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ABSTRACT: This paper will discuss the possibilities to develop a European framework for competencies into a well functioning tool for supplying education and training, within a specific sector in Europe, so it fits in with different countries and their national systems of education and working life. The ideas of the framework, is to develop a system of training that can balance needs and demands defined by individuals and companies, situated in a highly regulated sector, with the supply from education providers.

The paper builds on a longitudinal study and participation in a European project. The project started in 2003 and is expected to finish in October 2011; it involves twelve partner organisations representing researchers, education providers and social partners from eleven European states. The methods used are interviews, with project members and students, participation in project- and steering group meetings, participation in dissemination activities and finally evaluation and follow-up of project work.

1. INTRODUCTION

An understanding of explosives science and technology, and the competence to harness it is central to maintaining Explosives capability, national security, and in sustaining a competitive industry. A consequence of eroding this competence is the increased likelihood of explosives accidents. These are often catastrophic as demonstrated by accidents in Nigeria, Russia, Toulouse and Enschede. In addition to the serious loss of life there was the very significant damage to houses, domestic and industrial infrastructure and to the environment at a cost of many millions of euros.

There is a perception and some evidence that in Europe competence in this key technological area is being eroded. In several European nations a high proportion of the most experienced and knowledgeable personnel are retiring or nearing retirement. Urgent efforts are therefore underway in some European nations to replenish this expertise.

Explosives are fundamental tools for building our modern society. They are used for blasting in construction, mining and oil exploitation, airbags in cars, in medicine, in fuels and devices for space rockets and satellites, for pyrotechnics such as emergency rockets/signals, and for defence materiel.

As well as in other sectors in our modern society the international trade opens the national markets for global competition. Europe has an ageing population and in order to maintain a safe and competitive European Explosives sector it is necessary to attract and recruit talented people. Through transnational European Cooperation with joint education and training programmes the Explosive sector can provide wide experience opportunities which also enable attractive career opportunities.

However, since the turn of the Millennium there have been a number of well publicised explosives accidents around the world. One of the characteristics of these accidents is that they frequently have catastrophic consequences. In Lagos, Nigeria an ammunition dump exploded, the explosion created mass panic which subsequently led to the death of nearly 1000 people, most of whom were children. Another explosives accident aboard the Russian submarine led to the loss of 118 sailors, a loss of significant defence capability and serious political destabilisation of the Putin Government. In Holland an explosion involving fireworks destroyed 200 houses and killed 22 people, whilst in France an explosion involving ammonium nitrate destroyed a major industrial facility, killed 30 people and

injured around 2000. The consequence of explosives accidents is frequently serious in human, economic and political terms.

Examining the cause of explosives accidents invariably reveals that human error or failure is a major contributory factor. The Enschede incident in Holland was initiated by a deliberate act by a malcontent. However the catastrophic consequences were also a result of management failure, breaches of the explosives regulations and a failure to understand that storing fireworks inside steel ISO-containers generates sufficient confinement to maximise the violence of the event.

One of the torpedo’s loaded on the Kursk is known to have been dropped prior to embarkation and this may be linked to the torpedo explosion which, the official report suggests, led to the loss of the submarine and its crew. In both cases it was the actions of individuals or the failure to act in an appropriate way which contributed to the accident. Effective explosives safety depends on people making the right decisions at the right time. It depends upon people having the necessary competence to carry out their jobs properly. The concept of competence is well recognised in UK safety management. Much of UK safety legislation calls for “competent people” in roles that affect safety. In the case of explosives, this will be in all stages of life, from the formulation of new explosives in the laboratory, through manufacture, storage, transportation, use and disposal.

Whilst the stove piping of organisations in the European and UK explosives business has had an impact on the breadth of experience, the general contraction of the explosives business in Europe and the UK has had a major impact on the numbers of skilled specialists. Added to this many of the specialists were recruited in during a growth period in defence science and technology in the 1970s and are approaching retirement. A lack of recruitment in the late 1970s and 1980s has left a demographic trough, wherein there are insufficient skilled explosives specialists to replace those who will be leaving government service in the next few years. Figure 1 illustrates the typical problems faced by the European countries with respect to the loss of expertise, if you assume that the ‘experts’ are those who are of the age 50+.

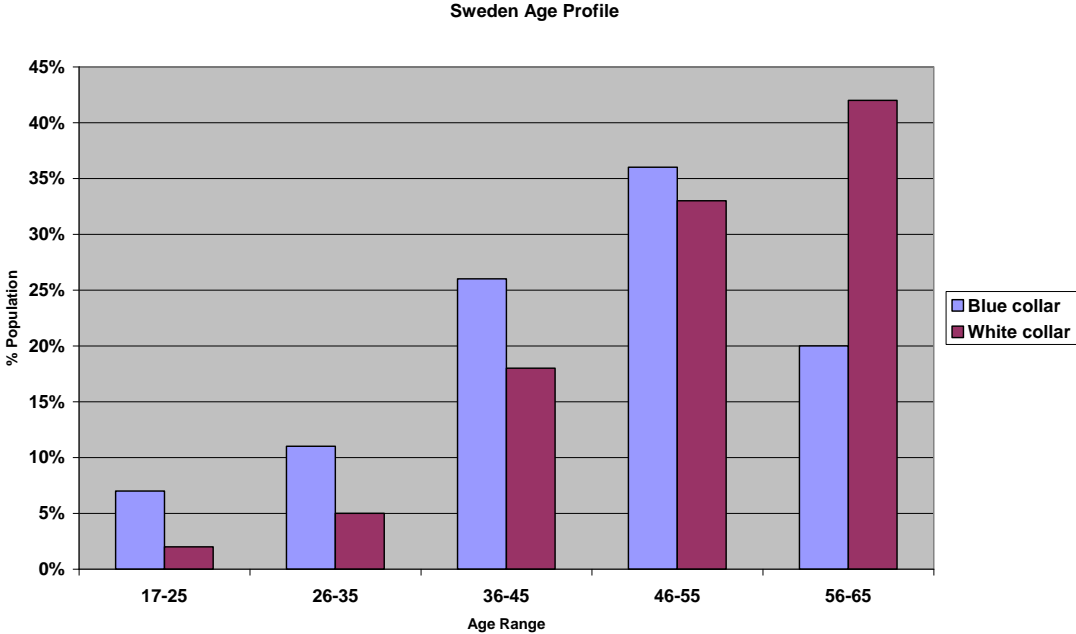


Figure 1 Age profile of White and Blue Collar workers in the explosives industry in Sweden

2. EUExNET

The Leonardo da Vinci programme office awarded in 2009 EUExNet with a further two years funding in order to continue the EUExcert programme of work. The objectives of this new programme of work are to make the independent European association EUExcert operative subsequently with signing of an

agreement between the EUExNet project partners. The association's aims are to develop exchange programs for students and employees, between member organisations in Europe, thus realising the free movement of workers. The independent national nodes/bodies have the task to award EUExcert certificates and be responsible for accrediting other awarding bodies. EUExcert certificates will be issued to individuals in the explosives sector, based on a procedure of accreditation of individual competencies according to the occupational standards that have been chosen as best practice by the previous EUExcert projects.

The EUExNet project will monitor and evaluate the work to set up national nodes/bodies and the procedures for accreditation and issuing of certificates at national nodes/bodies.

The ambition of the EUExNet project is to introduce a systematic approach to;

1. Lift the status of workers in the explosives sector
2. Attract younger people to work in the sector
3. Respond to the effects of demographic changes in a ageing workforce
4. Introduce trajectories for career paths for workers
5. encourage individuals to continually improve their abilities, skills and competencies
6. Develop a competitive European explosives sector
7. Create a learning environment and thereby realise the overall ambition in the ideas of lifelong learning



3. EUROPEAN PARTNERS

At the present time the number of participating countries in EUExNet are 10, these are UK, Sweden, Norway, Latvia, Italy, Ireland, Portugal, Germany, Estonia, and the Czech Republic also one European organisation are represented in the project. Finland and Lithuania are associated partners in the project. The number of associated partners will increase during the project time. It is also important to note that EFEE is a member of EUExNet which represents 23 countries. In order to increase this number of participating countries, it is intended to widely disseminate the work undertaken in the programme by

spreading knowledge about the competence framework to the explosive sector in Europe and the rest of the world by presenting papers and posters on the outcomes of the EUExcert project at national and international conferences, seminars etc.

4. NATIONAL NODES/BODIES

During the project independent national nodes/bodies will be started. The national nodes/bodies will be set up according to national prerequisites. However the nodes/bodies should build their work on using the occupational standards proposed by the EUExcert project or use other adequate occupational standards which can be recognised by the EUExcert partners. The national node/body shall participate in making the independent European association, EUExcert, operative subsequently with signing an agreement.

This part of the project will consist of

1. Defining the explosives sector in the partnership country
2. Try to estimate the sector size and it's key persons
3. Mapping of existing education and training provisions
4. Build a Internet based national network of interested persons
5. Distribute written information
6. Invite and gather interested persons to a meeting for presentation of the findings in the EUExcert projects
7. Set up national EUExcert node
8. Associate the national node with the European EUExcert organisation

5. ISSUING CERTIFICATES

During the project test issuing of competence certificates will take place. The test certificates will be issued to individuals in the explosive sector, based on a procedure of accreditation of individual competencies according to the occupational standards that have been chosen as best practise by the previous EUExcert projects.

Procedures will be developed and will mainly follow the scheme below

1. At the first project meeting one or more occupational standard relevant for the explosives sector will be chosen for the test
2. The partners responsible for the test will be chosen
3. A subproject group will be established
4. The partners who perform the certification will design a test procedure
5. The test procedure will be discussed with the other partners
6. Trials will be made for accreditation of explosive competence
7. Certificates will be issued

6. EUEXCERT A EUROPEAN ASSOCIATION

One final outcome of the EUExNet project will be to establish the EUExcert association. The aims of the association are:

- Serve as the central European EUExcert organisation
- Coordinate transnational competencies in the explosives sector
- Award the EU certificate to the national EUExcert organisations
- Form, expand and maintain a transnational network, aiming to promote excellence in explosives competence and thereby reduce accidents in the explosives sector
- Search for international cooperation
- Publish articles in professional newspapers for the explosives sector
- Promote and manage exchange programmes for students and specialists in the explosives sector
- Promote cooperation for transnational education and training in the explosives sector
- Manage a database and network of experts

- Manage and update the glossary on terminology for the explosives sector
- Support the European Commission with independent advice
- Be the sole and exclusive owner of the trademark EUExcert
- Organise global conferences on explosives competence

7. FUTURE ACTIVITIES

- Strengthen the trade mark EUExcert
- Engage more European partners,
- Establish National Nodes in new countries
- Engage International partners
- Find representative voices in National Governments.
- Find representative voices in the EU Commission
- Improve quality and reputation through a professionally recognized skilled workforce
- **Implement the European Credit system for Vocational Education and Training (ECVET)**

8. KEY FINDINGS

The paper will discuss the value of developing a European framework for competencies within a specific sector and show that although the framework will solve a lot of problems within one sector it is quite hard to realise, but still not impossible. The problems that arise along the way are posed by the differences found in each nation's legislation, tradition of education, system for education, technological development related to education and training, and even in the tradition to collaborate between education providers and representatives from different stakeholder groups. The paper will also discuss the issue of demand-led education and training, in relation to the actors who sets the terms – the system of education or the system of work life (Svensson & Randle 2006). The stakeholders need to have knowledge of many things in order realise the ideas of a European framework for competencies, for example how to collaborate with stakeholders in- and outside national boundaries, systems for accreditation of previous experience and learning, and how to use tools for accreditation and gap-analysis. Each nation has reached different maturity and readiness for change to develop systems for adult learning within their formal systems of education and training. To be able to implement a European framework for competencies each nation need to fit their infrastructure for learning with the common ideas of the framework, for example, how to validate previous learning, conduct gap-analysis, supply demand led learning at workplace level, develop new pedagogical methods for flexible learning, develop new methods for collaboration between companies and education providers, and develop methods to certify outcomes of individual learning. Each nation should also appoint organisations that can be responsible for issuing certificates and updating occupational standards.

There are many people and organisations who promote the harmonisation of European systems of education and training; still there is little evidence of how to go about realising these ideas. To be able to succeed it requires for example that the people involved in the change work has the power and mandate to influence strategic players – otherwise there is a risk that the efforts do not lead to any significant change in national systems or in practice.

Keywords:

European qualification framework, occupational standards, skills transfer, explosives sector, hazards and accidents, safety, security, competence and competencies

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