmes in industrial mechanics and robot systems, which were used as examples, was re-grouped in categories of occupational competencies. Standards of competence were defined on the basis of curricula, giving a detailed description of the occupational skills expected. The aim is to be able to document the competence to act autonomously that is developed during training by taking learning outcomes as the basis throughout. By assigning an EQF level and credits in accordance with the European Credit System for Vocational Educational Training (ECVET), standards of competence help promote the European aim of making occupational qualifications more transparent and comparable.

Project idea

The objectives set out by European politicians responsible for vocational education and training in the Copenhagen Declaration [1] were adopted by those in charge of vocational training at the Volkswagen Group. Consideration was then given to how said

objectives could be implemented within the company. The main aims of this initiative are long-term promotion of lifelong learning and facilitation of transnational employee mobility. Two instruments, the European Qualifications Framework (EQF) [2] and the European Credit System for Vocational Educational Training (ECVET) [3], are available as an aid to implementation. The European Qualifications Framework enables national and international qualifications to be compared whilst the ECVET system is intended to help assess occupational qualifications.

Through the EuroB project, which ran for two years from August 2005 to August 2007, Volkswagen Coaching GmbH took part in the developments, in a bottom-up approach, and examined the possibilities for implementing the European objectives. A key part of the research on the EuroB project was the development of standards of competence. Standards are used to define competencies for a particular occupational field. The standards of competence are described based on expected learning outcomes. A job description can be systematically divided into units with the help of standards of competence. These units are easier to compare internationally than the overall vocational qualification would be. Furthermore, such standards make it easier to officially recognise, for example, training periods completed abroad.

One of the main occupations at Volkswagen's German sites is industrial mechanic. Standards of competence were developed using this occupation as an example. In addition to initial vocational training, stand-

ards of competence were also drawn up for continuing training in the area of robot systems. In particular, the project involved testing and evolving methods and tools for developing standards of competence. The procedure was also tested for comparable occupations at four European sites with partners from the VW Group [4], leading to joint development of standards of competence.

By collecting standards of competence on an employee-specific basis, an individual competence profile can be compiled for each of the company's employees. The standardised competence descriptions create more transparency, which is of benefit for HR planning or targeted HR development. The competence of each employee to work autonomously is relevant to the company's success. Using standards of competence to document an employee's competence to act autonomously thus helps ensure that a person with adequate competencies is recruited when a position with specific requirements needs to be filled.

A further advantage of standards of competence is that credit can be given both for competencies developed formally and informally. Irrespective of whether the competence was developed by means of education and training or by learning on the job, a standard of competence provides proof that the employee in question does have the described level of competence to act autonomously. This means that training paths can be described from initial training right through to expert.

Procedure and structure of standards of competence

During the development of the tools and methods, the criteria for defining standards of competence were always chosen in such a way that the procedure could also be applied to occupations in other fields. The competencies are not specific to Volkswagen or to the automotive industry. Consequently, the standards of competence drawn up on the EuroB project can also be used for other areas of industrial mechanics and in small and medium-sized enterprises.

The first step entailed an analysis of the vocational school's training regulations and framework curricula. Whilst the training regulations are broken down in accordance with the items in the occupational profile, the content of the framework curriculum is grouped by area of learning. Due to these differences, a separate structuring system was developed on the project.

The task of identifying standards of competence involves dividing training content up to create examinable and certifiable units. In this context, the following four questions were asked:

1. How can the content and scope of a standard of competence be defined?

2. Which qualification requirements/training content can be grouped in one standard of competence?

3. How many standards of competence are necessary and sufficient to cover the entire training programme (the range of vocational qualification)?

4. What knowledge, skills, personal competencies and expertise need to be included in a standard of competence?

In our opinion, it is also necessary to analyse various sources in order to identify standards of competence. The training regulations and framework curriculum provide the legal basis but books, especially textbooks for the occupation in question, and in-company training documents should also be used.

The scope of a standard of competence can be influenced by various lines of argument. In terms of Germany's system of dual vocational training, which aims to promote vocational professionalism, large units would seem a good idea. If this approach were taken to the extreme and the entire training programme considered to be one unit, all of the competencies would have to be described by one standard of competence. However, it is doubtful whether such an approach would enable the requirement for more flexibility and mobility to be met. A standard of competence for an entire occupation complicates comparison with other European vocational training systems, making it difficult to give credit for periods of training completed abroad. On the other hand, very small units would result in a confusing number of units. Added together for all occupations, there would soon be several thousand standards of competence. Such a system would be unlikely to be accepted in Germany. Thus, the number of standards of competence for a particular occupation must be easily manageable. At the same time, however, each standard of competence must be usable on the labour market.

The EuroB project defined four requirements to determine the scope and target audience of a standard of competence:

1. The standard must cover an occupational activity that can be carried out by one person during the work process.

2. The occupational activity must comprise all of the steps in the model that depicts the overall activity.

3. The occupational activity must be usable on the labour market.

4. The occupational activity must be needed at a wide range of workplaces.

The next step was to specify the content of a standard of competence. The standard's description of the expected learning outcomes was based on the categories used in the European Qualifications Framework (EQF). The competencies are divided into knowledge, skills and competences (in the sense of ability to work independently and a sense of responsibility), as in the EQF. In contrast to the usual curricula, the perspective is shifted from input to outcome. In other words, whilst training regulations and framework curricula define learning content, the standards of competence describe concrete learning outcomes.

Comparison with real-life needs

In order to ensure that the content required by law matches the training needs at the workplace, the standards of competence were drawn up and discussed with several instructors. In addition, workshops were held with skilled workers and experts in order to validate the standards of competence. The participants included instructors, skilled workers from the company, workplace supervisors, trainees, vocational school teachers and employee representatives. In various stages, the descriptions in the standards of competence were added to or reduced and reviewed.

The first step is about identifying tasks and competencies typical of the selected area of activity. The knowledge necessary in order to perform the tasks, the extent to which the tasks are performed by the employee independently and the extent of to which the employee is responsible need to be described. In the second step, the individual descriptions (of the skills, knowledge and competences) are categorised either as relating more to the specific area of activity covered by the standard of competence or generally to the overall occupational field. Both extremes would result in a revision since the aim is a "medium level of specificity". The descriptions are then checked for completeness by considering possible changes in the future and qualification needs. Finally, all of the descriptions are assessed using the criteria of importance, frequency and difficulty, leading to a final revision of the standard of competence.

Conclusions and outlook

The model developed for the Volkswagen standards of competence is not dependent on any one education system. It enables periods of training to be described on the basis of competencies without having to change the structure of the underlying education system. The standards of competence thus provide a tool with which to systemise certification of vocational qualifications.

The lessons learned on the EuroB project have been fed into the vocational training debate by means of participation at numerous events. Further information and downloadable documents can be found on the Volkswagen Coaching GmbH website [5].

Since August 2007, the follow-up project on "Competence orientation in vocational training" ("Kompetenzorientierung in der beruflichen Bildung" or "KomBi") has been working on an implementation model based on the results of EuroB. Standards of competence are being drawn up for a further five main occupations [6] at Volkswagen. The next project phase will set out to test ways of identifying, certifying and documenting competencies using a competence-oriented vocational training model.

References/notes:

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[2] Commission of the European Communities: Towards a European Qualifications Framework. Commission staff working document, Brussels, SEC(2005) 957, *http://ec.europa.eu/education/policies/2010/doc/consultation_eqf*

[3] Consultation on a European Credit system for Vocational Education and Training, *http://ec.europa.eu/education/ecvt/index_en.html*

[4] The companies which participated were: ATEC (Portugal), Seat (Spain), Skoda Auto (Czech Republic) and Volkswagen (Slovakia).

[5] See www.vw-eurob.com.

[6] Tools mechanics, production mechanics, mechatronics fitters, motor vehicle mechatronics technicians and electronics technicians for automation technology.

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2.3 Embedding Standards – a testbed for the EQF and "Zones of Mutual Trust" for the ICT sector

Lutz Goertz, MMB – Institute for Media and Competence Research

Introduction

The contribution describes the development and the results of the Leonardo-funded project "Embedding Standards" – a trailblazer for the development of competence standards.

Between 2004 and 2006, a project group of 16 partners from eight countries tried out how courses in the IT-sector can be organised as e-learning lectures in different countries.

The basis for the mutual acknowledgement of learning results is the "European Qualifications Framework" (EQF) and the new credit point system ECVET (European Credit System for Vocational Education and Training) for vocational training.

The partners built up a "Zone of Mutual Trust" (ZMT) and tested their new methods to approve the learning outcomes of individual participants.

Overall Objective

In Europe in higher education and vocational training one can find a lot of different qualification degrees. The project "Embedding Standards" intended to overcome this "standardisation divide" in Europe by developing and piloting sector-oriented qualification approaches. To this end, the project simulated a transnational virtual training course for the IT-industry in which the partners agreed on a mutual acknowledgement for the course certificate.

Partnership

The following partners were involved in the LEONARDO-project "Embedding Standards":

- DEKRA-Akademie (Koordinator, DE) as consortial leader;
- Zentrum für Soziale Innovation, Wien (AT);
- Bundesverband der Digitalen Wirtschaft (BVDW, DE);
- Fachhochschule Osnabrück (DE);
- MMB – Institut für Medien- und Kompetenzforschung, Essen (DE);
- Asociación Española de Empresas de Multimedia (ASEDEM, ES);
- Indra S.A., Madrid (ES);
- Association Multimedia Emploi, Bordeaux (FR);
- South-East European Research Center (SEERC), Thessaloniki (GR);
- Security Technologies Competence Centre (SETCCE), Ljubljana (SI);
- Fastrak Consulting, Brighton (UK);
- National Institute for Vocational Education (NIVE), Budapest (HU);
- Prompt, Gödöllö (HU).

Corresponding partners:
- KIBNET/BITKOM (DE);
- Association SwissMedia (CH)

Subcontractor:
- E-Skills UK (UK)

Developing transnational courses – working with "moving targets"

The following report describes the proceeding steps of the project chronologically in accordance with other transnational activities on standardising national degrees.

Step 1:
Identifying grid/reference points

From autumn 2004 to spring 2005 the project partners identified existing ICT/multimedia profiles as grid/reference points for the future work.

The most important reference points were

- The European Qualifications Framework (EQF) issued in a first draft version
- The European Credit System for Vocational Education and Training (ECVET) – a European credit point approach to express the amount of learning, comparable to the European Credit Transfer System (ECTS)
- European e-Skills Meta-Framework – a competence based sectoral system for areas of learning in the ICT sector.

In addition, the partners found some good classification systems for the ICT sector in the SFIA (Skills Framework for the Information Age) and the AITTS (Advanced IT-Training System) in Germany [2].

Step 2:
Selecting profiles

In spring 2005, the project partners had selected profiles from those sectoral classification systems that fulfilled the following criteria:

- There were comparable profiles available in most partner states.
- Training providers were members of the partnership and were able to carry out training related to those profiles.
- Preliminary work results were already available: Profiles were subdivided into work elements.

Three profiles had been finally selected :

- The IT Project Coordinator (taken from the AITTS)
- The IT Security Coordinator (taken from the AITTS)
- The Web Content Specialist (taken from a previous LEONARDO project).

Step 3:
Defining smallest units

To set up a usable course program, the partners "sliced" the courses into smallest units. These units have been identified by using the descriptions of AITTS and Web-Content-Specialist.

Step 4:
Describing units in terms of KSC

In autumn 2005, a new version of the EQF was published [3], which described a system of eight levels. Each level was characterized by terms of "KSC" that means K = knowledge, S = skills and four different C = competencies (autonomy and responsibility, learning competence, communication and social competence, professional and vocational competence). This draft version was well discussed among European education experts. Thus, these characteristics became relevant for the description and classification of the course units.

One of the greatest efforts of "Embedding Standards" was the assignment of these levels to the course elements. The members of three working groups had to decide which learning outcome in the course fits to which EQF level and to which classification of learning outcomes. Furthermore, the three groups assigned a certain amount of ECVET credit points based on the estimated learning time [4].

The result: Three job descriptions are now available related to the KSC descriptors of SFIA, but also in EQF terms.

Step 5:
Carrying out virtual transnational training

In summer 2006, two of the courses were realized as distance learning courses with about 20 participants. Virtual transnational training was carried out for the

- Web Content Specialist
- IT Project Coordinator.

The participants were recruited by the training academies among the project partners. In addition, a 1-day IT Project Coordinator crash course took place as a present course.

Figure 1:
The top of the course concept "Web Content Specialist" with some (preliminary) learning outcomes characterised as "knowledge" and "skills"

The Web Content Specialist Qualification

Prepared by the Embedding Standards Project Team

For background on the purpose and positioning of the role, see the Job Description.
Suggested ECVET credit points: ‹20

Prerequisites

Knowledge:

- Knowledge of the specialist subject areas addressed by the content.

Skills:

- Native language skills.
- English language skills.
- Spelling correctly.
- Using grammar and punctuation correctly.
- Basic operation of personal computers (Windows or Macintosh).
- Use of Microsoft Office tools, i.e. Word, Excel.
- Basic report writing.

An evaluation has been carried out in order to determine whether the courses have been successful; in principle, results were positive.

An additional step: Testing a questionnaire measuring levels of EQF

As an additional task which was originally not mentioned in the project goals, the partners started to develop a system that measures the competencies of course participants on the basis of the EQF. This instrument has been developed within the project Embedding Standards by the MMB-Institute for Media and Competence Research with support of Zentrum für Soziale Innovation and Fastrack.

The purpose of this evaluation tool "CompAss" should be the measurement of changes in competence levels after finishing the course. Although the EQF is originally determined to compare national qualification frameworks it was an attempt to estimate knowledge, skills and competencies of individuals. As the EQF levels were used to describe certain competencies that course participants should gain after the course it seemed to be an appropriate way of efficiency measurement.

The method: The questionnaire is part of a general evaluation form. Like a psychological test, it consists of statements that can be summed up to indices. These indices can be transformed to scales that correspond to the EQF levels.

The questionnaire listed 52 items for 6 EQF dimensions (knowledge, skills and competencies) – since the tool was developed at the beginning of 2006, the items refer to the older version of the EQF with four different competence dimensions. Each item is an indicator for a general descriptor in the EQF system. There is at least one statement for each level descriptor on levels 1 to 6 – due to time-economical reasons, items for levels 7 and 8 have been omitted.

Example:

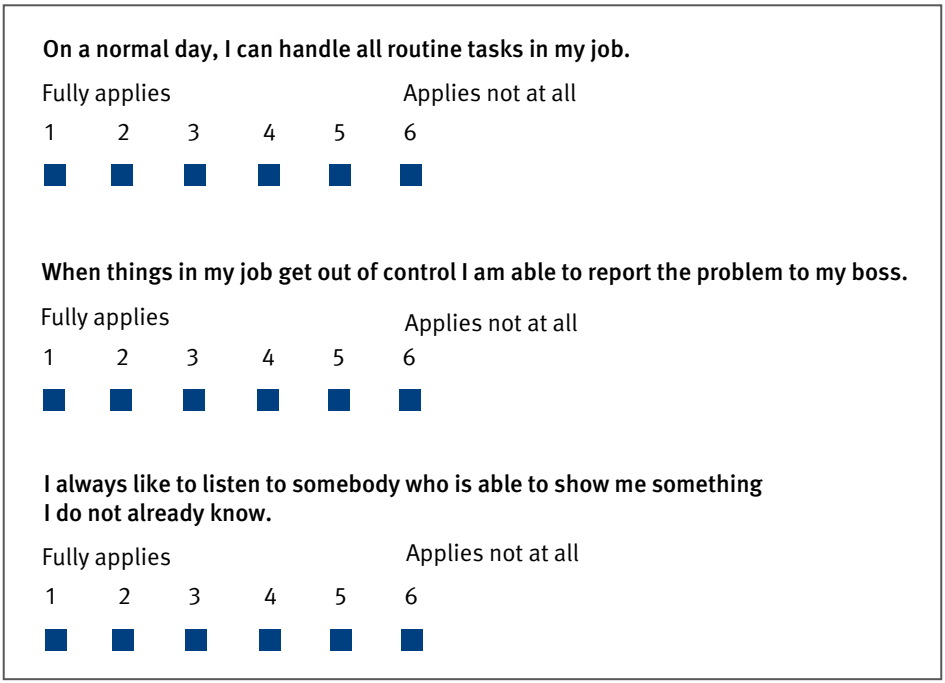
General descriptor in EQF "Communication and social competence", level 4: "Produce (and respond to) detailed written and oral communication in unfamiliar situations" is transformed to the questionnaire statement:

"When things in my job get out of control I am able to report the problem to my boss".

The participants have to rate their agreement with each statement on a scale from 1 (fully applies) to 6 (applies not at all).

The questionnaire was distributed in German and English versions before (first wave) and after the courses (second wave). In the second wave, four staff managers judged the EQF competencies of the participants additionally.

Figure 2:
Extract of CompAss questionnaire



Evaluation of course participants

In the first wave, 16 questionnaires were sent back. Figure 3 gives an impression how the six dimensions were summed up. In this case the participant is rated on levels 5 and 6 for the different dimensions (see line "Level").

Results: The participants are heterogeneous. Most of them rate on level 5 as the course suggested – but some of them only reached levels 3 or 4 on some dimensions. With reference to their current positions and school and university degrees one can recognize a correlation between work experience, school degree and EQF rating in CompAss.
The second wave after the end of courses had a return rate of 14 filled in questionnaires. Nevertheless the results show that the instrument lacks validity to present significant differences in learning progress: A lot of the participants show the same results on the EQF dimensions as in the first wave. Some even had lower (!) results in the second wave on some dimensions. Some participants did not take the second questionnaire seriously and copied the answers of the first questionnaire.

Figure 3:
Results of an individual participant on six EQF dimensions

Autonomy/ Responsibility		Communi-cation/ Social Competence		Knowledge		Learning Competence		Professional Competence		Skills	
KA1	6	KC1	6	KK1	5	KL1	6	KP1	5	KS1	6
KA2	6	KC2	6	KK2	6	KL2	5	KP2	6	KS2	5
KA2	5	KC2	6	KK2	5	KL3	5	KP3	6	KS3	6
KA3	5	KC3	5	KK2	5	KL4	6	KP5	5	KS3	5
KA4	5	KC3	6	KK3	5	KL5	6	KP5	6	KS4	5
KA4	5	KC4	6	KK4	6	KL6	2	KP6	6	KS5	5
KA4	6	KC4	2	KK4	5					KS6	6
KA5	5	KC4 (Cont-roll)	6	KK5	6					KS6	5
KA5	5	KC5	6	KK6	6						
KA6	2	KC5	0	KK6	2						
KA6	2	KC6	6								
Sum	**28,83333**		**27,5**		**30,83333**		**30**		**28,5**		**32**
Level	**5**		**5**		**6**		**6**		**5**		**6**

Conclusions and recommendations for the future use of CompAss

The development of a self assessment test in terms of EQF is a good idea to estimate the general knowledge, skills and competencies of course participants although it cannot be a test that replaces other qualification tests. It is more or less an “add-on” to roughly estimate competencies when a course starts. It can help synchronise a course training level with the abilities of participants.

It is not a tool to measure learning success. Although the courses of “Embedding Standards” have had the target to qualify participants to a certain EQF level, CompAss is not sensitive enough to detect changes in competencies that emerge during a course. But it can be interesting to measure such changes in greater time periods – e.g. before and after a vocational training.

To achieve the aim of a valid instrument, there are still some tasks to be done:

- Change the questionnaire according to the revised form of EQF (4 competence categories = „wider competence“).
- Change the print form into an online questionnaire so that participants cannot save results.
- The estimation by staff managers should become mandatory.
- The instrument should be proven by a greater test sample.

All in all, it could be worthwhile to continue this development in another research project.

Main lessons learnt

What were the main experiences in the project?

A common understanding of job profiles is crucial for enabling transnational training. If job profiles are described in work elements from which competences can be derived, to be defined as learning outcomes within curricula, this common understanding is easily achievable among experts despite their national educational tradition.

Under these conditions, instruments like ECVET are assignable to transnational curricula, whatever the concrete design of the credit transfer system might be.

Finally one can say that this project was really one of the first to practice the more or less theoretical concepts of the EQF and the ECVET. Meanwhile other projects have achieved further progresses that are based on the results of "Embedding Standards". Although the first steps of the Embedding-project seem to be like the first attempts of a Neanderthal man to light a fire these experiences were really important for later projects which improved the methods to achieve a European acknowledgement of degrees in vocational training.

Change of place and training institution is simulated by means of a virtual learning environment (VLE). It was planned that assessment of learning results is taken over by various national training institutions during the whole process of training. It turned out, that this objective was very ambitious and not achievable with the given project resources. For this reason, the partners consider building up a new structure of "ZMT-Development Unit" and a "Virtual Training Portal" in the future.

You will find the results of "Embedding Standards" on the website *http://www.embedding-standards.com*.

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2.4 Transnational Standards for the Qualification of OSH Managers

Andrew Hale, Giancarlo Bianchi, European Network for Safety and Health Professional Organisations (ENSHPO)

Background and requirements

One of the fundamental principles of the Treaty of Rome, launching what has become the European Union, was the right to free movement of labour between the Member States. This movement was limited before then, but still is limited, by differences in the national requirements for training and certification of different professional and other groups, before they were allowed to practice in a given country. Since 1989 the EU has established a basic requirement that professionals trained and qualified for a regulated profession, required under the law in one EU country, should have the right to practice that profession in another EU country where that same profession is also regulated and required by law [1]. There are provisos that requirements can be imposed for transitional periods and training if the content of courses in the two countries is very different, or if competence in the language of the new country and in its specific legislation relating to that profession is important. In some European countries the safety professional falls under this definition. Under this system, for example, a number of safety professionals trained on Belgian courses have been accepted to practice in the Netherlands. However this does not provide a route for those trained in countries without this legal regulation of the safety profession, such as France or much of Scandinavia, to practice in countries with such requirements. They must submit their qualifications and experience to national assessors, usually the regulatory authority, on an individual basis, to gain recognition. Because this process is cumbersome and bureaucratic it is little used and companies get around the legal requirements by appointing such staff as supplementary to the local staff needed to comply with national law.

Studies conducted by the International Social Security Association (ISSA) Section on Education and Training for Prevention, and later by the European Network of Safety and Health Professional Organisations (ENSHPO) have shown that there is a wide disparity between the definitions of safety professionals and their role and training in the different EU countries [2; 3]. Many countries have legally recognised training courses and qualification systems certifying safety professionals at two principal levels, a higher level requiring at least a bachelor's degree or equivalent for entry, and a lower, technician level. Other countries have only one level, or recognise even more than two. Some countries have courses at several of these levels, but no formal certification or registration system.

The breadth and depth of subjects covered in the different national training courses also varies considerably, as does the breadth of risks and areas of prevention covered by the professionals in practice. This is partly determined by what other professional groups are established in each country in the area of occupational safety and health. These may include occupational hygienists, ergonomists, occupational health nurses, physiotherapists, occupational physicians, risk managers and many others in specialist

areas such as fire, radiation safety and construction. How many of these other groups there are and how their role is seen in relation to the safety professional determine to some extent the national differences in training and job content of the safety professionals. However, there is a second dimension of difference across countries, namely the balance between technical, human factors and organisational subjects in the safety professionals' training and practice. Over the last 30 years the training and work has shifted its centre of gravity in many countries from the technical and legal requirements at the workplace to the policy, management and culture of safety at the top and throughout the organisation. The safety professional has tended to become the generalist in risk control, advising top and line management, with other groups being called in for specific problem areas. The old dividing line between safety (acute trauma) and health (chronic trauma) has been replaced by the recognition that prevention of both requires good design, installation, use and maintenance of technology, good human factors, training, motivation and participation in decision making, and good risk management (risk assessment, control, monitoring, learning and organisational excellence).

The EurOSHM standard

This rapid change in the job of safety professionals and the resulting lack of uniformity and clarity of the image of safety professionals has made it difficult for them to move between countries and for international companies, who require such professionals to work across many countries, to judge the suitability of candidates from different national backgrounds. This is the background to the work of ENSHPO in setting up a standard for the qualification of European Occupational Safety & Health Managers (EurOSHM) [4]. It is modelled to a degree on the FEANI qualification of European Engineers *(www.feani.org)*, where a similar lack of international recognition of qualifications had hindered professional mobility.

The standard is designed to define a minimum level of competence for OSH advisors at the higher (graduate) level advising on and overseeing policy (strategic and tactical) in organisations. One of its aims is to facilitate the movement of such people between European countries by defining a common core of knowledge and skill, which will meet the requirements under legislation in all those countries. It also aims to provide a template for countries still developing professions in this area, such as some of the Eastern European accession countries. Finally it aims to contribute to the development of the occupational safety and health profession by providing an agreed definition of its key competences.

The standard, which was finalised in 2007, offers registration to professionals by two routes; the main one is by recognition, or at least partial recognition, of national qualification and certification systems meeting all, or most, of the requirements of the standard. Those professionals already qualified under those approved schemes will be able to gain the EurOSHM title with a simple check of their eligibility and a more detailed check only of those requirements not met by their national scheme. The second route is an individual assessment of the criteria for those not covered by an approved national scheme. This will require an extensive indi-

vidual application and checking of all criteria. The essential criteria are:

- A bachelor's degree level of general education. This is not restricted to technical and natural science degrees, as in the existing schemes in some countries, given the increasing relevance of social sciences and management to risk control.
- A recognised OSH training course, validated by an examination, of at least 250 hours, covering in a balanced way the broad spectrum of subjects specified in the standard (risk assessment, workplace and process design and technical prevention, safety management, communication and training, organisational change and risk regulation) and including project work applying the principles to practice.
- At least 2 years full time professional experience in OSH work after the OSH training (or its equivalent in a part-time function).
- Adherence to a professional code of conduct.
- Membership of an OSH organisation which is a member of ENSHPO.
- Continuous professional development, including attendance at training courses, workshops, conferences, etc. for an average of at least 2 days/year, to keep knowledge and skills up to date. This will be required for renewal of the registration every three years.

ENSHPO has set up a certification committee to approve applications under the standard and has established an administrative secretariat for it. The national recognition process has started with assessment of the schemes from Britain and Ireland, the Netherlands, Portugal and Switzerland. In 2008 this has been extended to other applicant countries, which has also seen the launch of the scheme for individual applicants. Once recognised, the names of the successful applicants will be available on a register on the website of ENSHPO, so that companies wishing to consider them as employees or as consultants can verify that they continue to meet this standard. On 16 September 2009 ENSHPO launched the certification standard EurOSHM in Brussels.

ENSHPO also developed a sister standard at technician level, the EurOSHT (European Occupational Safety and Health Technician) standard, to recognise the fact that many European countries have a two-tier system of expertise, with the technician level concentrated more on workplace compliance and technical safety, as opposed to the manager level covered in the EurOSHM standard.

For the further development within the LEONARDO project EUSAFE look at: *http://www.eusafe.org*

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3 Development of standards of competence for instructors, lecturers and trainers

3.1 Deriving requirements from behavioural descriptions: an effective combination of practice and theory

Anna Koch, Dresden University of Technology

Introduction

The labour market is increasingly in a constant state of flux, with new jobs and work tasks being created and existing tasks changing. Job holders and managers need to adapt to and cope with these changes. However, it is not possible to cope with the new tasks and developments without knowing what they require of employees. This problem can be solved by identifying the requirements and using them to develop tools that provide a thorough means of assessing aptitude.

Requirement analyses are therefore necessary as a basis for any assessment of aptitude. A requirement analysis documents the conditions a person has to fulfil in order to perform a task or job successfully. This is also specified in standards. DIN 33430, for instance, defines a requirement analysis as follows: "(...) The requirement analysis should investigate the job, education, occupation or occupational task characteristics relevant for occupational success and satisfaction. All aptitude characteristics (...) including their degree of development, necessary for the satisfaction of the requirements should be derived from the requirement analysis. (...)" [1]

It is therefore not enough just to describe tasks that someone in a certain position has to master. What is important is to know what conditions a person should fulfil to be able to perform those tasks. This additional information can be obtained by means of a requirement analysis. There are some considerable differences between the theory and practice of the procedures used for requirement analyses [2]. The author therefore describes below how an empirically tested procedure was translated into effective practice. The underlying theory is presented in brief, followed by the individual steps in the requirement analysis and a look at how the requirement profile created could be used in the future.

Underlying theory of the procedure: the Critical Incident Technique and additions thereto

The Critical Incident Technique (CIT) [3] was originally used by the American military as a psychological tool for selecting pilots. Today, it is one of the most common methods for conducting requirement analyses. The aim of CIT is to derive requirements from the description of a person's behaviour in a critical work situation. Two components play an important role in this context: (1) the description of a critical work situation and (2) the description of what specifically the person does in the situation. Critical situations (or "incidents") are situations in which strong performers can be clearly

distinguished from weaker performers on the basis of their more efficient behaviour. Thus, typical and important situations are required. Persons who behave effectively or successfully meet a requirement, which is reflected in their behaviour in their everyday work. As it is not possible to observe the actual requirement, the observed work behaviour is used as an aid. This results in a profile, in which each requirement is defined by means of descriptions of specific behaviour.

The advantage of behavioural descriptions is that everybody understands the requirements in the same way. This significantly improves the manageability of the requirements profile in practice. But it also improves objectivity in subsequent use of the requirements profile because there is no interpretation of the requirements later, which would be prone to distortion.

In addition to the information regarding work situations and work behaviour, the requirement analysis should also be used to gather further information to increase the validity of the requirements profile [4]. It is useful to add (1) a task description for the job or task being observed, (2) information on the necessary qualification and knowledge and (3) trends relating to the job or task and any new situations arising from those trends. In a requirement analysis, a survey should be carried out among a selection of persons who are directly involved with the job or task being observed. Usually, these people are the persons who perform the job or the task and their direct line managers plus, often, customers (internal and external). These theoretical and methodological approaches were used in the development of the "task analysis tool" (TATOO) [5], which, at the prototype stage, was used for a requirement analysis for lecturers in occupational safety and health (OSH) in the practical example described below [6].

Phases in the requirement analysis for OSH lecturers

In a joint project between Dresden University of Technology and the German *Berufsgenossenschaft,* institutions of statutory accident insurance and prevention, a requirement analysis was carried out for OSH lecturers. In four phases, a requirements profile was drawn up, providing a unique definition of each requirement based on directly observable behaviour (see Figure 1). To this end, the participants in the requirement analysis were asked to name typical and important work situations and to state what specific action they take in typical and important work situations in order to cope with them successfully. The results of the requirement analysis were then used as the basis for a procedure for analysing trainer profiles, i.e. for analysing potential.

The individual phases are described in the following section. Details are also given of how the results were used for other HR selection and development measures.

Phase 1:
Collection of situations and types of behaviour

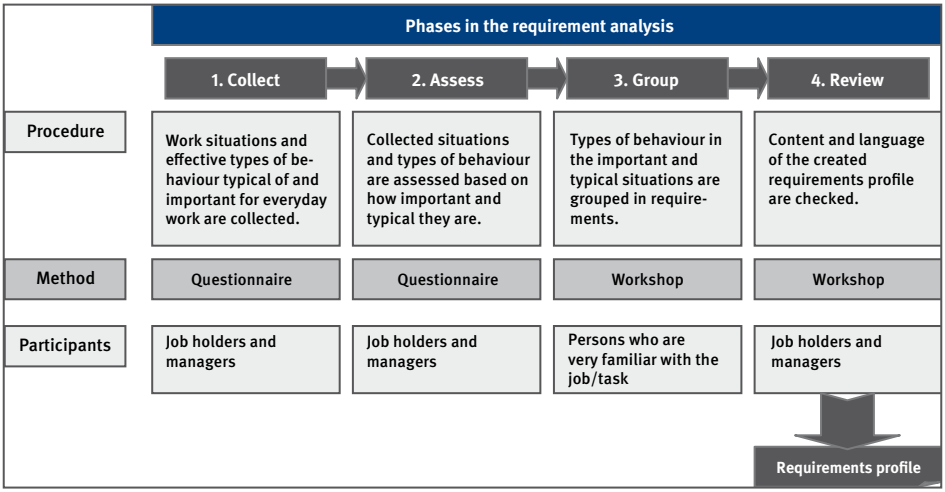
The aims of the first phase were as follows: (1) to gain an impression of the task or job for which the requirements profile was to be created, (2) to collect everyday and

critical work situations experienced by the participants and (3) to discover what a person did in the given situation. This was done by carrying out a survey among job holders (in this case, everyone who worked as a lecturer) and their line managers (a total of 45 people from all over Germany) by means of an e-mail questionnaire. The participants were asked to describe two situations which they had experienced themselves or observed and which had been mastered successfully by a lecturer. They were also asked to give details of two situations with which lecturers might be confronted in the future and what lecturers could do to master them successfully. The question about future situations was intended to reveal trends for the future development of the work so as to ensure that the requirements profile remained valid despite changes in the lecturing work in the foreseeable future. A crucial point in phase 1 was that the participants needed to describe the lecturer's behaviour in detail for each situation since this behavioural description was the basis of the requirements profile created later. A total of 144 critical incidents were gathered in this way and then used for the subsequent phases.

Phase 2:
Assessment of critical incidents

In an e-mail questionnaire, the participants in the second phase assessed the critical incidents collected by considering how clear a distinction could be made between strong-performer and weak-performer job holders in those situations. The critical incidents for which a clear distinction was possible were then used in the subsequent phases.

Figure 1:
Phases in the requirement analysis for OSH lecturers



The questionnaire asked participants to give each situation a rating on a scale of one to four depending on whether the situation really was a typical, critical incident that could confront lecturers in their work. The scale ranged from 1 = very much so to 4 = not at all. 40 job holders and managers from various locations took part in the survey. Only situations rated with an average of one or two were used in the rest of the procedure. This meant that the number of critical incidents decreased from 144 to 109 at the end of the second phase. For these 109 incidents, there were 219 behavioural descriptions, which were used in the subsequent phases. This second phase ensured that only situations that actually reflected the everyday work of all participants influenced the requirements profile.

Phase 3:
Grouping of similar types of behaviour in requirements

The 209 successful types of behaviour remaining after phase 2 were then grouped in requirement categories. The categories formed in this phase are the requirements that made up the requirements profile.
In the example presented here, half-day workshops were carried out at various *Berufsgenossenschaft* sites for the third phase. A total of four sites were included, at which a total of 15 job holders and managers took part. The participants grouped the types of behaviour in the situations remaining after phase 2. This grouping was done without any categories being specified. The participants were asked to decide whether types of behaviour could be assigned to a category. Once they had assigned all of the types of behaviour, they gave the categories names that reflected the requirements they covered. The individual requirements profiles created at these workshops were then combined in one joint requirements profile.

Phase 4:
Review of the requirements profile

The last phase involved checking the requirements profile for completeness, linguistic precision and correctness. It was also necessary, in terms of future use of the profile, to assess the importance of each requirement and to give details of the extent to which people can be trained in it and the extent to which it can be compensated. This assessment was performed at an expert workshop, attended by a *Berufsgenossenschaft* project group, which had been looking at the requirements for OSH lecturers for some time. The group consisted of managers with several years' experience as lecturers. The joint requirements profile was presented to these five experts for reviewing at the workshop.

The result of this phase and thus of the requirement analysis was a requirements profile with eight requirements, some of which had sub-categories. Each of the requirements was uniquely defined by means of descriptions of specific and directly observable behaviour.

Practical benefits of the requirements profile

Requirement analyses are usually followed by aptitude assessments. Here too, the results of the requirement analysis were used directly to design a trainer profile analysis for selecting and developing OSH lecturers. The lecturers are observed in

critical situations during a seminar and assessed on the basis of the effective types of behaviour described in the requirement analysis. It is thus possible to determine the requirements where lecturers can develop through targeted training and the requirements that they already fulfil. A detailed description of trainer profile analysis can be found in the following report by *Güler Kici* [7].

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3.2 Trainer profile analysis

Güler Kici, Institute for Work and Health (IAG)

The Institute for Work and Health of the German Social Accident Insurance (DGUV) has been offering systematic training for lecturers and trainers in the field of occupational safety and health (OSH) and health promotion since 2006. The "train the trainer" programme is geared to persons who work or wish to work as lecturers, trainers or instructors in the field of OSH and health promotion. To ensure a systematic start, we recommend that a trainer profile analysis be carried out in order to determine the current level of competence of the (future) trainer and compare it with a requirements profile for OSH lecturers and trainers. Where the two profiles differ, we advise the participants on an individual basis about ways in which they can expand their competencies and develop as yet unexploited potential. The individual advice followed up by systematic training is intended to help increase and stabilise the standard of OSH trainers' and lecturers' competence and thus to improve the quality of training, providing an important contribution to prevention. We use the following tools for systematic personnel development:

(1) Trainer profile analysis
(2) 7 seminars at which basic skills are acquired
(3) 19 seminars at which specific topics are focused on in depth
(4) Workshops at which knowledge in different areas is shared
(5) Individual development measures, e.g. sitting in on other trainers' courses, co-training, coaching

Trainer profile analysis is a key component of this training strategy and shall therefore be presented in detail below. Information on the other tools can be obtained by contacting us or visiting the following website: *http://www.dguv.de/iag/en/qualifizierung_en/trainer_en/index.jsp*

Objectives of trainer profile analysis

Trainer profile analysis aims to identify participant's current level and target level of competence and supply them with detailed feedback. This enables participants to consider their strengths but also their development potential and their limitations. Only people who are aware of their strengths can harness them effectively. And by recognising their own potential, they can develop those strengths effectively. The ability to deal with personal limitations only comes from examining the limitations themselves plus ways of compensating for them.

For lecturers, trainers and instructors in the field of OSH and health promotion to ensure that they provide effective training, it is important to find out more about the impression they make on others and whether, and to what extent, their own seminars have a long-lasting impact. A series of methods, media and other competencies play an important role in this context and these points are observed and assessed as part of the trainer profile analysis. These requirements were defined on an empirical basis with the help of 12 *Berufsgenossenschaften*, institutions for statutory accident insurance and preven-

tion and are described in the requirements profile for lecturers and trainers (see the report by *Anna Koch*). These requirements provide a basis – the target level – for assessing participants' current level of competence. Using practical exercises (presentation, facilitation and team teaching) typical of trainers' work, a structured interview and a written task, two trained persons observe and assess the participants after each exercise, independently of one another, on the basis of the requirements, which are very precise and behaviour-oriented. The results of the observations, the interview and the written task are included in the trainer profile for each participant. The assessments are carried out on the basis of a total of 12 requirements, which can also be termed "areas of competence" and are listed in Table 1 along with concrete assessment examples.

Method

It is important to ensure that a person's abilities and skills match the requirements for their job in order to prevent them being underchallenged or overchallenged. If the person's expectations are in line with the requirements for their job, the result is a high level of job satisfaction. The right level of challenge plus realistic job expectations are cornerstones of trainers' health. Consequently, our trainer profile analyses aim to give participants a realistic idea of the requirements for lecturers and trainers in the field of OSH and health promotion, to determine their current level of competence and, working with the participant, to define goals that are useful and achievable for the participant.

Two methodological approaches play an important role in ensuring that the judgements are as undistorted as possible. The first involves several simulations in order to observe and assess participants' behaviour in relation to a specific requirement. The second consists of independent assessments by two trained observers, which are not combined in one overall assessment until the end of the procedure. In addition, the participants are given feedback by their fellow lecturers and trainers on the impression they make, enabling them to compare their own image of themselves with that of others and thus to discover any "blind spots".

As part of the trainer profile analysis, typical and common training situations, e.g. presentation, facilitation and team teaching, are simulated in practical exercises and the participants' behaviour is observed and assessed. As far as possible, several information sources and, where appropriate, several simulations should be used to assess compliance with a particular requirement and several requirements should be observed and assessed in one simulation. Thus, in addition to the practical presentation exercise, there is also an exercise on facilitation and one on team teaching, in which presentation skills are also observed and assessed. On the other hand, a presentation exercise can also be used to observe whether and how the participant pays attention to time management, participant orientation and customer orientation.

In terms of costs and benefits, it does not make sense to carry out a simulation for each requirement. Consequently, supplementary information is collected by means of a structured interview and a written task and used to produce an overall picture that is as undistorted as possible. This results in

Figure 1:
Requirements and assessment criteria for OSH trainers and lecturers

Requirements for OSH lecturers and trainers	Example assessment criteria	
Communicative competencies		• Standing – General approach to public speaking • Gestures used support trainer's spoken words
Effective self-presentation	**Visualisation** **Lecturing technique**	• Legibility, • Laws of proximity, closure and similarity • Trainer maintains eye contact with participants • Trainer announces how he/she will deal with questions
Facilitation techniques	**Facilitation technique** **Metaplan technique**	• Uses facilitation materials • Initial thesis/question prompts discussion • Explains rules for writing on cards • Forms clusters based on participants' judgements
Participant orientation		• Includes experiences of participants • Plans procedure for asking about expectations • Uses participants' examples
Use of teaching methods and -media		• Familiarises himself with the media • Uses different media for different purposes • Uses and select methods according to the learning outcomes
Self-reflection		• Reflects on own strengths and weaknesses • Describes strengths/weaknesses using examples
Teamteaching		• Makes his/her knowledge, for example, available to team • Can make compromises to help achieve objectives
Seminar design/ planning		• Describes the learning outcomes for each learning unit • Content/methods appropriate for target group
Time management		• Adheres to planned timeframe • Concludes topics before a break
Flexibility with regard to seminar structure		• Ensures alternatives to planned procedure are available • Has alternative solutions at hand for organisational purposes

a trainer profile for each participant, which forms the basis of the feedback meeting and usually concludes with a "tailor-made" recommendation for training in the form of a target agreement between the trainer and participant.

The trainer profile analysis involves two trained persons facilitating, interviewing, observing and giving feedback to six participants. This process lasts a total of three days, with the first and last day being half days and the second day a full day.

Results of trainer profile analyses

On the basis of the observations and the requirements profile, a competence profile, which we refer to as a "trainer profile", is drawn up for each participant. This profile of the participant's current competencies is compared with the profile of required competencies and any matches or differences are discussed in the feedback meeting using concrete examples of the participant's behaviour.

Each participant is given comprehensive feedback on his or her strengths and, where necessary, advice on the measures required to eliminate any discrepancies. Such measures include seminars, sitting in on other trainers' courses, co-training, coaching or knowledge sharing with fellow trainers and lecturers.

The trainer profile analysis provides participants with documentation of their competencies in their capacity as lecturers and trainers for OSH and health promotion.
In 2006 till November 2011, a total of 191 trainers and lecturers have made use of the trainer profile analysis. Those who benefited most were the participants who were very skilled at self-reflection, who saw the assessment of their own strengths and potential as an opportunity for further personal development and actively sought such an opportunity.

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3.3 Trainer selection, assignment, mentoring – qualification profiles for trainers. An account of good practice of the development of quality standards and methods for trainers

Ulrike Craes, Institution for Statutory Accident Insurance and Prevention in the Health and Welfare Services (BGW)

BGW offers a wide range of premium courses for occupational safety and health to their members. The corresponding quality is not only influenced by different factors like seminar concept, tutorial environment and organisation but significantly by the trainer. For this reason BGW is increasingly occupied with selection, assignment and mentoring of their trainers. This includes professional tutors as well as BGW-employees who are holding the seminars on occupational safety and health.

These methods altogether aim at one goal: to develop standard guidelines for customer-oriented and quality-assurance measures for those courses and – if necessary – to optimise these swiftly and precisely.

This challenge was met by an inter-disciplinary assigned team which first of all worked out the quality criteria of the characteristics of a top quality trainer.

Above that special requirements of a course have been set-up and transferred to so-called seminar-profiles. These profiles being the fundamental process for the implementation of trainer's selection and assignment. In order to maintain the quality standard different activities in mentoring have been arranged for. First, on-the-job-training on newly issued seminars which includes a close contact between trainer and responsible "editor" of the seminar concept. Second, regular meetings of trainers enabling them to exchange information and experiences of all aspects of seminar performance. All data obtained on selection, assignment and mentoring have been tested, evaluated and integrated into a quality management system during a one year's pilot project which was completed in 2006. BGW has generated a manual containing the basic conditions for a specific adoption of instruments like seminar monitoring, interviews of participants etc. in order to systemise quality-assurance. These instruments are continuously developed further.

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3.4 ENETOSH Standard of Competence for Instructors and Trainers in Safety and Health

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Introduction

The ENETOSH Standard of Competence for Instructors and Trainers in Safety and Health was developed as part of a project funded by the European Commission (LEONARDO DA VINCI, 146 253, 10/2005 – 09/2007). The aim of the project was to set up a "European Network Education and Training in Occupational Safety and Health" (ENETOSH). The development of the standard of competence was one of the work packages on the project, in which 13 partners from 10 countries participated. The project was coordinated by the Institute for Work and Health, part of the German Social Accident Insurance (DGUV). ENETOSH offers a Europe-wide and international platform, via which knowledge and experience in the area of education and training in safety and health can be shared in a systematic manner. It includes, for example, a database with almost 600 examples of good practice from 38 countries plus international forums for discussion between participants. The network is aimed at all staff engaged in education and training on all levels of the educational system. In 2011, the ENETOSH network consisted of 57 members and partners from 23 European countries plus South Korea and USA. The IAG remains responsible for its coordination.

Background

The European Community Strategy on Health and Safety at Work 2002-2006 marked a turning point in the relationship between the areas of occupational safety and health (OSH) policy and education policy, at least from the OSH perspective. At European level, education and training were for the first time defined as key factors for the development of a true prevention culture in Europe [1]. 2002 also saw the European Commission's Committee on Safety and Health at Work create an "Education and Training" working party (see the paper by *Antonio Cammarota* in this report). In December 2006, the working party submitted a report to the Commission, explicitly stressing the importance of the training of educational staff in safety and health [2]. This development in the educational area corresponded with the detailed "Work programme on the follow-up of the objectives of education and training systems in Europe", adopted by the European Council in 2002 as a result of the Lisbon Strategy. The first objective defined in the work programme was "Improving education and training for teachers and trainers" [3]. In 2005, the "Education and Training of Teachers and Trainers" working party set up to implement this objective presented the "Common European Principles for Teacher Competences and Qualifications" [4]. These principles were used as a key point of reference in the development of the ENETOSH standard. The principles used

a broad definition of the term "teacher", which included educational staff in (continuing) vocational training. This broad definition disappeared in the "Improving the Quality of Teacher Education" paper, which was adopted in 2007, and the focus shifted to teachers in the general education system [5; 6].

The ENETOSH standard was developed after the importance of teachers' qualifications for the quality of education in general and for the development of a prevention culture in particular had been recognised.

The ENETOSH standard aims both to improve the quality of education and training in OSH and health promotion and to promote integration of safety and health into vocational training through better qualified teaching staff.

Although the development of a prevention culture is explicit intended to integrate safety and health into all areas of education, the scope of application of the ENETOSH standard is restricted to instructors in in-company and inter-company initial vocational training and to lecturers and trainers in the area of continuing education. The standard was developed at the same time as the European Qualifications Framework (EQF) and is based on the EQF system.

Development of the ENETOSH standard

Before the standard was developed, two background papers were produced, of which the first one dealt with the challenges of the changing world of work for the competencies in OSH [7]. The second paper explains the prerequisites for the development of an educational standard, the European Qualifications Framework (EQF) reference model and the advantages and disadvantages of staff certification. The paper also describes the differences in the development of educational standards for safety and health in Finland, Austria and Poland [8].

The key terms used in the EQF – knowledge, skills and competences – were adopted, along with their descriptors [9]. Based on the results of the "Europeanisation of vocational training" (EuroB) project (see the paper by *Christoph Anderka*), a grid was developed, which directed the development process of the ENETOSH standard.

Four international working groups drew up the ENETOSH standard in a total of 13 months. The standard consists of the following four parts:

1. Training the trainer
2. Basics of safety and health
3. Workplace health promotion
4. OSH management.

The knowledge, skills and wider competences required for each of the four areas were identified. This process was constantly guided by the question of how safety and health can be successfully taught as part of the education process.

Part 1, "Training the trainer", was developed on the basis of the results of an empirical requirements analysis for OSH lecturers and trainers, which was carried out by Dresden University of Technology in collaboration with the *"Berufsgenossenschaft"* institutions for statutory accident insurance and prevention in Germany *(*see the paper by *Anna Koch*

in this report). Parts 2 to 4 were developed on the basis of the expertise accumulated by the ENETOSH project partners over many years. That is to say, they were developed using an experienced-based, intuitive method [10]. Specific education and training situations and the ideal behaviour on the part of instructors and trainers were described in this process.

The result is an integrated standard for improving the quality of instructors and trainers in safety and health, its special feature being that it includes both the skills needed to be a trainer and subject-related expertise.

The fact that the parts of the standard are linked to the reference levels in the EQF makes it possible to compare on a European level.

The ENETOSH standard has been recognised by 14 institutions from 10 European countries and by one European social partner:

- IAG – Institute for Work and Health of the German Social Accident Insurance (DGUV), Germany
- BAR U&F – Branch Working Environment Council Education & Research, Denmark
- BG BAU – *Berufsgenossenschaft* institution for the construction sector, Germany
- BGW – *Berufsgenossenschaft* institution for the health and welfare services sector, Germany
- LDRMT – Lithuanian Labour Market Training Authority, Lithuania
- AUVA – Austrian Workers' Compensation Board, Austria
- NIOM – Nofer Institute of Occupational Medicine, Poland
- ISGÜM – Occupational Health and Safety Centre, Turkey
- ISPESL (today: INAIL) – National Institute of Occupational Safety and Prevention, Italy
- FIOH – Finnish Institute of Occupational Health, Finland
- TU-Delft – Safety Science Group at Delft University of Technology, Netherlands
- CIOP-PIB – Central Institute for Labour Protection, Poland
- Labour Inspectorate, Austria
- VUBP – Occupational Safety Research Institute, Czech Republic and
- EFBH – European Federation of Building and Woodworkers (EFBWW), EU.

The ENETOSH standard of competence is the first joint requirements profile for instructors and trainers in Europe in the area of safety and health. The standard has been translated into 10 languages and can be downloaded from the ENETOSH website at *www.enetosh.net*.

Implementation and evolution of the ENETOSH standard

The different parts of the standards are provided in combination with checklists, which can be used either for self-evaluation or for trainer assessment. To find out more about the development of the trainer profile analysis tool, see the paper by *Güler Kici* in this report.

With regard to the possibility of implementing the ENETOSH standard at the European level, it must be borne in mind that the European Union does not intend to harmonise the area of education and training. Instead, the "Open Method of Coordination" (OMC)

is being applied, the main tools of which are non-binding recommendations and guidelines from the Commission to the member states, indicators and benchmarks [11].

The ENETOSH standard is therefore a recommendation from the European Network for requirements for instructors and trainers in safety and health. It can be used, for example, for staff selection or as a basis upon which to develop training courses.

At the national level, the ENETOSH standard of competence can also be used for staff certification.

In April 2008 till July 2010 the ENETOSH Standard has been revised and evolved further. All of the parts of the standard are being reviewed, one after the other, to ascertain whether they really reflect the requirements in their area of application. This process is being conducted using the critical incident technique and the task analysis tool, which had already proved successful in the study on general trainer competences (see the paper by *Anna Koch*) [12]. The current version of the ENETOSH Standard is published on the ENETOSH website as well: *www.enetosh.net*

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3.5 Trainer certification

Michael Steig, Umbrella organisation of organisations for continuing vocational training e.V. (DVWO)

Background

The field in which trainers work is currently undergoing dramatic change. Rather than just being trainers, they also act as advisors and guides for learners, participate in cooperative learning networks, develop learning environments and much more. They thus promote lifelong learning and develop and implement increasingly innovative training strategies at the very interface to the learner. It is impossible to overestimate how important they are in tackling a number of the difficult tasks facing society. Our society needs a flexible training system for this occupational group – a system that not only ensures plurality in the various methods of entering the occupation and in career paths, but also guarantees consistent quality in education and training, in line with modern needs.

To meet these requirements, the DVWO's member associations developed a future-oriented quality model and specified it in binding form in the "DVWO Quality Model – Processes and quality criteria for the certification of education and training institutions and trainers".

The DVWO is an alliance of continuing training organisations, representing around ten thousand members. The majority of the members are trainers actively involved in training on a daily basis, be it as independent enterprises or as employees. The DVWO represents trainers' professional interests in the political sphere.

Education and training is not a product that can be tested against simple criteria in the same way as a mass-produced article. The education/training process takes the form of interaction between the provider and the learner. Critics maintain that it is not possible or only possible to a very limited extent to apply the usual standards, e.g. DIN EN ISO 9001:2000, to the field of education and training. But that is not true at all. The DIN EN ISO 9001:2000 standard is an open quality management model, which can be adapted to the needs of the education system in general and the courses offered by education and training institutes and associations in particular.

The heterogeneity of the education and training institutes, associations and other providers of continuing training results in a variety of interests, objectives and content in teaching and learning processes. In order to illustrate this broad variety in a uniform manner, it was necessary to expand on the basis provided by the internationally recognised DIN EN ISO 9001:2000 standard. Section 7 of the standard, "Realisation of the education product" (that being the actual value-adding process), is the "key" with which to "open" the potential for improvement in this area.

The DVWO quality model

In this connection, the DVWO Expert Commission on Quality developed an innovative addition, an expanded process model, as shown below.

Figure 1 illustrates the principles of the DVWO-ProzessAcht© in connection with the DIN EN ISO 9001:2000 process model. In the education/training field, the business organisation processes have to be clearly distinguished from the teaching and learning processes. The internal institutional and organisational processes can be transparently documented with the help of DIN EN ISO 9001:2000.

With the DVWO-ProzessAcht©, the key tuition-related and participant-related criteria in the education and training process can be differentiated. The core message in the

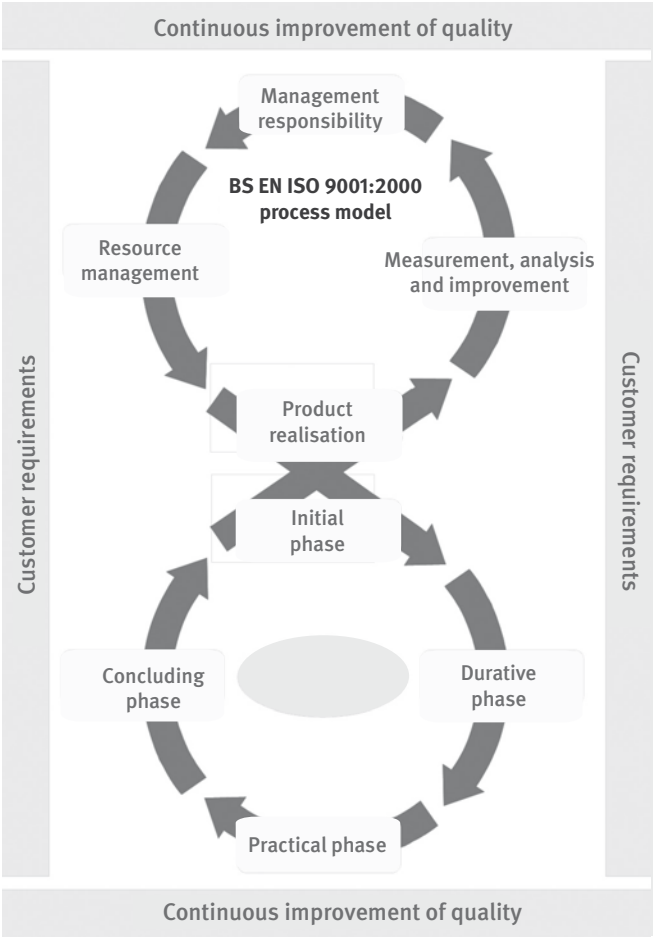


Figure 1:
The DVWO ProzessAcht"©

operational area of the DVWO-ProzessAcht© is that the quality criteria are the focus of the training process and that all training activities have to be performed on that basis.

The DVWO-ProzessAcht© therefore distinguishes between the functional areas of education/training administration (upper process loop), which are largely unifom, and the operational area of the education/training process, which determines the actual character of each education/training institution (lower process loop).

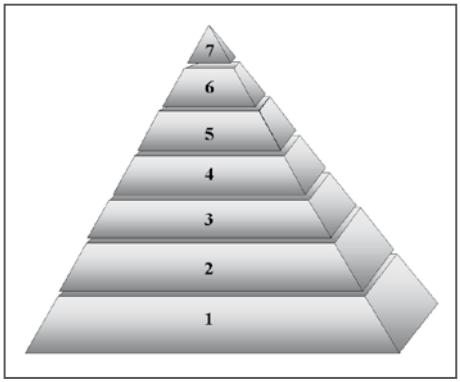
These quality criteria form the basis (or the foundations) of customer-oriented planning and preparation and of application-oriented determination of the objectives and functions of the learning process.

The competence pyramid

It is only possible to assess the effectiveness of teaching processes if what has been achieved can be measured from the same starting point against defined targets. The answers to this existential question about the education/training product and quality assurance in the curriculum process can be found in DVWO-ProzessAcht©, which formulates qualification criteria using a competence pyramid.

The competence pyramid classifies three sides (*Bloom's* cognitive, *Krathwohl's* affective and *Dave's* psychomotor taxonomies) and a fourth side (for users' own taxonomies) of the taxonomy levels or target levels of ability development that occur in humans when they process information (learn).

Figure 2:
The competence pyramid

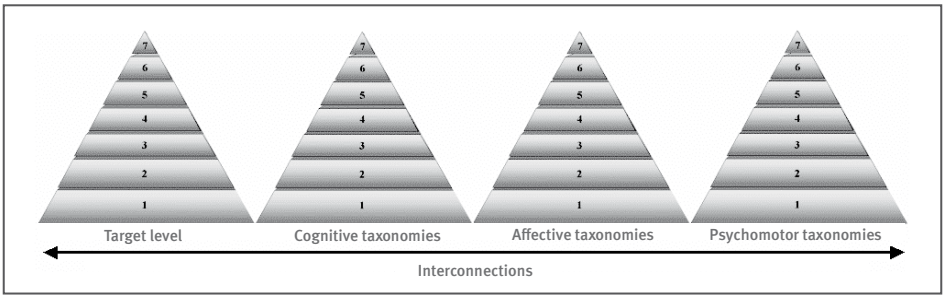


Recent findings in the area of brain research prove the importance of a holistic approach to learning. Neuroanatomical and physiological studies show strong links between affective, cognitive and psychomotor functions.

There is much practical evidence to back this up. For instance, handling and translating new cognitive content into practice requires emotional processing. An operational classification system that groups the target abilities and behaviour (cognitive, affective and psychomotor) on target levels is thus a good approach.

Such a system makes it possible to classify in a hierarchy and to measure the identified educational objectives, descriptions of precisely defined learning experiences and trainers' qualifications.

Figure 3:
Interconnected competence pyramid



The taxonomies

This use of taxonomies to illustrate the curriculum quality, which means that the education/training process is subjected to customer-oriented and user-oriented specific quality criteria, makes it possible to:

- document the trainers' qualifications,
- assess the extent and quality of the learning outcome on the basis of measurable quality criteria and
- determine the level of learning and of successful application: being able to perform successfully using the competencies and skills learned!

A taxonomy is a structure that observes certain rules and thus systematically categorises a specific object. Taxonomies are mostly used in botany, zoology and linguistics.

Using these taxonomy statements, the educational theoreticians *Bloom*, *Krathwohl*, *Masia* and *Dave* and their assistants developed a model that divides the educational objectives into three main dimensions (cognitive, affective and psychomotor).

DVWO has completed that model in the form of an interconnected competence pyramid. DVWO's proposal is a model that combines *Bloom, Krathwohl* (et al.) and *Dave*. The competence pyramid thus enables all target levels of ability development to be documented up to and including a seventh level, entitled "creative new development". Since not all content in a learning process is mainly characterised by the same level of difficulty, it is important to divide the content into different taxonomy levels. Classification of the educational objectives in this way can aid the process of identifying and formulating examination tasks, monitoring teaching outcomes and determining the quality of a learning outcome in as precise a manner as possible.

Cognitive taxonomies

DVWO proposes the following definitions for the cognitive taxonomies based on *Bloom*:

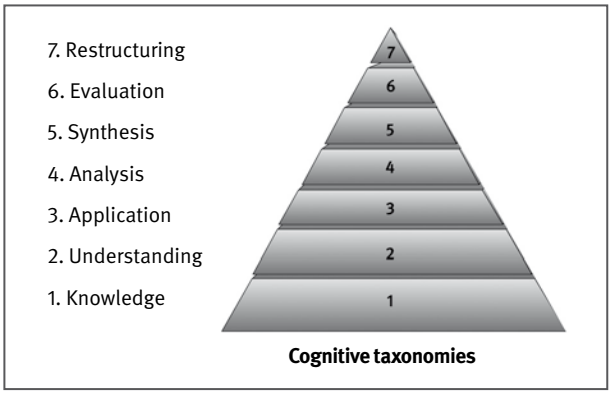


Figure 4:
Cognitive taxonomies

Affective taxonomies

DVWO proposes the following definition for the affective taxonomies based on *Krahtwohl* and *Scholz*:

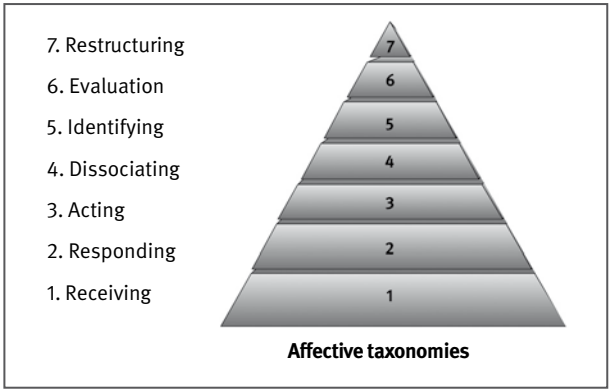


Figure 5:
Affective taxonomies

Education and training institutions have the possibility to differ from this definition of affective taxonomies and can develop and define taxonomies of their own. The individual trainers should – appropriate to their own purposes and aims – either use the affective taxonomy levels offered above or, if they do not appear adequate for their specific purposes, identify or create a structure that fits in with their aims.

From a scientific point of view, when a decision is made, as is permitted, to deviate from the above definition of affective taxonomies, the scalings must be defined and an explanation given as to why the curricular differ from the DVWO proposal.

Psychomotor taxonomies

DVWO proposes the following definition for the psychomotor taxonomies based on *Dave*:

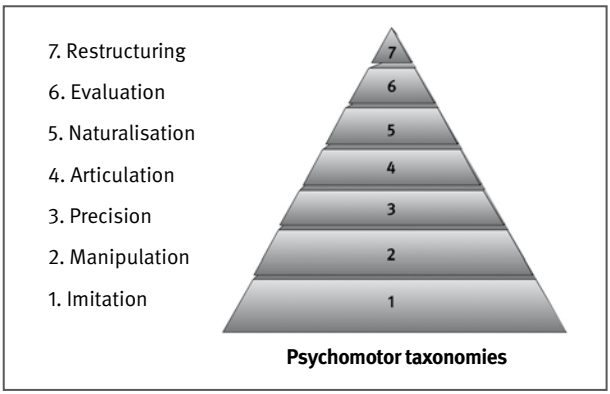


Figure 6:
Psychomotor taxonomies

The author should like to complete this description of how, for example, the *Bloom* taxonomy levels are used in the competence pyramid, with a quote by *K. Frey*, who has examined the usability of taxonomies at length:

"The existing taxonomies have heuristic, instrumental or operational functions for validation in the curriculum process – with regard to (information) reliability in the curriculum process, they act as yardsticks and reference systems."

This can be applied to the competence pyramid. The pyramid, with its scientifically founded taxonomy levels, serves as a yardstick and reference system for the validation and verification of the quality assurance system.

Customer-related processes cover all areas to do with application orientation and use of the educational product.

The application orientation of the educational process entails the learner mastering the subject matter and having developed the ability to apply what he or she has learned in a specific scenario.

The target group definition process determines who is included in this application-oriented analysis. The educational content

is linked to the degree of application (application targets) using the competence pyramid and working together with the persons involved in the training process.

It is this clear definition of application targets that provides a guide for trainers, which they can use to define educational objectives in a participant-oriented manner.

These educational objectives and application targets are participant-oriented "signposts", which make it possible to measure the results in terms of the required behaviour. They serve as quality criteria for participant-oriented and application-oriented curriculum development, guided by findings, thus ensuring teaching that is effective and assures quality.

Content	Educational objectives	Degree of application
Definition of the planned content	Definition of the educational objectives using the competence pyramid	Definition of the application targets using the competence pyramid

Certification

We distinguish between three types of certification:

System certification

System certification assesses whether a system complies with a particular standard. Internationally, the best known and most common standard for quality management systems is DIN EN ISO 9001:2000. System certification confirms conformity with this standard.

Product certification

Product certification confirms that a product, in this case an education product, fulfils a given standard. If the product conforms to the criteria specified in the standard, it is awarded a certificate. Since there are still no standards specifically for education and training, DVWO has made the additions described above. Thus, certification in accordance with the DVWO quality model is both system certification (in accordance with DIN EN ISO 9001:2000) and product certification.

Staff certification

It was precisely the issue of certification of individual trainers that prompted the DVWO Expert Commission on Quality to develop a staff certification programme on the basis of the DVWO quality model. The DVWO quality model is therefore the first model on the market for quality management systems in the area of education and training that makes system certification possible for institutions and companies, product certification and staff certification for individual trainers – all using the same criteria. In addition to the DVWO quality model, the trainer competence requirements specified in PAS 1052 are also applied when certifying staff.

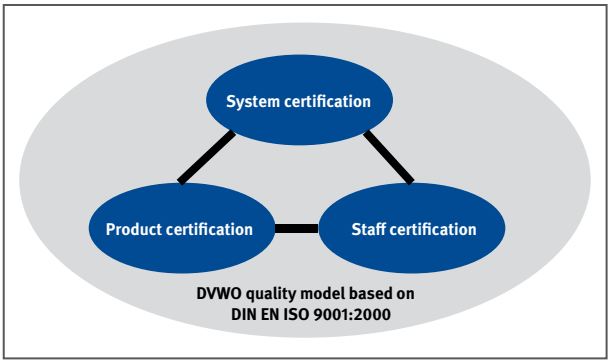


Figure 7:
Types of certification

The certification programme describes the specifications for, assessment, approval and updating of and procedure for agreeing on the conditions for DVWO trainer certification. With this system, DVWO ensures that the specifications and thus the staff certification are transparent for all persons for whom certification is being sought as well as for the employees of the accredited certification body, and that the decisions made by the certification body are also transparent.

The certification and assessment is carried out by independent certification bodies.

Details of the certification programme can be found on the internet at *www.dvwo-qualitaetsmodell.de*.

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3.6 Teachers and trainers of occupational safety courses, is certification necessary?

Paul Swuste, Safety Science Group, Delft University of Technology

Introduction

The main goal of occupational safety courses is to teach hazard identification and subsequently risk prevention. Risk prevention is by large a management responsibility, and its principles are rather simple, at least in theory. Apply management tools based upon a *Deming* circle, the well-known plan – do – check – adjust model, be sure all parts of the cycle are filled in adequately by applying well established safety techniques, and make the circle go round [1]. One cannot deny the merits of this message, and its pleasant simplicity. For some time now, courses on occupational safety are teaching these management tools to control occupational safety risks. And occupational risk prevention programs in companies, organisations, and workshops are largely based upon this model. There is a general believe this managerial approach towards safety is responsible for the steady decline in occupational accidents, and fatalities, at least in the so-called Established Market Economies [2]. But it is questionable whether or not this decline is the result of a successful application of these tools, or due to the phenomenon known as 'export of hazards', of exporting hazardous industries to developing countries [3].

In a free market system transparency of administration, quality and quality systems have received increasing attention over the last decades. Transparency implies openness, communication and accountability. The driving force for this attention can be found in the need for defining quality in objective terms and to ensure that a defined quality level can be reached and maintained on a continuing basis. Quality is always placed in relation to a specific intent, for instance quality measures the fitness of a product, a service, or a work process for its purpose [4].

Quality of educational programs in occupational safety, and more specific the quality of the trainers and teachers of these courses is seen as a tool in ensuring a sufficient and transparent level of education in this field. The question remains to be asked whether a separate certification system for these teachers and trainers is serving a purpose.

This article is based upon a presentation at the 2nd International Conference of the Occupational Safety and Health and Fire Brigade Chamber of the Czech Republic, jointly organised with the European Network for Safety and Health Professional Organisations (ENSHPO), the European Network Education and Training in Occupational Safety and Health (ENETOSH), the Czech Ministry of Labour and Social Affairs and the Czech Chamber of Commerce. 'OSH education and training in the changing world of work', Praha, 28th – 29th of February, 2008.

Quality and standardisation as a ticket to markets

Attention to quality and quality control goes back to the early decades of the last century, when the building industry used collective experience to achieve a high quality through

repeatability in work processes. After the Second World War quality assurance for products and work processes was introduced into Japanese management thinking by American pioneers as *Deming*. Later concepts as Kaisan and Total Quality Management were developed, which were used extensively in the Japanese car industry. The quality thinking was adopted gradually in the rest of the world through quality associations and the use of quality circles. It is now a well established concept through the various ISO series of standards. Many companies and organisations today have certified their quality systems, also including services like education and training. Certification to ISO standards has been the fastest growing certification practice of all times, and is increasingly seen as a ticket for entry into important markets. Distinct from mandatory systems, the success of private certification is caused by the voluntary participation of the parties involved [5].

Different forms of certification

Certification is one of the instruments of quality assurance, and can be applied to persons, systems and to objects. Certification of persons contains a framework for peer review of professional activities and achieved standards. Furthermore, continuous improvement must be an important aim of quality insurance, which involves efforts to improve teaching methods, and to keep professional knowledge up to date.

Certification is the process by which a certifying body officially tests and declares that an object, a system, or person satisfies fixed criteria and standards and will continue to do so. These criteria and standards can be formulated internationally, nationally, or formulated by a board of experts, which includes all relevant stakeholders. Two different forms of certification are relevant for teachers and trainers; First party – based on self auditing against a standard, and third party – based upon a qualified national or international certifying agency. There also exists a second party certification – based upon vendor or supplier assessment, and even a fourth party – based upon a governmental assessment. Most likely, second and fourth party certification will not be relevant for teachers and trainers of courses in occupational safety.

First party certification is characterized by self-regulation. Certified professionals make up a professional body that assures the credentials of persons in the same profession. It usually has a system of self-initiated monitoring from within and from outside consultants. This type of certification has an obvious disadvantage when the group of professionals is limited to hundreds or a few thousand members. The circle might become too small to guarantee anonymity, and independence. Third party certification refers to a formal scheme that is no longer self-regulated. National organisations have been created that monitor the certifying body. Peer review by independent experts constitutes an important element in procedures to approve third party certification schemes [6]. An example of a third party certification is the certification of safety managers by the Dutch SKO (Foundation for the Certification of Professional Competence). Third party refers to the independence of the board of experts, with representatives from unions, employer organizations, educational institutes, certificate holders, Dutch Society of

Safety Science, research institutes, and the Ministry of Social Affairs and Employment. All these parties have an equal opportunity to include relevant elements in the standards and criteria for certification.

Certification of professional competence is not new and existed long before official certification schemes became effective. Professional societies already had their systems of examination in place to guarantee the competence and quality of members. And one of the oldest institutions, the universities, already use examinations and diplomas' to guarantee the quality of their graduates. In The Netherlands educational programs on occupational safety, organized as post graduate programs at universities or at schools of higher vocational education, are subjected to certification.

Certification also seems to enter in the educational domain outside universities. Certification of teachers and trainers in occupational health and safety is considered a primary instrument for assuring the credentials of these teachers. It creates accountability to school managers and also to students (on this see *Güler Kici* as well as *Michael Steig* in this report).

SWOT analysis of certification of teachers and trainers

Certification of teachers and trainers has quite some advantages. It has effect not only on the teachers and trainers, but also on the education they have to follow, as well as the programs they are going to offer. In general certification will increase the transparency, and the coherence of these educational programs, as well as the comparability of different programs. The quality of these teachers must be assessed on a regular basis, e.g. every 3-5 years, since momentary compliance with quality standards is not enough. And this repeated assessment will control the improvements of the professional knowledge of the person certified.

A major disadvantage of all systems of certification is the tendency to widen the gap between certified experts. So far no system encourages the cooperation between professionals, by means of common parts in their education, or mutual knowledge of their fields of expertise. An integrated, efficient and flexible education of teachers and trainers in occupational safety is therefore hampered. And a rigid application of these systems will stimulate the conservation of the present state of the art, which is reactive by definition.

When regarding the certification of teachers and trainers in relation to other certification systems, there is a real danger of certification upon certification. It may seem logic to close all gaps possible, but this can end up in a situation pictured in figure 1, an example of 'certification madness'.

This situation does not represent some far away future and similar elements will be assessed two, three or four times. This raises the question if we cannot reduce the bureaucratic burden of certification without paying for quality [7; 5].

It will be clear that large problems will occur to organize and to develop a system which is cost efficient and payable. Recertification is an important tool of the certification process and ensures an up-to-date level of

knowledge of the teachers and trainers. But is also has a severe downside. Who is going to judge the activities, which can be used for recertification purposes?

In Holland the certification process of occupational hygienists and safety managers has created an extensive administrative burden in assessing a point system for seminars, presentations, meetings and the like, which are recognized as a valid contribution to re-certification. Such systems stimulate an attitude where people 'go for the points', meaning that the collection of sufficient points is

Figure 1:
Certification madness

Certified teachers
follow
certified educational programs
delivered by
certified educational institutes
using
certified instructors
and assessed by
certified auditors.

Figure 2:
Results SWOT analysis, certification of teachers and trainers in occupational safety

Strengths	Transparency of educational goals Increased coherence and comparability of educational programs Increased mobility of teachers and trainers within Europe Ticker to important markets
Weaknesses	Administrative burden, costs Focus on procedures instead of content, on input instead of output Restricted educational freedom Certification represents a frozen state of the art, and restricts cooperation between different experts
Opportunities	Enhanced rationality in teaching EU standard is a tool for mainstreaming occupational safety practice Certification identifies demands and generates consensus between countries
Threats	Limited acceptance of additional standards Reactive instead of pro-active People only 'go for the points', and not for the content

more important than content, and activities related to the profession are only undertaken when sufficient points can be earned.

Security and trust amongst clients and the general public is the main goal of certification. It separates the sheep from the goats, creates employment for those who are certified, and puts fences around the fields of activity. Therefore it seems that quality is ensured by reducing freedom. An overview of the results of the SWOT analysis on certification is summarised in figure 2.

Conclusion, Anglo-Saxons versus Rhinelander's

The debate on certification is a logic follow-up of a rather strong influence of free-market thinking, which has entered the public domain. Not only in education, but also in health care, in day care centers, in youth welfare, and in public transport, to name a few, the duties to register, the protocols and guidance notes has lead to an endless list of data to show a required level of accountability. We seem to live in a world of formalized distrust, and suffer from the terror of transparency. And the discussion in the public domain on cost-effectiveness is filled with the familiar jargon of managers with their standards, indicators, controls, and quality tests.

After the fall of The Wall the private sector became unrestrained, and the Anglo-Saxon's interpretation of the economy, as well as their concepts of organizations and management has been adopted in almost the whole of Europe [8; 9]. This Anglo-Saxons' model is strongly based upon the notion of a maximum control of the environment, through an extensive planning and control cycle and reporting systems. Certification of systems, like quality systems and the like is a good example of this control. The Anglo-Saxon approach is dominated by so-called 'soll-thinking', by concepts how the world should look like, and managers' interest is similar to the interest of shareholders. Consequently, the influence of employees on organizations is marginalized and mainly approached instrumentally. The impact of this transformation on the private sector has its influence on the public domain from the 1990s onwards. And the call for a quality assurance of trainers and teachers of occupational safety by means of certification is one of many manifestations.

In reaction to the Anglo-Saxons' model of organizations the Rhinelanders' model makes an appeal to the 'task maturity' of employees, and to their craftsmanship. Achieving predefined goals is considered to be more important than a strict obedience to rules leading to these goals. Also, shareholder value is not a prime objective, instead stakeholder value is the main orientation of management. Organizations are managed less rigidly, leaving more room for independent judgments, and for discussions, which will increase the companies' flexibility in times of developments unforeseen. As a consequence rules and procedures play a less prominent role in these organizations. After all, more rules may lead to more control, but also to more demotivation amongst rule followers. The Rhinelanders' model is a European answer to the dominance of the Anglo-Saxon model. The model is not meant to be superior, but only as an example of the other end of the scale of business and management models.

Back to the teachers and trainers, the two organizational models presented will provide different answers on the necessity of certification of teachers and trainers in occupational safety. In the Anglo-Saxons' model, certification is a logic step. It will increase control and accountability. From the perspective of Rhinelanders', certification will be an option, once it is clear the quality of teachers and trainers in occupational safety is creating a problem, and other methods to assure the quality of these persons have failed substantially. Certification within the Rhinelanders' model will be a possible alternative to decide, once other systems have failed.

In case the decision is in favor of certification, both models will put emphasis on so-called output criteria. This means safety management systems, as part of a risk prevention program, does not need a detailed introduction into its elements, or its implementation within companies and organizations. Instead the focus will be directed towards the effects of such a system, what should be achieved by a safety management system [10]. Which contribution can be expected from such a system in reducing which types of (major) accidents? These questions will be more important than classical input criteria as, for instance, long lists of topics teachers and trainers have to master, including the hours spend.

Discussion on the necessity and the content of the certification of teachers and trainers of occupational safety is the main purpose of this article. And hopefully some arguments are presented to counter an over-enthusiastic view on the benefits of certification.

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Section II

Examples of good practice for the integration of safety and health into education and training – quality assurance using standards?

1 Examples of good practice for general education and initial vocational training

1.1 Educational safety training at educational institutions

Ulrike Fister, German Social Accident Insurance (DGUV)

Introduction

Since 1971, all children in Kindergartens, all pupils and students have been included into the German legal accident insurance system meaning that they are covered by the legal accident insurance on the way to their educational institutions as well as on their way back home.

Objectives of educational safety and health promotion at educational institutions

Objectives of educational safety promotion and health needs are both safety and health of the pupils and the teachers, as only teachers who are motivated for the matters of health and safety are able to convey these ideas to the pupils.

If adults and employed people later on in their professional life are supposed to behave in a safety-conscious way, the educational safety training must start in time meaning that security issues should be made accessible to the children at school in such way that they get motivated for living those ideas without far from every risk. We must not excessively protect the kids but enable them to deal with different problems and risks in order to manage them. The pupils will get a certain sense of risk which can further grow.

Both safety and health promotion do not only aim at a change in behaviour, but at modified and adjusted building and equipment conditions as well.

Schools should be promoted to the effect that the school surroundings and the teaching process should be designed so much that well-being and contentment as well as health and safety of all those being engaged in the school will get better. In doing so, the pupils and the teachers must stand up for their own safety and health.

The accident insurance associations have a big interest in seeing the kids and young persons go through their school life safe and healthy. In our institution we have a specialist division – "Educational institutions" – and the insurance associations, therefore, have developed – among others – regulations, informations and practical ideas for the teachers.

Some of these activities will be introduced as follows:

Accident preventive measures concerning „School"

We have a regulation for schools. Actually focuses on building and equipment.

The "Dead Angle"- A teaching concept

There have always been serious accidents with truck drivers turning off and losing sight of walkers or cyclists who were in the dead angle. The dead angle is the space (in the form of a sharp angle) near the vehicle which cannot be seen from the right side mirror or the right side window either.

To explain the danger of the dead angle to the pupils, adequate traffic situations can be reconstructed at school. Therefore, the accident insurers have made agreements with driving schools to the effect that they came with trucks or buses for practical application. In this way, the kids do not only learn in theory about the harmful dead angle and which danger exists if they are in its reach with their bikes for example. The practical experience also allows them to see the truck driver's sight and the area the truck runs over when turning off. They will recognize that the driver has no insight into that dangerous area.

The „Bicycle Helmet" poster

The necessity of wearing a bicycle helmet has been the subject-matter of this informative poster within the context of „Road Safety Education". Children, as soon as possible, are compelled to protect themselves by means of relevant protective equipment when doing certain activities. If they are used to do so, they will also employ protective equipment later on in their professional life. Kids should start out to wear bicycle helmets as personal protective equipment, and the poster (which can be hung onto the classroom walls) should motivate and informate them.

„Work Placement" brochure

In Germany, pupils of the 8 class must do a two weeks' work placement in different companies to get to know the working life. In class they will be prepared accordingly by learning something about industrial safety marking, how to recognize health and safety regulations at work and how to read them. For this preparatory training, we have developed a brochure which helps the teachers treat the subject „occupational safety and health" with their pupils.

As to "working life", the following brochures are placed at the teachers' disposal: „Woodworking Machines", „Electrical Engineering / Electronics", „Ceramics", „Paper Industry", „Metal Industry" and „Domestic Economy".

The North Rhine-Westphalian accident insurance associations have created an Internet page called „Safe school". You can visit a virtual school and call off the specials of the different (class)rooms.

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1.2 Källby Gård – A Safe school

Eva Cardell, Källby Gård

Introduction

Källby Gård is a compulsory school in the community of Götene, Sweden with children from 1 to 12 years old. Some 400 children and 60 adults are working there. At Källby Gård there are several different activities as pre-school, pre-school class, after school centre, leisure school centre, and a library. Since 1997 there is a board of parents governing the school. Systematically work environment has been carried on since 1994. Källby Gård has been a model for work with prevention. Källby Gård was the first school in the world to be awarded the title of safe and secure school, according to the criteria set up by the World Health Organisation (WHO).

School – one of our common places of work

More than 1,4 million pupils and about 250 000 adults are working in Swedish schools every day. The environment forms their ideas about the life of work.

Basic needs

The UN Convention of the Rights of The Child, article 2, 3, 6 and 12, provide a value base for the task of creating environments for children, which are safe and conducive to their development, and of involving youngsters themselves in this process.

Art. 2 All children have the same rights and are of equal worth.

Art. 3 The best interests of the child are to be a primary consideration.
Art. 6 The right to life and development.
Art. 12 The right of the child to express his or her views.

We have to see with children's eyes – The child's perspective, and we can see three views:

1. The adult's view of the children's perspective and the ability to see the existence through the children's eyes.
2. The children's perspective on their own existence.
3. Connections between children, adults, where the children communicate their experience that the adults interpret.

Research exists on "how" children think. But we also have to find out "what" children think and visualise it. A child perspective cannot be developed if the child does not have anywhere to express itself.

Understanding

The school is the environment of the pupils. They today spend the largest part of their everyday life at school. That's why it is important to have a good environment, which is development both intellectual and social. It is important for them to feel safe and secure.

The children's right of having a safe and secure work environment
The adults have the responsibility for the security and safety of the children in their environment. You must have knowledge, engagement and power to act. In Sweden there is a work environment act telling the principle's responsibility for the childrens safety and security.

Factors of success

Why do certain schools succeed better than others? We think that it is important to have a vision, a dream scenario: This is how I want my school to be.

Some important starting points
The starting point is willingness and capability. To have a vision shared by everyone of how to create a good and secure environment. To critically evaluate is the key to success. The working environment is a point of the quality work. A good education environment supports health and everything goes back to the importance of feeling valuable.

The pupils have to feel that they have an influence on their own work environment
School is the environment of the pupils. That's why it is important that they can have the possibility to have influence on their work environment. When the adults respect the engagement of the children, they are also good examples. The schools value has a decisive meaning.

Participation and influence
To reach a high level of engagement and consciousness it is important to let the pupils be involved in the work environment. In the work environment we must take the pupils ideas seriously. They often know where to find the risks and they also have clever proposals how to solve them.

The deputies of the children
At Källby Gård the pupils have different possibilities to practise participation and influence. We have Pupils council, Food council, Break council, safe school group, Pupils safety controllers. The councils consists of pupils, school-principle and members of the staff and parents. The pupil safety representatives are working to increase the safety and promote their own security. They are a kind of surety for pupils influence.

The beginning of the work environment was changing of the schoolyard
We asked us:
- If we form a school playground that offers challenges that are something out of the ordinary, will it be increasing the number of injuries?
- How can we deal with the safety measures without losing creativity and excitement?

We strive to create a safe and secure school where the children have a place for their own desires and recreations. At Källby Gård we work with all parts in order to create a safe, secure and stimulating learning-environment. The environment is important! It should be welcoming, a space for play fantasy and rest.

Children need their space, challenges and space for their own creation and to be able to test their limits. It is important to create environments where children can have different experiences.

A plan of action

Our work environment program covers both genders and all ages, the physical and social working environment as well. The program is based on following leading principles and measures:

- Create good teaching and safe environment full of challenges and activities.
- Every close call and accident, which occurs at school, is registered.
- Special sub-committee works against bullying and violence.
- Environment tours with staff and pupils look for risks at school.
- A local rule for the use of cycle helmet since 1997.
- Parents are involved in to create a safe traffic environment around school.
- A cooperation with associations about values and rules of the pupils.
- Education in first aid.

Registration of accidents and injuries

A special form, red and blue pins, and a map helps us to find risks in the environment. On the special form every injury and close calls are registered. On the map all injuries and close calls are marked with pins – red for girls and blue for boys. The pins indicate where the injuries and accidents have occurred. They are good guidelines for us to do different steps.

Registration of injuries is an important aid for us to prevent injuries. The form gives us information about injuries and close calls. The children themselves, sometimes together with the staff, fill in the form. The form is handed over to the school nurse. We receive information where the injury occurred, about the type of injury, why it has been occasioned, who takes care of the pupil, time, gender, age and so on. On the form there is a ”body” where the pupil marks the place of the injury and then on the school-map.

Since 1996 we have registered all close calls and injuries occurred at Källby Gård. The registration has helped us to do something about it and prevent risks by looking for them: children are our detectives. Still 691 close calls and injuries have occurred.

Table 1:
Injuries occurred 1996 -2006

Indoors	205
Outdoors	486
Schoolyard	437
Accidents without injuries	160
Accidents with injuries	690
“When”, break	365
Lesson	183
To school and home	35
Boys	352
Girls	310
Ages 6-8	230
9-10	214
11-12	177

Table 2:
Källby Gård – registered injuries 1996-2006

Head injuries	189
Foot, knee, leg injuries	184
Hand injuries	137
Neck/back injuries	26
Teeth injuries	19
Breast injuries	15

The school nurses dialogue with the child after an injury is important. Here you lay the foundations of a preventive work. The talk increases the consciousness of the child for risks and how to avoid them. You also get knowledge of what children think about their own work environment.

To prevent risks in the pupils environment

The working environment tour gives us important knowledge. Our detectives are looking for risks in their environment. We make the inspections of the school twice a year. The responsibility have the principle, the children and the staff representatives.

Following measures are carried out:

1. *Inventory*
   Every class takes stock of the risks from a checklist. They do a report and give it to the principle and the work environment committee.

2. *A walk around the school*
   A special group by children and the staff inspect some areas from the reports. They do notes and analyse what they have seen.

3. *We make plans for improvements*
   What will be done? Who will do it? When will we do it?

4. *Follow up*
   What has happened? Have we done our undertakings and so on.

Out of 8 points, ventilation, lights, hot/cold, the classroom, details, play-ground, atmosphere/relations, and others, every class takes stock of the risks in their environment and gives proposals for improvements. The check-list contains areas involving both physical and psychosocial environment, bullying, violence, special treatment, risks etc. Key persons are the principle, pupils safety representatives and schools safety committees.

Important points of view from the mapping must be closely examined. The defects are listed and a working environment tour is carried out to determine which corrective measures are required. A plan of action is written. What are we doing? Who takes the responsibility? What can we do ourselves? What must we let other people to do? Parents are informed. Our working environment tours guarantee the quality of our work.

Our work with social safety

The environment plans include for example:
- Programs against bullying and violence
- Pupils safety controllers
- Value based work – group exercises / interaction
- Work environment education
- Insulting: special treatments
- Equality
- Work ethics
- Expectation document

The safe environment

A large part of our work is concentrated on high-risk groups and environment. The local parent committee introduced a local rule

for the use of cycle helmets in 1997. 97% of the pupils today use cycle helmets. We continuously measure their use.

A programme for the traffic environment has been taken by the local parent committee. In cooperation with the National Road Administration and the technical staff in the community a lot of measures have been attended.

To make the pupils breaks safer there are many grown-ups out during the pupils breaks. All adults are wearing yellow jackets to be visible and easy to find. In the changing-room of the pupils there is always a grown-up before and after a gym-lesson in order to give the pupils safety. We have for many years a continuous co-operation with the police and leisure organisations to increase the safety outside the school. A local net-work has been established with the local organisations and common commandments about norms has been drawn up.

Our psychosocial work for social collaboration and companionship

We listen to the pupils seriously and help them in solving their conflicts. More adults are present during the breaks. All break hosts have yellow jackets again in order to be visual. All classes work with cooperation exercises and value exercises based on age and growth. We take children's conflicts serious and are therefore able to help them to solve the conflicts. The staff persons have through this received education in handling conflicts. We create a safe environment in the changing room before and after the physical training, always having adults there. We have pupils safety controllers in all groups from 7 age onwards. Ten years ago we started an anti bullying group (AMG). The group consists of people from different staff categories and is chosen by the principle.

Committees against mobbing and violence

Since more than 10 years Källby Gård has a special sub-committee with both adults and children working against mobbing and violence. The committee is elected by the principle. There are pupil safety controllers from age 7 onwards. Their task is, to look with "their eyes", to get the adults conscious of the pupils physical and psychosocial work environment. They are the pupils representatives. They receive training for the task every year.

Activities to promote health

We started with the "Move year" 2001. The pupils walked a footway around the school-yard every day. 2002 we bought ropes for all pupils and we had the "Jump year" at Källby Gård. Then we continued with break activities. Physical activities with every class, football and sport-training in the afternoon open for all pupils and collaboration with sport clubs.

What have we accomplished since 1994?

We claim that our work has contributed to create a good work environment for children and the staff:

- Improve ventilation, lighting and forming of the place of work.

- Prevent accidents and incidents through the discovery of scarcity in an early stage at the schoolyard.
- Through a local bicycle helmet law decrease head injuries at bicycles accidents.
- Secure the traffic environment around Källby Gård has contributed to a safer environment.
- Create engagement and participation in the work with our work environment and shown our children respect and confidence and our children have felt that they can affect their own work environment.

To be successful

- Basic of value at school – attitudes
- High degree of influence – pupils, parents, staff
- Knowledge and competence. Why? What? How?
- Staying power – we started 94
- Programmes, structures, models and daily work
- Enthusiasm and good leadership
- Collaboration – internal and external.

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1.3 Educating Young People about Risk

Jill Joyce, Institution of Occupational Safety and Health (IOSH)

Introduction

The European Commission's strategy for health and safety at work recognises that young workers are still over exposed to occupational risks and that education is a key factor for maintaining and improving the quality of work.

IOSH [1] has long had an interest in ensuring the safety of young people. Ten years ago IOSH was promoting the importance of risk education for young people and the need for not only schools to have the will to educate young people about occupational safety and health, but also the knowledge and skills to comprehend the risks and convey the teaching points accurately. IOSH was also promoting the need for the teaching of safety related concepts to be incorporated in the continuous education and training of teachers [2]. In 2006 IOSH launched their "Putting young workers first" campaign, which focused on making health and safety a government priority in education.

Generic teaching about safety and risk is part of the Personal Social Health and Economic (PSHE) education framework in the UK but it is not a compulsory subject [3]. A statutory statement produced by the Health and Safety Executive (HSE) and Qualification and Curriculum Authority (QCA) applies to the teaching of health and safety in science, design and technology, art and Personal Education (PE) in England, which clarifies that students should be taught about hazards and risks associated with these activities. This is a stronger position than that of Scotland, Wales and Northern Ireland.

The Office for Standards in Education, Children's Services and Skills (Ofsted) has reported that the quality, consistency and coherence of teaching in PSHE are improved when the subject is taught by specially trained teachers [4]. Ofsted also found that some schools defend the use of form tutors teaching PSHE because of the role of the form tutor in the personal and social development of their pupils. However, in these cases the overall quality of teaching was unsatisfactory in twice as many of these lessons than those taught by specialist teachers.

There are some resources that have been developed for the teachers and these are available from the national curriculum online [5] but they are not all free of charge. Since November 2006, teachers of PSHE have been able to use an on-line multiple choice to help them identify areas for personal development they might need to pursue to teach a particular PSHE subject, such as safety. The Qualification and Curriculum Authority (QCA) has also published some units to help teachers deliver PSHE [6].

IOSH are campaigning however for health and safety to be included in all teachers' initial training and not to be left as an optional personal development issue. The Workplace Hazard Awareness Course (WHAC) is a resource to help teachers delivery PSHE.

Where WHAC fits into the UK curriculum

Work related learning is a statutory requirement in the curriculum in the UK at key stage 4.This is because it is felt that all young people need work related learning to prepare fully for their adult lives in which they can make a contribution to the country's economic well being. IOSH believes that health and safety must be tackled in schools before students start work experience and want to see it as a mandatory part of the curriculum.

WHAC is available free of charge to schools and colleges from a link on the WiseUp2Work web site. The course was designed and written by IOSH and the Health and Safety Executive (HSE). Candidates who take the course and successfully complete the assessments will qualify for the Entry Level Award in Workplace Hazard Awareness (Entry 3), currently offered by British Safety Council (BSC) Awards. The course is useful to anyone, but it is specifically designed to help young people improve their ability to spot and understand hazards in preparation for work experience and formal employment. The course is accredited by the bodies responsible for curriculum and qualifications in England, Wales and Northern Ireland and the course is currently being accredited in Scotland [7]. The materials are designed to:

- be accessible and inclusive
- offer a flexible course to meet individual needs
- give young people an understanding of the health and safety hazards they may face when they start work
- give students what they need to meet the national standard in hazard awareness
- offer a foundation in hazard awareness which students can build on if they want to take further qualifications in health and safety

It also helps to promote the government's aim in "Every child matters" [8; 1] and the Children Act 2004, that all children should be given the support they need to be healthy and stay safe, helps students to develop key skills in a number of areas, including communication, working with others, performing, problem-solving and improving own learning.

There are no formal entry requirements for the course or qualification, but students will need to have the right level of literacy and numeracy skills. It can be taught on line or face to face.

WHAC – designed for teachers & students

Because most students may start the course with no experience of work, the first section of WHAC starts with some scenarios of risky activities such as extreme spots, skateboarding or ice skating. This allows the students to start learning by reflecting on what they are already familiar with.

Making young people "risk aware" and teaching about the concept of risk is difficult. McWhirter [9] suggests that teachers might find it difficult to explain risk because they are not used to using the rational framework that health and safety professionals are familiar with, but tend to make intuitive judgements about risk in common with the general public. Therefore WHAC is designed to help teachers gain an understanding of the con-

cept of risk and be able to explain it easily to their students.

Accident stories – anecdotal accounts where students can think "it could have been me" provide an opportunity for teachers to agree with students what the desirable behaviour in such a situation would be, thus giving them a template for action should they be faced with a similar situation.

Nowadays, students are able to search the internet for free information in various formats in real time and do not need to wait to listen to a lesson. They are therefore used to immersing themselves in a virtual environment, which they can control and may find a traditional lesson rather boring. The "virtual generation" is used to acquiring information through searches carried out alone through Googling. This presents a challenge for the teacher to prevent aimless Googling during the class. WHAC contains summaries at the beginning of each section to help the teacher plan the lesson and address this challenge.

It has long been recognised that effective learning is a social activity [10]. In a traditional classroom this can be done through classroom discussions but for the virtual generation this can be done through blogs and forums. Wiseup2work contains a chat room where students can discuss their work experience.

"Effective learning is an active and constructive process" [11], meaning that students learn better when they are actively involved in the acquisition of knowledge and tailoring the information that is relevant to them. Therefore there is a need to actively involve the students in the learning process, to provide a social setting and to focus on problem solving [12; 2]. WHAC provides the materials to help teachers do this.

With WHAC we have tried to make learning a social process and the games are designing to make the learning a fun activity. Also there are extension activities to appeal to the virtual generation, where they can search for information on the internet. IOSH hope students will be motivated to continue their learning about safety and health when they start work and continue to be risk aware throughout their lives.

To register for the WHAC course, go to *www.wiseup2work.co.uk*

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1.4 Educating Young People about Risks – new approaches

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Young job-starters / New Kids on the Job

The existing occupational safety and health legislation in Denmark has focus on prevention to create a safe and healthy work environment on the work places including to pay special attention to young workers under 18.

Today most young people mainly attend the education system and not the labour market – they are studying at schools and colleges. In Denmark however nearly 80 % of all young people get acquainted with the labour market as workers in their leisure time and in their holidays. Some of them are "early starters" – only 13 years old.

In spite of focus and strict regulations young workers have a higher accident rate than older workers – in Denmark as well as in the rest of Europe.

The need for a change in young peoples´ attitudes

Politicians, teachers and safety and health professionals have realised, that – besides other initiatives – it is important to change young peoples attitudes to occupational safety and health. They have also realised, that it requires better and more goal oriented education and instruction in OSH.

Teaching of health and safety has therefore gained a high priority in legislation and curriculum at all levels in the education system. It is incorporated in a number of subjects, and health and safety training is mandatory in most grades.

We believe, that courses and education for teachers increase their motivation for teaching OSH, and that teaching OSH will increase the knowledge of the trainees, and hereby improve their attitudes to safety and health.

We also believe in the necessity of developing engaging and qualified teaching materials to improve the teaching conditions. That is why "New Kids on the Job" was developed.

The message and the main idea

"New Kids on the Job" is teaching materials addressed to young people in transition between education and job. It also addresses young people, who have just started their working life.

This is the message from the preface of the book:

"You are standing on the threshold to your new place of work. Alone. No teacher, no classmates, no supervisor. Just you. It is now or never. Are you prepared?"

"You do not just choose a career and a trade, you also choose an every day life, working community and environment when you move from the classroom to your first "real" job."

The ten young key figures from the book and the film tell about their job-experiences – on their own conditions and premises.

The purpose is to inspire other youngsters to reflect on and to debate their "role" in the world of work with particular reference to occupational safety and health.

Documentary

"New Kids on the Job" describes real life – documentary stories in words and pictures. The materials box contains books, posters and DVDs.

The innovation of "New Kids on the Job" is the on-the-spot report description, where a "fly-on-the-wall-camera" has followed young people from different work places. This has led to the development of a report book with eight work place stories and four films / DVDs, each with crosscut between two workplaces. The case-stories have been broadcasted several times on Danish TV.

The key figures and their workplaces

The film crew followed ten young trainees / apprentices or newly skilled workers from eight different workplaces: a hairdresser, two building constructors, a chauffeur, a nurse, two bartenders, an engineer stationed in an Arabic country, ship constructor and a farmer.

The workplaces/locations were chosen because they were typically and ordinary, not "role model" workplaces. The key figures were chosen, because of their personal resources and reflections on their working conditions. They all had something on their minds to give the spectators food for thoughts.

Cooperation

The "New Kids on the Job" concept has been developed in cooperation between professionals from the OSH field and experts from the educational field. The steering group had members from the Ministry for Education, Ministry for Employment, The Working Environment Council, the Factories Inspectorate, the Social Partners (Unions and Employers Organisations), Pupils' and Students' Councils, The Parents Organisation. The working group of practicians consisted – besides the journalists and the film crew – of staff members from relevant Branch Working Environment Councils (BAR) and teachers and councellors from the involved educational levels.

Teachers book on the web

The project has its own web-site: *www.nyijob.dk* . Here you find the teachers guide with ideas of how to use the teaching materials. It is important, that the case experiences can be transformed into debate and more structured reflections to strengthen the awareness of OSH and to change attitudes into a positive direction.

Area of distribution

The teaching materials are sold and distributed to various types of schools for young people: Primary schools, lower and upper secondary schools, vocational training, agricultural schools, continuation schools and others.

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1.5 Future new approaches for occupational health and safety training and education

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Abstract

Prevention of hazards in workplaces or protection of employees against the risk factors is not sufficient; consequently, to take measures for upgrading the health conditions of the employees and constitution of awareness are required. Generally, it is difficult for people to leave the habits and internalized reflexes. Therefore, effort should be made on safe methods and behavior beginning from the early stages of the education so that this behavior could be adopted and implemented in working life. New approaches in occupational health and safety training beginning from kindergarten to elder ages and the ways of implementation at national and international level are considered in this article.

The Concern of Occupational Health and Safety with Training

In working life, which is one of the main requirements of life, we are exposed to various factors such as physical, chemical, biological and psychological factors. Consequently; the health, safety and efficiency of people are affected. Occupational Health and Safety (OSH) programs should give great importance to the gathering, analysis and dissemination of information by taking into account the requirements of the government, the employee and employer organizations, the research institutes and other organizations which are situated in the field of upgrading the working conditions. OSH, which aims to prevent the adverse affects on employees' health, occupational accidents and diseases, is a multidisciplinary field intending to increase the work adaptation and efficiency of the employees [1].

Training, which composes one of these fields, provides people with the required theoretical and practical information to manage their jobs. There are several international regulations for the purpose of providing this information and strengthening the prevention culture. The common understanding in these regulations is the importance of improving the training and the awareness beginning from early ages and training's being the main basis of providing and continuing the quality and efficiency in working life.

The awareness of protecting the individuals health, healthy and balanced nutrition, life long exercise and constitution of safe behavior awareness which leads the public to access safety culture, will contribute to the countries development and prosperity. The mainstreaming of OSH into education presents a great importance for providing the future workforce to be healthy and safe and for supporting the creation of a safety culture at public level [2].

OSH and education policy should be integrated for the purpose of mainstreaming OSH into education. This is possible by cooperative acting of various organizations and systems together with communication [2]. For this purpose, the sharing of good prac-

tices, is very important in order to constitute an awareness on the level of modern civilization for the new generation. The consistency of these policies and studies with the national OSH issues should be considered. While performing these studies, the development of a legal framework and of standards should be undertaken. The contribution of all parties has to be provided, to make OSH an integral part of life-long learning, interactive methods to be used, direct communication to be provided at the working places and feedbacks be provided and evaluated. An OSH education model should be prepared considering all of the above mentioned issues and should be disseminated on national level [3].

Safety Culture Approach in OSH

"Safety Culture" which is defined as making the healthy and safe behavior spontaneous habituation defines a new approach which is arisen in recent years. The objective in OSH should be the constitution of a common "Safety Culture" in working life and public.

The modern OSH approach is submitted to the parties as a service and client focused approach apart from the compulsive and legal measures. In order to implement this approach "social dialog" and "training" are vital and indispensable [4].

Mainstreaming OSH Concepts into School Education by Indirect Learning Activities

Surely health and safety subjects should be inserted into school curriculum for the purpose of improving proper behavior before children and youth get a job. In this context, some revolutions have been evolved during the recent 20 years. According to the traditional approach, OSH subjects were incorporated in the curriculum as only one subject in science and vocational lessons. Nowadays OSH is not restricted to only one subject title, but is integrated into mathematics and Turkish lessons at every level of education. A question prepared by using occupational accidents statistics in math lessons or an article out of a book about working life in Turkish lessons will provide indirect and permanent learning [1].

In this scope, various meetings were arranged with Ministry of Education, Turkey; whereupon by contacting the commission of primary school books writers, OSH subjects were included into the curriculum, not as a new lesson. Therefore, by OSH approach oriented to children and youth in the manner of indirect learning, not only a new generation of employees but also mothers or fathers in working life could be trained by their children [3].

Training Approach to All Age Groups from 7 to 70

The Ministries pilot studies of OSH education given to primary school students in the recent two years have been very efficient. The aim of these studies was to make students have a general concept regarding OSH and to increase their awareness of most common health and safety risks in their daily life. Drama, group works and games were used for training. It was observed that students enjoyed while they are learning the subject and were actively involved in training, as you can see on some of the pictures below.

Besides, in order to make students and their teachers conscious of the importance of the OSH concept and to create an awareness of safe living for tomorrow's employees, an educational program was designed for the students of vocational schools in 10 provinces throughout Turkey. This study aiming to help young people to adopt safe behavior models reached approximately 4000 students.

Apart from this, educational programs were prepared for children and youth between the ages of 13 and 17 attending sea camps and between the ages of 18 and 24 attending mountain camps. The purpose of these programs was to develop health and safety concepts and to create the awareness of safe behavior in potential labor force of the future. As a result of the evaluation of the pilot applications, the preparation and distribution of "Healthy and Safe Life Booklets" at

Picture 1 and 2:
OSH education given to primary school students

Picture 3 and 4:
OSH education for students of vocational schools

sea and mountain camps is planned. Another example of OSH training, an example that is oriented to all age groups, is conducted in Japan. In order to create social awareness on OSH, Japan Industrial Safety and Health Association (JISHA) has established OSH Squares. Within these centers, study visit programs and applied education intended for all ages varying form primary school children to elder employees, are conducted. Sky-ball, which was created as Japan OSH hero, shows the reactions in risky situations at work places to the audience by 3D films. After the risky situations, questions for risk assessment are asked to the participants. Participants answer these questions individually in the movie room by pushing buttons. At the end of the video show, each participant is given his or her test results which are presented by cute cartoon characters as a reminiscence of the day. This design is considered to be an example appropriate for all age categories to participate with keen interest and pleasure [4].

Picture 5:
Sky-ball – the Japanese OSH hero

Innovative, Interactive Approaches in Training

Dissemination of knowledge through lectures does not seem effective enough for acquiring accurate and usable knowledge. Trainers recently have agreed on the efficiency of training methods. An interactive approach requires trainers and participants to work together and participants active and creative contributions to the activity.

Nowadays, we need an integrated education and training conception in adult training, in order to change participants role from passive to active agents of the learning process. Teaching methods should be participant orientated. Therefore, to enable participants to acquire more professional skills, and to become experts on methods, to achieve personal development and small scale application skills, OSH seminars aim to increase experience and practice. This is why participant orientation is emphasized in an innovative and interactive OSH training approach. Participants are asked for their ideas and experiences. Their demands and needs are considered. Intense and active exchange of information and experience makes participants and trainers partners which learn together. Participants cease belonging to a passive audience and become to be helpful and active agents in the planning of their own learning processes. Best example of this is that they determine learning conditions, learning styles and goals by themselves. During the learning process, trainer adopt the supporter role, he or she is an organizer and learning partner of the student. Multiple senses (seeing, hearing, etc.) should be stimulated as much as possible in the process. When human-being is approached as

a whole, it is necessary to take emotions always into consideration. By this means, a positive basis can be created for the improvement of learning skills [5].

Safe Life Training Approach in Daily Life

At schools and in education modules, studies of raising public awareness and sensitivity in daily life are also new approaches in OSH which are becoming common in addition to the applications of OSH.

In the training campaigns which will be designed for this purpose, public awareness should be provided to the subject by using some methods such as spot films, making use of famous faces for the OSH promotion, preparing TV programs for national and local channels, using cartoon characters like NAPO in OSH trainings, preparing OSH puzzles, arranging poster, composition and slogan painting competitions.

"From home to work, from kindergarten to university, Safety Culture for Everyone".

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2 Examples of good practice for continuing vocational training

2.1 Safety Card Training

Markku Kämäräinen, Finnish Institute of Occupational Health (FIOH)

Introduction

To improve occupational safety and health in shared workplaces in Finland a new national innovative policy called the Occupational Safety Card training (OSC) has been developed. In addition to companies the development process has been joined by representatives from labour market organizations, the insurance sector and educational organizations. The training has been launched in 2003. The term shared workplace means a workplace where one principal employer holds the authority and where at the same time or in succession one or more contractors or self-employed workers are working for him. A shared workplace may be a plant, industrial establishment, construction site, terminal or service facility.

The Card is awarded after one-day introductory training on safety and health given by a specially trained trainer. After the training event and an accepted written exam the safety card is granted for a five-year period to the worker. The card is designed especially for workers at worksites that are shared by several enterprises. The cardholder masters a certain minimum competence in occupational health and safety. Person having completed the training knows the basics of safety in the plant area, understands the importance of safety co-operation, recognises hazards in ones own work and in the workplace, knows how to avoid hazards and knows what to do in the case of an accident. The aim of safety measures is to protect workers against health hazards and accidents at work and to create well-being and work ability.

The card has become very popular, and some companies have trained 100 % of their personnel in the courses. Some large companies also provide training to their subcontractors and clients in safety card courses. Implementation of the OSC is voluntary, but in practice it is the principal employer who decides whether or not it is necessary.

Nowadays there are over 400 000 OSC holders. That is about 16 % of the Finnish workforce, and it is becoming more and more popular.

Surveillance

OSC system operations are guided and monitored by the Occupational Safety Card Committee of the Federation of Accident Insurance Institutions in Finland and by the Centre for Occupational Safety in Finland. It means that training of the trainers, registration of course trainers and course contents will be under continuous quality control. The quality of the training is monitored to ensure united practice.

Some control activities have already been done. In October 2007 the rights to train

were abolished from ten trainers because of neglects.

Partners and their tasks in OSC training

Centre for Occupational Safety in Finland administrates the OSC system, provides training materials and www sites, holds listing of available OSC courses and OSC cardholders, holds trainer register and disseminates information to trainers by keeping up www sites.

Industrial enterprises have the participants and order and pay the OSC courses, social partners have co-operation and educational organizations and trainers keep the training going on.

Table 1:
Elements of the OSC training system

OSC Training	OSC Trainer Training	Renewal of OSC Training	Renewal of OSC Trainer Training (after 5 years)
1 day	2 days	min. 4 hours	8 hours
written exam	written exam	written exam	written exam

Standardised OSC training

To ensure that the OSC training contents will be standardised some common elements are described by the above named OSC Committee. These are as follows:

1. *Occupational Health and Safety in the Workplace*
   - The Responsibilities
   - Occupational Health and Safety in the Shared Workplace

2 *Target: Zero Incidents*
   - Safety – My Concern
   - Preventing Accidents ad Work-Related Illnesses
   - Identifying and Preventing Hazards
   - Human, Economic and Social Effects of Accidents

3. *General Instructions*
   - Traffic at the Site
   - Housekeeping
   - Personal Protective Equipment (PPE)
   - Work Permits
   - Locker Rooms
   - Alcohol, Drugs and Smoking
   - Cameras, other Equipment and Data Security

4. *Major Hazards and Prevention*
   - Machinery
   - Unexpected Start-Up
   - Lifting
   - Ladders
   - Scaffolding
   - Shaft Mouths and Openings
   - Confined Spaces
   - Chemicals
   - Electricity
   - Hot work

5. Emergency Preparedness

- What to do in Case of Emergency
- First Aid
- Emergency Call
- Fire-fighting and Initial Extinguishing
- Gas Escape

6. Closing Words

These contents must be taken into consideration by the trainers when planning the training program. In addition there is a guidebook for the trainees to support their self learning.

Specially trained trainer

To own the trainer rights means that every trainer must have fulfilled some qualifications, namely activity in OHS matters; e.g. a period as safety representative, safety officer or safety committee member; participation in a OHS 5-days basic course, practical experience as a trainer, 2-days accredited trainer course and 8 hours supplementary training after 5 years of the preliminary training. The OSC courses are solemnly held by a course trainer who has qualified in a specific trainer training.

Nowadays there are over 3 000 trainers which have arranged nearly 15 000 OSC courses during the years 2003 - 2007.

Training course for trainers is a 2-days course, which authorizes to allow OSC. This training is material based and teaching is supported with 149 Power Point-slides, of which 65 are compulsory! Also DVD is available. There are no didactical advises or solutions. Advices concern how to run the written exam and administrative information at the end of the course and how to register their courses and participants who have successfully performed the exam. More pedagogical advice is needed.

One day supplementary course authorizes to train OSC renewals and its content focuses on the challenges and safety activities of shared workplaces.

Information for trainers about courses and instructions are also available in English. The OSC trainees guide is available in Finnish, Swedish, English, Estonian and Russian.

Conclusions

Experience shows that OSC training improves practical collaboration between employers and contractors in shared workplaces and especially it supports job introduction in shared workplaces. It provides basic information on occupational safety and health from the viewpoint of accident prevention, but that is not enough. The work ability and well beeing must be taken into consideration too. One practical benefit is that it reduces overlapping training provided by different employers and it arouses interest and motivation also for the safety skills of the companies own personnel. It is hard to show in figures but obviously it seeks to decrease work accidents and hazards.

According to *Koskela* et al. the OSC training system as a whole functioned well [1]. Their study pointed out that the most essential factor affecting on the quality is the training of OSC trainers. The trainer needs to be familiar with the topic being taught and needs to know the basics about the pedagogy. Furthermore, the trainer needs to modify the training according to the audience. The active role of trainees should also be em-

phasized. Material should support different learning styles. By improving the guidance of the trainers it is possible to contribute to the better learning result of the trainees.

It seems to be clear that OSC is not enough to the safety workplace. At the workplaces there must be a safety management system too.

One current task is to create an internationally recognized practice for safety passports. Some efforts are already made at enterprise level. More must to be done at EU level and globally. *Uusitalo* et al. reviewed different safety passport schemes in use in Europe and other countries [2]. According to them there are no major differences in various passport schemes. This provides a good starting point for developing e.g. a European wide recognition system for safety passport training.

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2.2 SOLVE Addressing Psychosocial Problems at Work. An ILO SafeWork Educational Program that examines both policy and shop floor action to address psychosocial problems in a comprehensive way

David Gold, ILO SafeWork

What is SOLVE?

SOLVE is an interactive educational program designed to assist in the development of corporate or institutional policy and action to address psychosocial problems at work.

The SOLVE Concept

Stress, the problems of addiction (alcohol and drugs, tobacco, gambling, and cyber addiction); violence (both physical and psychological); the problems associated with HIV/AIDS; lack of adequate sleep, nutrition and regular exercise and economic stressors such as the threat of job loss all lead to health-related problems for the worker and lower productivity for the enterprise or organization. Taken together they represent a major cause of accidents, fatal injuries, disease, absenteeism and presenteeism at work in both industrialized and developing countries. These problems may emerge due to the interaction between home and work, they may start at work and be carried home (or into the community) or vice versa. SOLVE focuses on prevention.

The combined effects of these psychosocial issues have considerable negative ramifications for workers, employers, the worker's family and society:

- For the worker, these problems can result in isolation, stigmatization, injury, illness and even death.
- For the organization or enterprise, these factors can result in increased absenteeism and accidents, reduced productivity, increased recruitment, training and insurance costs and decreased profits and therefore a lack of competitiveness.
- The family invariably suffers the full brunt of the loss of income, reduced welfare, missed opportunities for children, psychological trauma, lack of self-respect, and injuries, to the extent that the family may break up altogether.
- For society, the impact may be seen in terms of increased social costs, decreased consumer spending, increased crime and adverse economic development.

There are numerous interrelationships between the above-mentioned psychosocial problems. Any one of these problems may be a causal factor for the others. Each one may be an end result or find its roots among the others. Thus psychosocial problems can initiate or exacerbate an increasingly damaging cycle that will lead to negative consequences for the individual, for the organization or enterprise and for society as a whole. The traditional approach in dealing with psychosocial problems has been reactive and isolated, focusing on just one of the problems and treating its symptoms. But the problems are increasing and because they are interlinked treating just one can be ineffectual. Therefore a major paradigm shift towards an integrated, proactive and prevention-oriented approach is needed.

A multi-level approach is essential.

To address these problems at the enterprise or organization, a comprehensive policy should be put into place. Enterprise policy should focus on occupational safety and health needs including psychosocial problems. Traditional approaches have neither addressed the policy requirements nor action required to reduce the negative impact of psychosocial problems.

Through educational courses, SOLVE encourages senior executives, directors of human resources, occupational safety and occupational health professionals, employers' and workers' representatives and others to develop a comprehensive policy for their respective workplace. This policy should incorporate issues such as prevention, non-discrimination, confidentiality, social support, worker involvement, the provision of training and information and the provision of treatment and rehabilitation. The policy should call for an occupational safety and health management system to assure smooth development, implementation and evaluation. For workers and supervisors, SOLVE provides for action through education and training, translating policy into action at the shop-floor level.

The ILO, with its tripartite structure and its leadership in occupational safety and health, is in a unique position to develop and support activities which translate concepts into policies and policies into action at the national and enterprise levels. It is one of the goals of the ILO to develop national capacity as well as the capacity of individual enterprises and institutions to reduce the negative impact of workplace psychosocial problems. The SOLVE methodology enables governments, workers and employers to improve working conditions and productivity. Through improved psychosocial working conditions, workers are healthier with a higher morale and employers see productivity increase. The government as an employer can also benefit from such capacity building, but in addition can use the SOLVE methodology to meet its own mandate to improve working conditions.

Bringing SOLVE into a country is a positive way to involve all the social partners: government agencies, employers and workers in a program that relies heavily on social dialogue. In a number of countries university programs at the honors or graduate level are engaging in courses or research related to SOLVE. To date over fourteen universities have taught the SOLVE policy course. In the near future the SOLVE methodology will be expanded to include six additional psychosocial issues: sleep deprivation, inadequate nutrition, lack of regular exercise, gambling, addiction to new technologies and economic stressors.

The SOLVE Methodology

The SOLVE methodology is currently offered as six different courses. Three are managed by ILO-trained Course Directors and for two others, the materials are provided, at no charge, to companies or organizations that have been through the SOLVE Policy-Level Course for them to implement as part of their continuing education program. Finally the Course Directors' Workshop is provided exclusively by ILO SOLVE Master Trainers. SOLVE for Mid-Level Managers is currently under development.

Courses managed by ILO-trained Course Directors

1. *SOLVE for Managing Directors.* This is a two hour course designed to motivate the heads of industries, corporations, institutions or services to bring the SOLVE methodology into their organization. The course introduces the integrated approach and demonstrates the impact on corporate survivability. This course uses an interactive approach incorporating case study analysis, cost analysis and group discussion. SOLVE for Managing Directors is, as the name says, aimed at top executives.

2. *The Policy-Level SOLVE Course* is a 32-hour interactive program for operational managers designed to provide the elements necessary for participants to design a comprehensive corporate policy including psychosocial factors.

   - This course is highly interactive, using case study analysis, simulation exercises and policy development activities to reach its objectives. It may be conducted in consecutive four days or over a longer period of time, dividing the course into smaller units.
   - The course is designed to work best in groups of 16 participants with workers, government and employer representation.
   - During the course, six simulation exercises are linked together by a story line that starts on the first day of the workshop and ends on the last day. The story is an on-going scenario with problems that require participative high-level management decisions for resolution. The simulation exercise is designed so that each participant in the course is actively involved in a role-playing capacity.
   - The last element of the course is dedicated to action planning. At the end of the course participants are required to develop an action plan that will indicate how the SOLVE concepts will be applied in their respective organization or enterprise within the three months after the course is completed.

3. *SOLVE for Peer Counsellors* is a two day course. It provides enterprises or organizations with an informal safety net for psychosocial problems before they become acute and require professional intervention. Participants, who have met the prerequisite of the SOLVE Policy Course, are trained in active listening, assessment of problems and referral to specialist sources when needed. Participants in the SOLVE for Peer Counsellors' Course must have completed the Four Day Policy Course.

Courses and materials provided to organizations having completed the Policy Course

4. *SOLVE for Workers* is a one-hour orientation course for workers, workers' representatives and supervisors. It is designed to demonstrate how multiple psychosocial problems can impact on an individual at work, during leisure activities and at home. It also provides an opportunity for the worker to become familiar with the comprehensive corporate policy. SOLVE for Workers uses exercises, group discussion and individual action planning to achieve its objective.

5. *MicroSOLVEs* are subject-specific courses relating to any one of the psychosocial problems covered in SOLVE. They are the action-oriented follow-up to the policy-level SOLVE activities and are designed for workers and supervisors in enterprises that have already completed the Policy-Level course and have developed a comprehensive policy that addresses psychosocial issues. MicroSOLVE elements come in sets of three for each topic; module one addresses recognition of the problem; module two addresses action and module three prevention. Each module is about 1.5 hours long and can be instructed independently.

Course provided exclusively by ILO SOLVE Master Trainers

6. *The SOLVE Course Directors' Course* is five days long. The course covers several vital components necessary to successfully organize and instruct SOLVE for Managing Directors and the SOLVE Policy-Level Course. Like all other SOLVE courses it is highly interactive and encourages active participation by the trainees. The prerequisite to the course directors' course is the four-day Policy-Level course. Once an individual becomes a course director, they are in an ideal position to significantly facilitate the implementation of the SOLVE methodology.

    - The course director is trained to manage the implementation of SOLVE for Managing Directors and the SOLVE Policy-Level Course in his or her respective country. After completing the course, Course Directors can then instruct and direct SOLVE in different locations. From here, SOLVE packages for workers and supervisors can be distributed to participating enterprises and organizations in order to reach large sections of the working population.
    - A crucial part of the Course Directors' Course are the demonstrations of different levels of SOLVE, which are carried out by the participants themselves. In this way the participants can experience first hand how the courses work, and also can be guided in their instruction by the ILO SOLVE Master Trainers. The demonstrations of SOLVE for Workers and MicroSOLVE, which are for the shop floor level, also ensure that participants appreciate how SOLVE is intended to reach to all levels of an enterprise or organization and that all levels have to work together to achieve changes in working conditions. The demonstration of SOLVE for Peer Counselors will allow the Course Director to be able to carry out this training package in enterprises and organizations.

Management and health

7. *SOLVE for Mid-Level Managers* is two days long. The course provides managers who are not working at policy level with a broad understanding of the psychosocial issues in question and how they are interrelated, as well as their impact on work. Awareness is raised of the influence that managers can have on the health of their workers and the productivity of the enterprise or organization.

The strength of SOLVE

SOLVE uses the workplace to develop policy and action based on policy to diminish the negative synergy among psychosocial issues. Articles about SOLVE explore this negative synergy in Africa and also point to the importance of integrating HIV/AIDS related issues in overall occupational safety and health educational programs, thus using components of SOLVE to compliment behaviour change communication methodologies.

SOLVE combines economic and social objectives by stressing win-win, low cost, practical solutions that meet the needs of both industry and workers. With the implementation of SOLVE activities, a capacity can be established to address, in a combined way, multiple psychosocial issues within occupational health and safety and industry development programs.

To achieve this SOLVE is:

- *People-centred:* Workers are increasingly recognized as the crucial asset for the success of any business. Their well-being is essential to the development of the "new" flexible, quality-oriented, knowledge-based, healthy enterprise.
- *Preventive:* Prevention is much more cost effective and successful than waiting until a significant problem has developed before action is taken. A healthy work organization and environment are pre-conditions to the development of a productive workplace.
- *Results-oriented:* The SOLVE programs success can only be measured by the results in the workplace. Taking action to promote change in the workplace should be the natural follow-up to the project. The project will also show how strategic and immediate objectives are compatible.
- *Adaptable:* Situations are complex. Solutions are multiple. One approach to any problem does not work in all environments and cultures. Several approaches and options will be presented and discussed so that users can develop programs and action that meet their unique needs. The design of the SOLVE training package is based on the manufacturing industry. It is also adapted to the airline industry, the health care industry, the fire service, public administration and the maritime sector through modifications of handouts, activities and the simulation exercise. Through the extensive use of simulation activities, the participants naturally bring their own cultural norms relating to themselves as individuals, their homes and communities and their work into the exercises. Thus SOLVE activities are readily tailored to the participants' needs.
- *Self-sustainable:* Programs and action that are developed through the SOLVE program are designed to meet the needs of employers and workers. They show positive results, can be modified to meet changing circumstances and are cost-effective. The resulting effect can be seen as a positive economic and social gain which grows, sustains and adapts itself to changing needs in the organization.

SOLVE information and implementation

Promotion

A comprehensive introduction to SOLVE had been developed as an audiovisual presentation with an accompanying text. Promotional presentations have been delivered in a number of meetings, symposia and conferences over the past four years.

Training courses

Policy-Level SOLVE Courses have been held in a number of countries such as Algeria, Belgium, Botswana, Burkina Faso, Cameroon, Canada, France, India, Italy, the Ivory Coast, Kenya, Lesotho, Malaysia, Namibia, the Philippines, Senegal, South Africa, Sri Lanka, Swaziland, Switzerland, Tanzania, Thailand, Togo, the United States and Zambia. Participants have included government officials, university professors, medical doctors, health workers, employers and workers, officials from six United National agencies and the Athens Olympic Committee.

There have been Course Director's Courses in a number of places, including Turin and Rome (Italy), Cape Town and Pretoria (South Africa), Montreal (Canada), Bangkok (Thailand), Manila (Philippines), Brussels (Belgium), Douala (Cameroon), Penang (Malaysia), Arusha (Tanzania), Cotonou (Benin), Gabarone (Botswana) and Hollywood, MD (USA) and Algiers (Algeria). Some of these courses have included participants from other countries, thus creating capacity to implement SOLVE both nationally and regionally.

Translations

English, French, Italian, Spanish and Thai versions of the SOLVE manual do exist. The SOLVE manual has been translated in draft into Bulgarian, Portuguese, Russian and Italian. Translations into Chinese and German were foreseen.

Through the implementation of SOLVE, psychosocial issues can be addressed in an integrated and therefore effective way to contribute to improved health and productivity.

For current SOLVE-courses consult the internet web site: *http://www.ilo.org/safework/events*

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2.3 Synergies between the organisational and individual learning aimed at improving safety and health at work: trainees as knowledge workers

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Introduction

In theory and practice alike, the belief is widely held that individual and organisational learning are becoming (or having to become) increasingly intertwined. Synergies between individual and organisational learning (i.e. more than the combined sum of their effects) are a very promising phenomenon, particularly from the point of view of safety and health. This report presents results and experiences gathered with a form of learning developed for initial local vocational training in industrial occupations with the aim of harnessing synergies. Along with other aspects, this form of learning incorporates the idea of the "learner as a designer" in a strategy geared to ongoing promotion of safety and health in the product lifecycle.

Background

Below, the authors present and substantiate two basic assumptions, which can be seen as meta-standards, relating to the integration of safety and health into vocational training.

(1) Safety and health are joint evaluation and target criteria, linked in terms of their logical development, for competence development both of organisations and individuals

On the one hand, companies that place technical products, e.g. machinery and plant, on the market are expected to conduct comprehensive risk prevention, covering the entire product lifecycle. The challenges involved are mainly concerned with the fact that risks increasingly depend on knowledge and definitions [1], because change-related (harmful) effects of organisation-specific selections (e.g. a specific work process) are usually ambiguous, spatially and temporally somewhat removed from those selections and result from the non linear interaction of various causes.

It is evident that this goes beyond the limitations of traditional consumer and occupational safety and health (OSH) policy, which is mainly based on compliance with technical standards and regulations. The modern perspective is that safety and health are actually preventive activities that have to be performed by all persons involved in a company continuously and in all phases of the value chain [2].

On the other hand, these factors make the situation for employees ambivalent. An ability to optimise work and business processes implies experience-led action and learning, geared to coping with unexpected, unplannable situations. This also always includes being involved in organisational processes. The ambivalence mentioned above stems from the fact that, on the one hand, this does suggest favourable conditions for progressive forms of work, i.e. forms that promote competence and development (in the sense of new scope for action, decision-making and interaction) [3]. On the other hand, however, these phenomena

are inextricably linked with an increase in uncertainty and ambiguity (e.g. in the form of role conflicts) as psychosocial stress factors. One particular aspect that can be mentioned in this context is the concept of a "sense of coherence" in *Antonovsky's* "Salutogenesis" health model [4].

(2) Promotion of safety and health implies a systematic linking of individual and organisational learning.

For some time now, the main objective of German vocational training has been to "empower [trainees] to help shape the world of work in a socially and ecologically responsible manner" [5]. In order to be able to behave proactively and responsibly with regards to the consequences of one's own actions, factors such as systemic thinking, knowledge-sharing and risk communication are key prerequisites. These have previously not been focused on in skilled work and vocational training strategies and methods, which primarily see work as "organised action" and predominantly base learning and competence development on knowledge receipt. Lecture-style tuitition, for instance, is still the main method of tuition in vocational training schools. In-company training is also dominated by trainer-centred and instruction-centred forms, chiefly based on adaptation and reproducing what has been learned.

If one attempts to summarise the modernisation trends in the world of work, (e.g. increasing functional integration of tasks and responsibilities), it can be said that there is a trend towards to tertiary skilled work can be spoken of. The term "tertiary skilled work" can be used to refer to groups of actions that have a considerably organising and knowledge-oriented character as part of occupationally organised work. Tertiary skilled work focuses on the (co-)shaping of uncertain and ambiguous situations and processes. Explicit forms of tertiary skilled work are innovation circles or circles in participatory planning processes. Implicit forms stem from increasing integration of planning, information and cooperation elements into skilled work, with organisations' employees being required to act as agents of organisational learning [6].

Proposed solution: trainees as knowledge workers

A three-year pilot programme entitled "Dialogische Medienentwicklung" (DiaMedia) [7] developed and tested a learning form that combines individual and organisational learning in a way that opens up synergies. The intention behind the pilot was that trainees (both in technical and non-technical occupations), working on collaborative projects, should identify, reproduce in the form of examples, reflect on and improve company-specific expertise on how to deal with equipment and product safety requirements and requirements pertaining to safety and health at work.

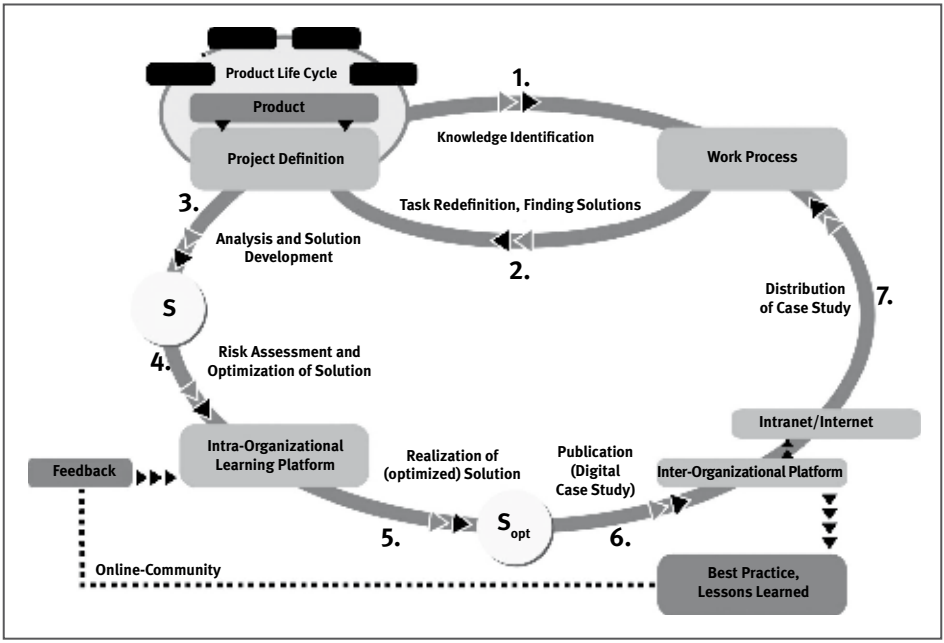
The reference process used to define projects was the product lifecycle, with each project relating to one phase of the product lifecycle (e.g. work preparation, production, putting on stream or maintenance). The projects start and finish with knowledge work, i.e. the trainees begin by researching in-company expertise (by making enquiries, analysing documents, etc.) on, for example, work processes used to integrate safety

and health, and develop new, optimised solutions on that basis. In the last step, the project results (e.g. suggestions for improvement) are published in the form of digital case studies. Figure 1 illustrates a project lifecycle. In the pilot programme, the projects lasted one month on average [8]. The DiaMedia form of learning implements four key educational methods/ideas, as follows:

(1) Trainees are knowledge workers and innovators. The trainees are given the task of drawing up proposals for improvements in workplace practice. This requires them, for example, to be able to access business departments and work with other employees to obtain information and feed back results. Key stakeholders in the organisation (executive management, departmental management) must also be open to or impressed by the idea of trainees as providers of input and agents of organisational learning [9].

(2) Problem-based and experience-led learning. The trainees develop example problem solutions based on specific products and/or real customer orders. Unlike with safety briefings or training courses, knowledge and competence are not predominantly conveyed through instruction. Instead, the intention is that the trainees should contribute their own or identified assumptions, strategies and solutions, in an

Figure 1:
Lifecycle of a project



open, resource-based learning arrangement, and expand and differentiate using challenging tasks that have been found to be beneficial. The practical handling of, for example, materials and tools remains the basis of the skilled work.

(3) Learners as designers. As part of the project, the trainees develop "digital case studies". These can later be used both by trainees and permanent employees as particularly practical information and learning tools. Digital case studies recapitulate the problem-solving process, focus on critical decision points and aim at improvement. The documentation and presentation of the problem-solving process on a computer implies a change of perspective, resulting in more detailed processing of the subject matter learnt with a long-term effect [10]. Digital case studies are produced with the aid of an authoring system integrated into the learning and communication platform.

(4) Dialogue-based/web-based learning. During the course of the project, the trainees conduct a solution-oriented dialogue with skilled workers, specialists and practitioners both inside and outside the enterprise. This dialogue takes the form both of direct contact (e.g. questionnaires, consultation and observation interviews) and web-based dialogue using the internet platform. In particular, the internet platform is used to organise solution-oriented feedback from external experts on the problem solutions being tried out. That feedback is then incorporated into the optimised solutions (see Figure 1).

Lessons learned and findings

DiaMedia was mainly piloted in large enterprises in the plant construction and mechanical engineering sector. The lessons learned, as substantiated by, for example, statements made by trainers and departmental managers, included the following:

- the axiom laid down in human factors engineering and vocational education, that the development of competencies that enable persons to help shape their workplace and cope with change (e.g. an awareness of interdependencies in the product lifecycle) requires areas of activity that are open to shaping, error-friendly and experience-intensive, appears to have been proved true [11];
- through this form of learning, trainees initiated concrete improvements and innovations. These resulted from failed attempts to reproduce organisational practice (critical decision points and triggers for problem-solving during the project). The developed learning form therefore provides a strategy for avoiding a problem that arises when implementing innovations, namely that companies restrict their search for new knowledge to an area relatively close to prevailing practice [12];
- DiaMedia had a bridge-building function in the companies. It helped integrate disparate perspectives and experiences of different groups and departments that have to collaborate in the performance of safety and health activities during the product lifecycle;
- DiaMedia entails a change in the definition of trainees' role. The training staff are also required to adopt a new role, serving more as guides for learners and facilitators of learning processes. In the pilot pro-

gramme, it became clear that in-company trainers who were also qualified tele-trainers or tele-coaches had fewer difficulties with this form of learning. Other trainers were supported by a project group, which introduced them to the new concept;
- it also became evident that factors in the learning and innovation culture of the organisation play an important role. Factors that make it difficult to use this form of learning successfully include situations where training is separated from the rest of the company (training seen as a "protected space"), low prestige on the part of the skilled workers in the company (seeing work as organised, executing activity) and knowledge management seen as a specialists' domain). The following factors have a favourable influence on the use of the learning form: a certain amount of pressure to change in the organisation, scarce resources (e.g. no money for specialists), management's conviction that modern forms of training are the right way to go and that multimedia and internet-based learning should become a fixed part of training.

Conclusion

In summary, the pilot programme furnished extensive evidence of the plausibility of the two statements made at the beginning of this report. The form of learning piloted operationalised safety and health as logically interdependent criteria in the development of individuals' and organisations' competencies for the purposes of vocational training. On the one hand, this gives trainees the opportunity to acquire competence to act autonomously at work and help shape their workplace – particularly the ability to cope with uncertain and ambiguous situations in (professional) life. On the other, the trainees' learning processes are geared towards preventive improvement of safety and health in the product lifecycle. The importance of the ability to perform work tasks independently and under direction is stressed in an effective manner.

However, it also became apparent that the selected strategy for integrating safety and health into vocational training is difficult to comprehend. Important groups of players and multipliers in vocational and in-company training (vocational school teachers, trainers, occupational health professionals and HR development staff) mainly see the topic of "safety and health" as being about averting hazards and preventing accidents. However, integrating safety and health into vocational training with the aim of prevention and redefinition of occupational safety and health as a "task for the organisation as a whole" [13] goes far beyond that. In view of this, it must be concluded that it is essential to overcome the attitudes and stereotypes that pose obstacles in important target groups in the integration of safety and health into vocational training.

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3 Examples of good practice for higher education institutions

3.1 Occuptional safety training in Finnish polytechnics and universities

Simo Salminen, Finnish Institute of Occupational Health (FIOH)

Introduction

The Finnish school system includes pre-school education in children's day care centres for 3-7 years old children, comprehensive schools for 7-16 years old, upper secondary general schools or vocational institutes for 16-19 years old, and tertiary education in universities and polytechnics for older than 19 years of age. There are 31 polytechnic institutes with altogether 143.500 students and 20 universities with 176.600 students in 2006 [1].

Training is defined in this study as formal and informal methods for assisting individuals in acquiring knowledge, changing attitudes, or practising safe work behaviour. A review of 41 studies showed that training has a positive effect on occupational injury control [2]. Another meta-analysis by 95 studies showed that active training methods increased the safety knowledge and skills of students three times more than passive ones. The active methods also decreased injuries [3]. In the United States, the integration of occupational safety and health information at different levels of the education system has been inconsistent [4]. However, university students thought that the teaching of cross-cutting competencies is valuable and useful [5]. The trainees should know the exact circumstances under which the student will go at the workplace [6].

The aims of this paper are to describe the extent to which occupational safety is taught in Finnish polytechnic institutes and universities and analyze the differences between these two levels of the education system.

Materials and methods

In order to determine who receives occupational safety education in Finnish polytechnic institutes and universities, a postal questionnaire was sent out to each of the 26 Finnish-speaking polytechnic institutes. Each institute received 10 questionnaires, because there is no exact information on the number of occupational safety teachers at these institutes. A total of 69 questionnaires were received back or 2.7 responses per institute. The response rate was 27% [7].

Ten questionnaires were sent to each of the 19 Finnish universities, because the exact number of professors and lectures teaching occupational safety was not known either. A total of 48 questionnaires were returned giving the response rate 25%. On the other hand, there were 2.5 responses per university.

The questionnaire consisted of 16 questions, which were almost the same for all teachers. First, the number of occupational safety lectures given during a term was asked in the questionnaire. Then it was required the subject to inform about his/her methods of

teaching and teaching materials. Finally, the education of the occupational safety teacher was asked.

Results

The teachers of polytechnic institutes gave more hours (20.3) occupational safety lectures per term than those of universities (16.4), although the difference was not significant ($t = 0.77$, $df = 117$, n.s.).

Lectures and discussions with students were the most often used teaching methods both in polytechnic institutes and universities (Table 1). In the polytechnic institutes they prefer more students' teamwork, whereas in the universities professors and lectures gave demonstration more often. These differences, however, were not significant (teamwork: $\chi 2 = 3.67$, df=1, n.s.; demonstations: $\chi 2 = 2.22$, df=1, n.s.).

Text books and photocopies were the most often used teaching materials in Finnish polytechnic institutes and universities (Table 2). Teachers in the polytechnic institutes used brochures (= 5.27, $df = 1$, $p<0.05$) and audiovisual materials ($\chi 2 = 4.60$, $df = 1$, $p<0.05$) significantly more often than university professors and lecturers. On the material downloaded from the Internet the difference between polytechnics and universities was not significant ($\chi 2 = 3.12$, $df = 1$, n.s.).

The education of teachers is the key question in the occupational safety training in schools. Over half of the teachers of polytechnic institutes had received extra courses in occupational safety, whereas university professors and lectures more often taught occupational safety without any formal education based on their own work experience (Table 3). However, the difference between these two levels of education was not significant ($\chi 2 = 3.37$, $df = 2$, n.s.).

Discussion

The results of this study showed that teachers in polytechnic institutes taught occupational safety issues more actively than teachers in universities. They used more hours in teaching occupational safety, gave more lectures and discussed more often with students about occupational safety, used brochures and audiovisual materials significantly more often, and had participated in extra courses on occupational safety more often than university professors and lecturers. This difference is partly explained by the work life orientation of polytechnic institutes or applied universities.

The students of polytechnic institutes and universities become supervisors and managers at workplaces so that their personal risk of accident will be minimal. However, according to the Finnish law of occupational safety the management is responsible for the safety of their subordinate workers. Teaching this managerial responsibility at polytechnic institutes and universities is difficult, because the responsibility in the future is far away from the reality of the students nowadays.

Occupational safety issues are taught in Finnish schools according to a penetration principle, when the safety issues are taught at the same time with work skills, for example using safety goggles when a student is welding. However, implementation of this principle depends on the initiative of the teacher. For example, one teacher of electri-

Table 1:
Teaching methods in occupational safety training

Teaching method	Polytechnics % said yes, (n=69)	Universities % said yes, (n=48)
Lectures	81	75
Discussions with students	55	42
Students' teamwork	46	27
Students' presentations	26	23
Demonstrations	26	44
Excursions	26	23
Outside specialists	26	19

Table 2:
Teaching materials in occupational safety training

Teaching material	Polytechnics % said yes, (n=69)	Universities % said yes, (n=48)
Text books	57	42
Photocopies	51	54
Brochures	39	19
Audiovisual material	41	19
Material from Internet	45	27

Table 3:
Teachers education in occupational safety issues

Reachers' education	Polytechnics % (n=67)	Universities % (n=45)
Teacher training	19	22
Safety courses	57	40
No safety training	24	38

cians sent a portfolio where the students can collect the information related to safety, whereas some students reported that they have not heard anything about occupational safety at school. Ultimately the workplace must take the main responsibility for teaching occupational safety issues to young workers.

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3.2 Students' knowledge of occupational safety and health

Petra Ceglarek, University of Potsdam

Introduction

As part of the 2006 European Week, entitled "Safe Start", a project seminar was initiated on the undergraduate psychology course at the University of Potsdam to find out what students at our university know about occupational safety and health. In their future roles as managers, students will be responsible for protecting their employees' health and lives. But how are students prepared for this task? The project aimed to determine the current level of OSH-related knowledge at our university.

Example of good practice

The Institute of Organic Chemistry at the University of Potsdam is an example of good practice in the successful integration of the subject of occupational safety and health into university education. Since chemistry students have to complete numerous laboratory practicals, the occupational safety strategy is based on four pillars: 1) OSH instruction prior to and as a prerequisite for participation in a practical; 2) instruction in the laboratory on factors in the laboratory; 3) safety measures during the practicals; and 4) OSH theory delivered alongside the practicals. Laboratory assistants are models of good practice themselves, showing the students how one handles hazardous substances correctly whilst still being able to work swiftly.

Figure 1 lists the elements of the safety strategy. In summary, the strategy can be said to result in successful interaction between theory and practice.

In line with the strategy, students may participate in practicals only when they have successfully completed all safety instruction units, lectures and tests. They can be excluded from placements for misconduct. The success of the safety strategy can be seen in the low rate of accident incidence and the low level of accident severity. The students display a higher level of awareness of hazardous situations (they make fewer "mistakes" in the laboratory).

Empirical study

Method and sample

An on-line survey was carried out at the University of Potsdam to determine students' level of basic knowledge on occupational safety and health. The questionnaire included sociodemographic details (subject studied, age) and previous experience (employment/training prior to the degree course). Two methods were used to determine the students' level of knowledge. Firstly, a multiple choice test, covering their basic knowledge about accident insurance for students, employers' duties and action to be taken in the event of an occupational accident. A maximum of 58 points was possible. The second method was free association, in which the students were asked to list in note form everything that they knew about three

Figure 1:
The four pillars of the safety strategy employed at the Institute of Organic Chemistry at Potsdam University

1. OSH instruction prior to the beginning of a practical

- Takes place prior to the practical, irrespective of what instruction has been given earlier
- Personal attendance is a prerequisite for participation in the practical
- Attendance is confirmed by signature
- Occupational safety and health is treated both in theory and practice in "experimental lectures" with demonstrations (e.g. extinguishing procedures or demonstration of glove "stability")
- Presentation of the most common information sources regarding (occupational) safety and health user instructions, etc.

2. Instruction in the laboratory on factors in the laboratory

- Explanation of the technical equipment in the laboratory
- Instruction on how to operate the equipment and use the materials
- Instruction on escape routes, emergency equipment and waste removal devices
- Reference to special hazards (e.g. apparatus with corrosion damage, damage following mechanical impact, smouldering following contact with the stove)

3. OSH measures during the practical

- Short test before each experiment (focusing on the specific risks) required before the experiment can begin
- The lab journal must be kept completely up-to-date = complete list of the hazardous substances before the experiment begins
- All receptacles containing hazardous substances must be adequately labelled
- Room monitor = One student is responsible for safety in the laboratory throughout the entire day
- Assistants point out safety faults (even faults that appear "minor") whenever they become apparent
- Demonstrate how to handle hazardous substances properly by showing students that it is possible to work safely with hazardous substances and still be quick

4. OSH theory during the practical

- A seminar run in parallel to the practicals discusses the safety-related aspects of the experiments
- Unannounced written tests (including questions on occupational safety and health)

stimulus terms (occupational safety, occupational health and occupational accident).

A total of 472 students participated in the survey. One quarter of the respondents (N=112) were students of biology, chemistry, nutritional sciences and sports sciences. Occupational safety and health issues are part of the curriculum for all of these fields. It was thus expected that these students would already have knowledge of the topic (this was therefore the "expert" group). The remaining sample (N=360) did not have anything to do with occupational safety and health in their studies (this was the "greenhorn" group).

Results

Although there was significant evidence to back the assumption that, in particular, the subject studied would result in different levels of knowledge, the evidence was not as extensive as expected. There were major inter-individual differences in the multiple choice test. The score, arrived at by adding together the number of correct answers, is normally distributed (min=4; max=50); on average, only around half of the questions were answered correctly. The expert group (M=30.9; SD=7.9) performed significantly better than the greenhorn group (M=26.9; SD=8.6).

The concepts listed by the respondents in the free association method were added together for all three stimulus terms. As in the multiple choice test, there were major inter-individual differences (min=1 and max=27 associations). At an average of M=9.7 (SD=4.1), the expert group produced slightly (but significantly) more associations than the greenhorn group (M=8.4; SD=4.5).

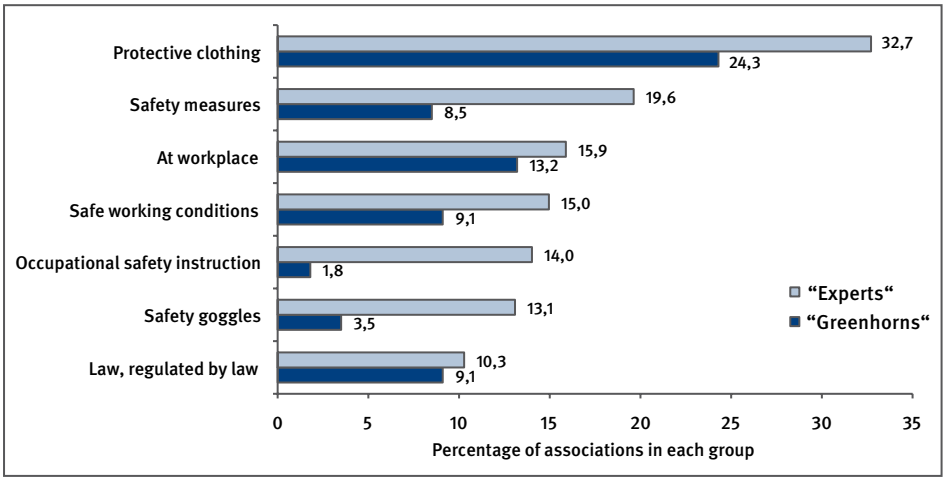
Regression analysis did not provide any indication worth mentioning of which personal factors (previous experience, demographic factors or study-related factors) led to the major inter-individual differences. Admittedly, the survey of the students' knowledge dealt with the topic of occupational safety and health on quite a general, formal level. It is possible that knowledge imparted during the courses is more subject-specific (e.g. how do hazardous substances react?) or more procedure-related (conduct in the laboratory), with the result that individuals do not store the knowledge under "occupational safety and health" in their memories.

The qualitative results of the free association differ considerably between the two groups. In the expert group, there is a larger amount of shared knowledge than in the greenhorn group. Figure 2 shows the most frequent associations, taking the example of the "occupational safety" stimulus, which were made by at least 10 per cent of the experts or 10 per cent of the greenhorns. For example, "protective clothing" was mentioned by a third of the experts and only a quarter of the greenhorns. In addition, the experts' associations were much more specific whilst the greenhorns' knowledge base was much more variable and reflected quite general knowledge. Thus, as expected, the topic is dealt with in lectures by the students harnessing their joint knowledge.

Conclusion

The results of the empirical study indicate that the students' overall knowledge of occupational safety and health is insufficient. Students on courses with OSH content have only slightly more knowledge than students

Figure 2:
Most common associations with the stimulus term “occupational safety”



of other subjects but there is more shared and specific knowledge in the group.

At the same time, the safety strategy employed by the Institute of Organic Chemistry at the University of Potsdam demonstrates that it is possible to successfully integrate safety-related aspects into university education. As a result of the combination of theory and practice, focused on specific laboratory situations, and the presence of the OSH topic in every practical phase, these students are very aware of hazardous situations in the laboratory and have internalised safe behaviour.

Since adequate knowledge of occupational safety and health is a determinant of students’ future work, it is advisable that the topic should be integrated into all subjects taught at universities, in the form of a “key skill”.

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3.3 Integrating risk concepts into undergraduate engineering courses

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Graham K. Schleyer & Rui Fang Duan, University of Liverpool
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Introduction

Engineers play vital roles in managing risks, including those relating to health and safety. It is therefore essential that engineering graduates be prepared for that role. Despite this, across degree courses in the UK, there is evidence that the extent and content of risk education varies [1]. To address this, the UK Health and Safety Executive (HSE), working closely with the Engineering Institutions, has commissioned two projects. One is to integrate risk education into the curriculum of an undergraduate engineering degree course at Liverpool University [2]. The other is to develop a demonstration e-learning package that can be used flexibly in support of engineering degree courses or employers' graduate training programs [3].

The overall goal of both projects is to ensure that all students who complete their engineering course have the necessary understanding of safety and health risk issues relevant to their discipline. This has involved defining a set of learning outcomes, designing a tool to ascertain students' awareness of risk issues and developing teaching materials to enhance students' understanding of risk concepts.

Learning outcomes

These are based on the template developed by the UK Inter-Institutional Group (IIG) on health and safety [4]. They are grounded on current professional requirements of the UK engineering institutions, legislation, and best practice described in relevant HSE publications and categorized according to the following levels of capability:

- **A** **A**ppreciation and awareness: be able to refer to something
- **K** **K**nowledge and understanding: be able to explain something
- **E** **E**xperience: be able to do something with help and/or close supervision
- **B** A**B**ility: be able to do something without supervision

The e-learning package can fulfill them all, however to balance the necessary knowledge of risk concepts with competing demands of other topics on the curriculum, such as sustainability, the following have initially been selected for integration into the new taught curriculum at the University of Liverpool. They incorporate those areas that were identified, during consultation, as high priority.

On graduation be able to demonstrate knowledge and understanding of:

1. Concepts of hazard, safety and risk
2. Professional responsibilities for managing risk
3. Principles and methods of hazard identification and risk assessment
4. Techniques for reducing and controlling risk
5. Personal safety

6. Underlying causes of accidents and failures

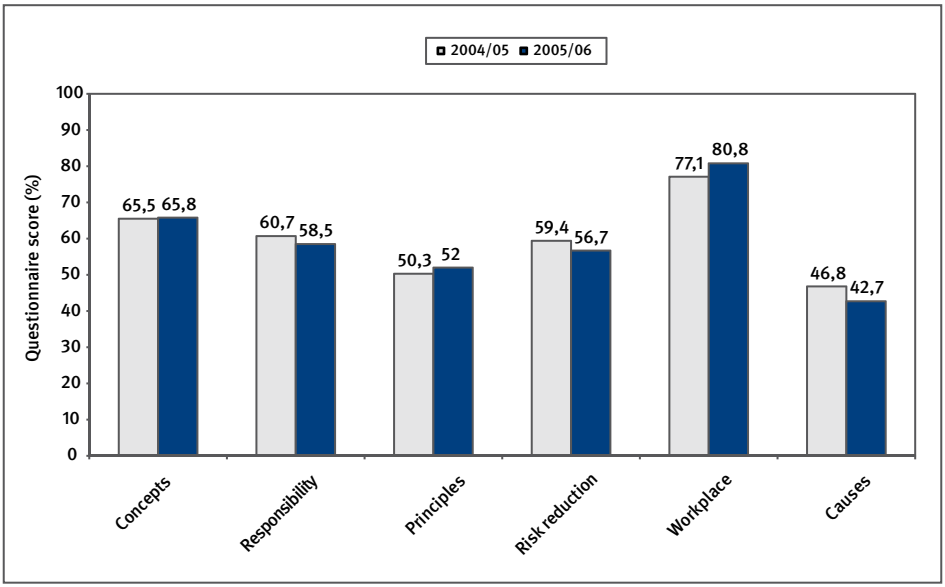
On graduation be able to demonstrate ability in applying knowledge to:

7. Design simple engineering systems for safety.
8. Perform a risk assessment and implement effective risk reduction measures.
9. Learn from documented failures and accidents the underlying risk issues and relate this to their future professional responsibilities.
10. Identify and control safety hazards to themselves and others in the course of work activities.

Evaluation of student awareness of risk

A questionnaire was developed to ascertain students' level of understanding of the learning outcomes prior to receiving formal tuition. Multiple-choice questions were designed to assess understanding and awareness of concepts, as opposed to knowledge of facts relating to a taught course. The average scores for the 2004/5 and 2005/6 Liverpool University student intakes, in topics relating to the first six learning outcomes, are given in Figure 1. This shows consistency between intakes and was used to inform the development of teaching materials.

Figure 1:
Comparison of average scores by section



Teaching Materials

The engineering taught programs at Liverpool are aimed at developing the knowledge, skills and understanding of graduates to meet the needs of industry. This includes a sound understanding of engineering principles, the ability to undertake teamwork, communicate ideas and the engineer's role within industry both nationally and internationally.

Risk topics have been successfully embedded into first and second year core engineering modules, through formal lectures, accident case studies, and a virtual accident investigation laboratory exercise. Visiting experts have given lectures on professional practice in key health and safety risk themes.

For example, case studies of engineering disasters are linked to the teaching of stress analysis. This shows, whilst retaining the engineering theory, what can happen when engineers make mistakes, or even worse, ignore the warning signs that something is wrong. This encourages students to think outside the confines of theory, to real issues that could affect them in their future professional life. Safety issues are thereby embedded in the lecture material and integrated with the theory rather than taught as a separate topic.

Students are expected to put what they have learned into practice within a personal project that they start at the end of the second year. Additional guidance material has

been developed on project risk management and drop-in tutorials are held where visiting experts assist students to complete project specific risk assessments. Each year, some projects have a health and safety theme.

A laboratory exercise, which links to and complements the formal lectures, promotes learning through experiential role-play. It is based on HSE's investigation into the collapse of a passenger link bridge at a Ferry Port [5]. A re-construction of the scene has been created with a 1/100th scale model that was used in the actual court prosecution. All first year students do the exercise in small groups and take on the role of an accident investigation team. In order to get through the set tasks, they need to share out the work and brief the rest of the team of their findings. These tasks include: gathering evidence; consideration of the design concept; implementation and operation, including stress analysis; and risk assessment.

Students are encouraged to search for clues on the model and follow them up using a file of information comprising photographs, witness statements and other technical documents. A worksheet has been prepared, which guides students through the tasks and leads them to record important information so that they can write an expert witness statement. Students generally engage well with the material, although some groups need encouragement to interact as a team.

A virtual reality software package was developed to support the delivery of this laboratory exercise.

Development of an e-learning demonstration CD

A demonstration CD has been produced containing a representative sample of proposed

e-learning material, which is being used as the basis of discussion with potential funding organizations and end-users [6].

The CD includes an eye-catching introduction of accident statistics, video-clips of personal stories and major disasters. A virtual-reality construction site 'spot-the-hazard' exercise has been developed. Briefing materials and interactive tutorials have been produced covering: the difference between hazard and risk, why people view risk differently, comparison of risks, quantitative and qualitative risk assessment. There is also a presentation of the background to, and overall aims of, the project, including the full list of planned learning outcomes.

The final package will contain three "layers" of material that can be used as part of an engineering undergraduate course or graduate training program. The first will be a simulation, using interactive video or virtual reality, of a team of three young engineers undertaking a range of projects with a major company. The second will consist of briefing material, interactive tutorial exercises and assessments to reinforce the concepts covered in the simulations. The third, will be accessible from the same user interface, but would be populated by university departments to meet their specific needs.

The simulated projects will be sufficiently broad to be of interest to all engineering disciplines instead of being concerned with technological detail. In each simulation, the student team will encounter health and safety issues, which they will need to think about and debate in order to resolve. Briefing materials and interactive tutorials will support this process at appropriate points. The package will be able to run in self-assessment mode to provide automatic feedback or supervised mode, requiring students to submit their work to a tutor who provides feedback.

Learning outcomes will be explicitly linked to different modules so that the simulated journey can be tailored to support project or course work, rather than be a specific extra part of the curriculum. Briefing materials and tutorials could also be used as stand-alone exercises.

Initial discussions with stakeholders in higher education, including lecturers and students, and several major industrial companies has been positive overall, particularly to the idea of a modular, layered structure and the use of a strongly interactive 'gaming' approach.

Concluding comments

It is possible to develop teaching materials that can be successfully integrated into an undergraduate engineering course, which delivers key occupational health and safety learning outcomes without losing coverage of engineering science and taking into account other competing demands on the curriculum.

Students at Liverpool University are seriously considering risk issues and understand to a significant extent their professional responsibilities for their own safety and that of others.

Collaboration between university teaching staff and experts in health and safety risk is essential. The encouragement and support of UK engineering institutions, and other professional OSH and educational bodies is also important.

E-learning materials were developed independently from those used at Liverpool University. However the authors are now working together to take forward the use of e-learning for teaching risk management to young engineers.

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3.4 The continuing education programme in industrial science at Leibniz University Hannover: problem orientation versus standardisation – the example of occupational safety and health and demographic change

Frank Wattendorff, Leibniz University Hannover

Introduction

The continuing education programme in industrial science was launched in the 1979/1980 winter term. It is aimed at (management) professionals whose work is related to industrial science. Rather than having to provide evidence of a qualification permitting the holder to enter the higher education system, applicants must demonstrate that they have at least two years' professional experience in a field of industrial science listed in the programme's study regulations. The entry requirements for the programme depend on the participants' professional experience. Following their education, they must have spent at least two years working in a planning, managerial or advisory capacity within an organisation. The programme participants from the field of in-company advisory services for occupational safety and health (OSH) are safety specialists, company physicians, employee representatives and managers. The participants who work for/with different enterprises and specialise in workplace health management on the programme are management consultants, inspectors from various accident insurance institutions and the state inspectorates and advisers from health insurance and pension companies.

Open curriculum and process-oriented education

The curriculum has an "open" structure. The aim is for the students on the programme to operate confidently in their fields of activity and workplace roles and to acquire the current expertise that they feel they need, building upon their existing knowledge and many years of workplace experience. Information events, introductory seminars and individual student guidance help the students plan their own individual programme of study.

The content of the curriculum was designed on the basis of scientific consideration of the target group's wealth of practical experience, new research methods, project findings and examples of good practice. The teaching staff come from the field of higher education, enterprises and applied research. Apart from knowledge on current OSH problems and/or strategies and methods of workplace health management, the programme focuses on the principles of action at the workplace and the ability to operate within corporate structures [1].

The programme is process-oriented so that participants acquire the skills needed to find their way around and operate effectively within complex systems. In order to translate into workplace practice the knowledge they gain on industrial science issues, they have to be able to organise themselves and to take part in the design and evolution of

workplace health management and OSH programmes. Project courses and "tracks" offer students supervision for this purpose.

The programme is designed in such a way that courses on current workplace health management topics are developed and held each term. To be able to work intensively with students on specific topics in a period of three to four terms, the programme offers "tracks" dealing with the six specialist areas of the programme. Interested students attend a kick-off workshop, at which the timeframe, content and requirements for participation in the track are presented. Such requirements can include certain practical experience with the topic or contribution of a workplace project.

New target groups for occupational health management topics

In our experience, OSH topics are mainly of interest to specialists in the field. Getting managers and other professionals interested in OSH issues in the area of workplace health management was one of the objectives pursued in the two tracks in the specialist area of "Human resources and leadership".

One track deals with resources and exposure to risks for individuals in the company and with how health management should work in order to strengthen resources and analyse and reduce exposure. This track examined the topic of leadership at length. Not, as is customary in occupational safety and health, in terms of responsibility, managers' tasks and legal consequences, but rather concentrating on the burden on managers and how workplace health management can strengthen their resources. This track also looked at the question of how measures can be developed to promote a sustainable, healthy leadership culture for managers and their employees [2].

The second track, "HR development in line with older employees' needs", also reached a new target group. Rather than being from the sphere of conventional occupational safety and health, this target group tended to consist more of managers, employees from the field of HR and HR development, in-company addiction and welfare, HR advisers, employee representatives and trade union representatives.

Both tracks illustrated that it is crucial that the various target groups work together with OSH institutions at the workplace and that one can win the new target groups over to the idea of OSH and health promotion if one tackles their problems directly. In this context, these new target groups develop requirements for problem-oriented OSH activities, resulting in the need to reconsider the roles currently prevalent in OSH advisory work.

Problem orientation versus standardisation

Thanks to its problem-oriented approach, both in the ongoing planning of the programme content and the (educational) methods and system of participation used on the courses, the programme's status both within the Hanover region and beyond has increased.

For each course in the programme, the student's participation is documented and can be attested in writing within the modular

system for specialist areas with at least 200 hours from courses and tracks linked to the specialist area in question, or, if the student's performance has been tested, can be certified. To obtain the final certificate, participants must have completed at least two specialist areas and have test records for them, totalling 540 hours minimum. There is no prescribed timeframe in which the programme has to be completed. This ensures that the learning process is always related to current issues. The content of the modules is also planned in cooperation with and discussed with the students.

The "Working group on OSH and workplace health promotion", for example, has been a course on the programme for more than 40 terms. 20 to 30 students, mostly experts in the field of workplace health management, attend the course one evening per month. At the beginning of each term, a brainstorming session is conducted to identify current problems and trends in OSH and health promotion, which are then weighted in a facilitated process. This collection of topics is used to plan subjects and speakers for the following evenings. If the issues require intensive examination, we as industrial scientists have to identify new scientific findings on the issues or solutions and incorporate them into the course plans for following terms. Topics currently being discussed and offered include "The process of changing a canteen menu to provide healthy food", "Opportunities and risks of nanotechnology" and "The shift in perspective in OSH arising from demographic change".

This diverse range of topics and the flexible approach to planning, in the OSH target group alone, show that it would not be beneficial to standardise the content of this successful programme. Restricted flexibility would make it difficult to achieve our aim of promoting an ongoing research-based learning process and making lifelong learning interesting and possible. Furthermore, specifying uniform entry requirements would significantly decrease the variety of opinions and the range of experience in workplace implementation of industrial science findings. It is precisely this variety in the work with the students that provides a considerable incentive to study and teach on the programme.

Track on "HR development in line with older employees' needs"

The topic of ageing workforces and demographic change was first mentioned by a company physician in the above-mentioned working group back in 2003. We responded directly by referring to the publications by *Volkholz* and *Köchling* [3] and presenting and discussing the development of Germany's working population. The "Personal and workplace health management" track, mainly attended by people from the HR and HR development fields, asked the question of what the OSH system does for older employees and whether strategies exist to prevent health-related early retirement.

Since we have been involved as researchers since 2004 on projects funded by the European Union and Germany's federal government with the aim of tackling demographic change, we planned a track entitled "HR development in line with older employees' needs". We purposely placed the focus of the title on HR development and not on work design and work ability in order to attract HR managers. The decision was successful –

more than 80 participants registered for the kick-off workshop in January 2006.

The track aims to:

- illustrate approaches with which to raise enterprises' awareness of the topic of ageing workforces,
- present models used in practice for HR development, HR scheduling and work design and
- review the effectiveness of strategies used in differently structured and sized enterprises.

The following content is planned:

- Age structure analysis, HR development measures and measures for long-term HR scheduling
- HR development and health promotion
  - Work-life balance
  - Presentation of training programmes
  - Self-management
- Personal and workplace lifecycles
- Gender aspects
- Work ability index
- Knowledge management
  - Knowledge transfer
  - Experience transfer
  - Lifelong, workplace-oriented learning

The call for participants for the kick-off workshop included descriptions of the above content and intentions. To limit the number of participants, one of the conditions for participation in the overall track was that applicants had to submit a brief description of a project from their field of activity when they registered. Eight projects in various enterprises were supervised by a project coach during the track.

The following chart by Professor *Peter Knauth*, from Karlsruhe University, who held a workshop in the summer term of 2007 on the subject of planning shifts to meet older employees' needs as part of the track, gives an overview of demographic change from the political point of view and of the questions facing enterprises [4].

Dedicated projects on workplace health management discussed the issues of healthy ageing and work design and organisation for older employees and the question of how to keep the younger workers healthy longer. New requirements for OSH experts from HR managers' and developers' point of view were also specified.

An OSH strategy in line with older workers' needs – findings

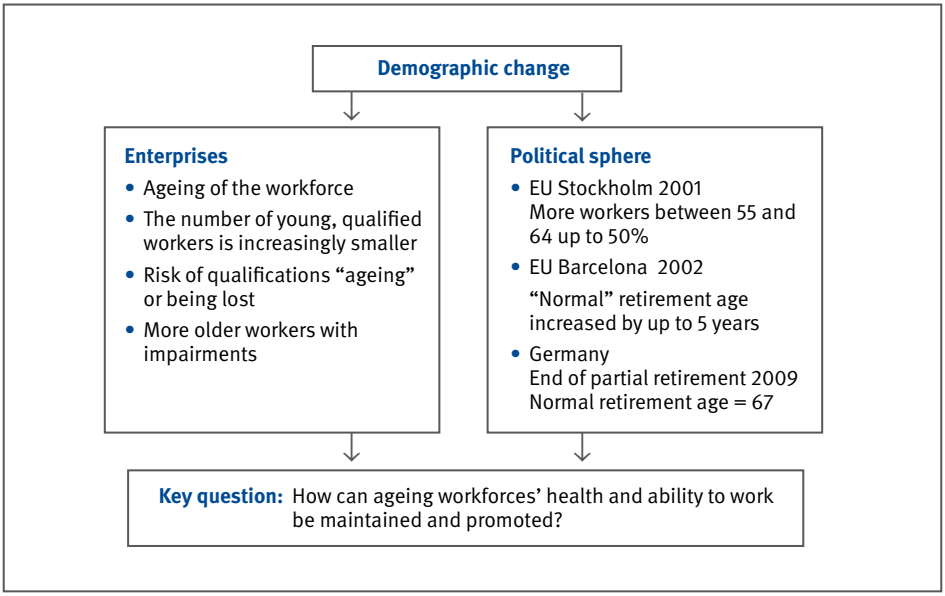
Based on the workplace projects and the project coaching, the following statements can be made with regard to an OSH strategy that reflects older workers' needs:

1. It is currently rare for HR (development) departments to work on this topic with workplace OSH players.
2. The HR departments are already more aware of demographic challenges than OSH players.

The following criteria apply to and link the two areas of HR development and workplace OSH:

- They need to think in terms of longer timescales and plan their objectives on a longer-term basis.
- They need more information about exposure to risks and health risks with a long latent period.

Figure 1:
Demographic change



- They have differing knowledge about the fact that some activities can only be performed for a limited amount of time without resulting in long-term health damage (e.g. shift work, particularly nightshift work).
- They should ensure a good workplace atmosphere and high level of employee satisfaction.
- They need new joint strategies to recruit young qualified employees and to keep them in the long term.
- Prevention strategies have to be developed and implemented jointly so that employees retiring later remain healthy and productive.

Challenges and opportunities for OSH

These joint requirements create challenges and opportunities for occupational safety and health at the workplace, i.e. [5]:

- Systematic, long-term HR planning and development require occupational health, ergonomic and occupational psychology knowledge in the enterprise in order to prevent work-related impairments in older employees and employability problems.
- Everyday OSH activities such as briefings, hazard analyses, risk assessments, drawing up of user instructions, etc. gain a new, higher level of importance as the focus shifts to demographic change, if they support the management in maintaining and strengthening human resources in the long term [6].

- Participatory approaches that harness the experience and knowledge of older employees can be initiated by the OSH sphere and show enterprises ways of promoting and successfully expanding knowledge management and experience transfer on all levels.
- Questions arising from the work ability index [7] can be used, providing the employees and employee representatives trust the users, to identify problem areas in enterprises and develop preventive measures in cooperation with the employees.
- A particular challenge for OSH experts is the necessary change of role and the clarity of their role as advisors in the sociotechnical system.

In the past, OSH experts' specialist knowledge was required for direct problem-solving. Today, however, they are required to conduct complex advisory processes in the sociotechnical system, and to have not only safety and health expertise but also a feel for psychosocial processes plus social skills in the micropolitics of the workplace [8], through which employees' experience and knowledge is valued.

Identifying the roles expected of OSH experts can be enough in itself to help them find their role and perform it in a way that better meets those expectations and enables them to become more aware of conflicts between roles [9; 10]. Unfortunately, experts' concept of their role as experts with specialist knowledge and training as compared to employees whose expertise comes from experience often results in statements that are not particularly solution-oriented.

On one project, I witnessed a situation in which experts described employees' assessment of their working conditions as "incredible complaining" and stated that, since the workplace limit values were complied with, there was no need for work equipment or organisation to be changed. In this typical example of the assessment of a complex work situation, evaluation of individual limit values resulted in the experts only looking at individual bottleneck factors without being able to identify and assess the multiple situation-related risks as experienced by the employees. If older employees are to be encouraged to pass on their experience-based knowledge to younger workers and therefore to the enterprise itself, their experiences (relating to risks, exposure, personal enjoyment of their work and pride) must not be made the subject of doubt or ridicule. Their descriptions must be valued in such a way that prevention strategies and measures are developed together with them as a result. This necessitates a change in advisory culture, away from a focus on advice related to equipment, standards and limit values to advice that accepts subjective declines in well-being [11] as a trigger for preventive action.

Summary

Our experience on the industrial science programme illustrates that it is possible to interest management staff in the topic of "health at the workplace". To do so, it is essential that continuing education for this group deals with factors specific to situations they encounter and to their enterprises. The most important point appears to be to address the risks to which these (management) professionals are exposed and to show them tools and methods for workplace health manage-

ment that enable them to strengthen their personal resources and to reduce exposure for themselves and their employees. In terms of continuing education programmes, this necessitates an ability to react very flexibly to problems and current developments and to develop with the participants solutions that draw on all areas of industrial science.

A number of steps are necessary in order to set up an integrated system of workplace health management. I hope that I have taken a small step in this direction with the reader since, as *Willy Brandt*, former German Chancellor, once said, "Small steps are better than no steps at all."

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