

# **A Network of Experts for Sharing MET Knowledge - It Works!**

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## **Abstract**

This paper describes the NetOSKAR project and the experience gained from establishing and running an international network of maritime training professionals for the development of a knowledge assessment tool on STCW-95 subjects. At the present, the network consists of training professionals in MET institutes in five different countries. The goal is to build a large database of multiple-choice questions for testing knowledge on STCW-95 subjects. Each specialist, i.e. question producer, has access to the internet-based development tool and can enter new questions to the question database. Other specialists on the same STCW-95 subject will check and comment the questions. After this quality control the new questions are approved and become available to all members of the network. This activity, the NetOSKAR project, was begun in 2003. The project is managed by Satakunta Polytechnic, Finland and the other partners are Svendborg International Maritime Academy from Denmark, Technical University of Catalonia from Spain, Maritime University of Szczecin from Poland, Escola Náutica Infante D. Henrique from Portugal and the University of Turku from Finland. At the moment, there are 21 question producers with about 1000 new questions added yearly to the database.

There is a great potential in this kind of activity. A network of MET experts could, for example, develop and share complete e-learning modules on STCW-95 subjects. In the future, the NetOSKAR project will be extended by inviting MET institutes all over the world and new training professionals to join the network. Also new forms of sharing knowledge will be developed.

*Keywords: Knowledge assessment, training of seafarers, e-learning, network of experts*

## 1 Introduction

Seafaring and professions related to shipping are international. STCW-95 by IMO sets the same minimum requirements for training and education of seafarers all over the world [1], making the requirements for different licences virtually the same all over the world. The system introduced by IMO for auditing maritime training and education (MET) institutes also aims at ensuring the quality of seafarers' training. A well-educated and skilled personnel is the most critical resource for safe and efficient shipping. It is a well-known fact that the majority of all accidents related to sea transportation are caused by the so-called "human factor."

The knowledge and skills of the seafarers and those aiming to become seafarers must be controlled. Knowledge assessment is carried out by teachers at maritime education and training institutes, by maritime officials in connection with issuing licences, by ship masters and shipping companies and even by manning agencies. This universal need for controlling the knowledge of seafarers along with the common STCW95 standard, form the necessary basis for the development of general-purpose knowledge assessment aids. A large question database on STCW-95 subjects is such an aid. The idea is not new. There are some commercial products on the market available for this purpose. Also, the US Coast Guard exam question database is available at their homepage[2]. The USCG database is quite extensive, but it is said that the language of many questions is too difficult for persons who do not speak English as their native language. The questions should reflect the knowledge of the STCW-95 subject concerned rather than English language skills. There are some differences between the existing tools regarding the STCW-95 coverage, technology used and question formats. A comparison between some features of the existing question databases is described in [3].

A national OSKAR project for developing a computerised tool for the assessment of the knowledge of seafarers was introduced in Finland in 1996 [4]. Satakunta Polytechnic was the responsible leader and five major Finnish shipping companies were the partners in this project. The aim was to build a question database on STCW-95 subjects through co-operation between teachers of Satakunta Polytechnic and experienced maritime professionals of the shipping companies. As a result, a question database of more than 4000 multiple-choice questions was created, with half of the questions being in the Finnish language. After the start-up phase, new partners were invited and later on partners from Estonia and Denmark joined the project. Experience gained from the OSKAR project was very positive.

In autumn 2003 this activity reached a new phase when the new two and a half year NetOSKAR project was started [5]. The main goal of NetOSKAR is to expand OSKAR into a truly international network of maritime training experts for the development and maintenance of the question database. The experience gained from a shop floor level co-operation of training specialists during the NetOSKAR project has been very encouraging. Joint development of the question database with colleagues from other MET institutes gives teachers

excellent opportunities to learn from each other, to compare course content, subject priorities and to compare teaching methods and resources in detail enables individual teachers to get new ideas to develop their own work. As stated, bringing people together can be done easily and cost-effectively by utilising the Internet. However, it is also important that the question producers periodically be brought together to meet each other at project workshops. This co-operation of MET institutes has great potential.

## **2 The NetOSKAR project**

### **2.1 Experience from the pilot project**

Beginning in 1996 through 2003 Satakunta Polytechnic, in co-operation with five Finnish shipping companies, developed a computer-based tool for assessing the knowledge of sea personnel. The NetOSKAR project, which started in autumn 2003, utilized the experience gained from the OSKAR project as much as possible. A pedagogical evaluation of the method was carried out in the beginning of the new project. This study confirmed that a large question database is a good tool for assessing the knowledge of seafarers. The questions in the database are multiple-choice type with four answer alternatives. While there was no reason to change the format, it was determined that the quality of the questions is critical. The questions should be written in clear and easy English (or Finnish) language and so that they measure essential knowledge. The difficulty of the questions may vary, but the information content must be absolutely correct.

It was also learned from the OSKAR project, that the idea of building and maintaining a question database in co-operation with professionals is a good idea, although it might take some time for a teacher to see the development of new questions as part of his/her normal work. Only when the teacher realises the benefits of using the question database, producing new and relevant questions becomes a natural thing and part of the normal work routine. The students generally do not oppose the use of multiple-choice exam questions, since the exam results became available much faster than from traditional written exams. It became obvious that a question database can be utilised in different ways as a part of training. A question database can be used by students as a self-education tool. A quiz can be used by a teacher to raise the student's motivation. Also, tests used before and after the training can be used to control the efficiency of the training. Thus a question database is much more than just a tool for the assessment of knowledge.

### **2.2 Goals of the NetOSKAR project**

The primary goal of the NetOSKAR project was to establish an international network of maritime training and education experts for the development and maintenance of the question database. The number of member organisations shall be at least 25 by the summer 2006. While the membership of the

NetOSKAR network is agreed upon at the organisational level, the actual development work and the exchange of knowledge is done at the shop-floor level among individual experts.

Other recent goals were to improve the database itself by creating 2500 new questions, establishing and testing new quality assurance procedures and by grouping questions into categories according to STCW-95. Also accomplished was the need to test the technology and procedures for a productive and efficient operation as an international network. It was quite clear from the beginning that the Internet should be utilised as much as possible and therefore the platform software was changed to Moodle [6] from the original 'Create a quiz' [7], which used in the OSKAR project. This affected the structure of the database and the instructions for the developers and users.

### **2.3 Organisation of the project**

The responsible leader and the operative coordinator of the NetOSKAR project is Satakunta Polytechnic from Finland. The other MET institute partners are Escola Náutica Infante D. Henrique from Portugal, Maritime University of Szczecin from Poland, Svendborg International Maritime Academy from Denmark and Universitat Politècnica de Catalunya from Barcelona, Spain. Two shipping companies, Silja Line and Finstaship from Finland represent the shipping companies. University of Turku from Finland was the assistant coordinator of the project, responsible for coordination of the internal reporting. The project received 2,5 years financing from the Leonardo da Vinci programme of the European Union [8]. The total budget is 387 000 € (approximately 464 000 USD). The project was started in the end of 2003 and it will end in March 2006. The Internet is the primary means of communication among the parties. Also, six workshops are arranged during the project. Each partner will host at least one workshop. The main topics of discussion for the workshops are discussions about the content of the database and discussions about the project and the network activities.

### **2.4 The question database and the development tool**

The question database is divided into 100 categories according to functions of the STCW-95. As mentioned, all questions are multiple-choice with four answer alternatives. The questions may contain multimedia elements, i.e. sounds or pictures associated to the question. Each question may have one or more correct answer alternatives. This reduces the possibilities of guessing. All questions are written in English. Special attention has been paid in keeping the language as simple as possible.

The software platform is Moodle. Moodle is actually a course management system designed to help educators create online courses. The Moodle software is used all over the world by universities, schools, companies and independent teachers. There were several reasons why Moodle was selected for NetOSKAR. First, it is technically suitable for NetOSKAR. Moodle offers all the basic features necessary for development and maintenance of the question database.

Also it can be used to manage the network activities. Actually it is not only a quiz software but a complete course management system (CMS). For teachers running online courses the use of NetOSKAR questions as part of their courses is very simple. The use of Moodle is very easy and does not require any knowledge about the technical details of the software or the database. Moodle is written in a scripting language called PHP, and stores most of its data in a database. The recommended database is MySQL. Today Moodle has a very large and diverse user community with over 50 000 registered users speaking 60 languages in 120 countries [6], so technical support is available virtually anywhere in the world. And last but not least, Moodle is cost-effective as it is an open source program and totally free to use.

Social construction-ism is the core theory behind Moodle. Most CMS systems have been built around tool sets and being tool-centric. Moodle is learning-centric. Social construction-ism is based on the idea that people learn best when they are engaged in a social process of constructing knowledge through the act of constructing an artefact for others. Learning is seen much as a process of negotiating meaning in a culture of shared artefacts and symbols [9].

A customised version of Moodle has been developed for NetOSKAR. The Moodle software has been complemented with various features for supporting the quality assurance and maintaining the database. The NetOSKAR question database itself is of the standard format and is compatible with any Moodle installation. Moodle software is being developed by a large international community of developers. Software updates and additional features are introduced constantly. For example, software modules for exporting questions and converting them into other formats are being developed, yet not available at the moment (summer 2005).

## **2.5 Quality assurance**

The most important matter regarding the usability of the question database is the quality of the questions. Creating efficient quality control procedures was one of the goals of the NetOSKAR project. The quality of a question is defined by several factors. The most important factor is the correctness of the information. This means that the correct answer alternatives must actually be true and that the false alternatives must be false. Also the claim or the question and the answer alternatives must be unambiguous. The language must be correct and not too difficult. The question should not be too easy, i.e. the correct answer should not be obvious. Also, a good question tests essential knowledge. The quality of images must also be taken into account and other potential error sources. So, assuring the quality of a question means taking into account many aspects.

The management of the quality of the questions is based on a life-cycle approach. It means that the quality is controlled during the whole lifetime of the question. The block diagram of this life-cycle principle is shown in figure 1. In the beginning, the quality is controlled by the author of the question. At this phase the question should also be tested using a group of students. At the next phase, the question is checked by another specialist of the STCW-95 subject from another member organisation. Finally, the question becomes "official" and

it is published. During its lifetime, the question may be commented on by any user of the database. Moreover, the validity of the question will be checked every three years and continue until the subject has eventually changed so much that the question has to be removed from the database.

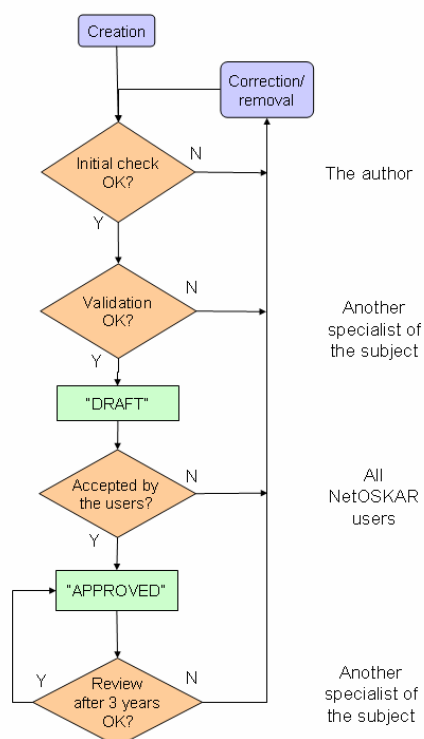


Figure 1: The life cycle of a NetOSKAR question.

## 2.6 The network of users and developers

As mentioned above, one of the main goals of the NetOSKAR project is to establish a network of MET specialists to develop and maintain the question database. Exchange of knowledge in the form of multiple-choice questions becomes more beneficial for each individual member as the network grows. At this moment the network consists of 21 teachers from five European MET institutes. In the future, the NetOSKAR community should consist of hundreds of teachers from MET organisations all over the world. Shipping companies and maritime authorities can also join the network and have access to the question database. Actually there will be two different member categories in the NetOSKAR network. Firstly, the development and maintenance responsibility is shared by the MET institutes, i.e. by the individual teachers in these organisations. These primary members form the first level of the NetOSKAR network. Secondly, there are the shipping companies, national maritime

authorities and other users of the database who do not have any development responsibility. They join the network via a local primary member and they form the second level of the network.

The development of questions is carried out by small, specialist teams. These teams are small groups or pairs of specialists on a particular STCW-95 subject from different organisations. The author of the question is the primary producer, then one of his colleagues in another organisation has the main responsibility of controlling the quality of the question. He can be called the secondary producer of the question. All other teachers on the same subject can participate in the development work by providing their comments and suggestions. The primary and the secondary producer maintain direct contact with each other during the development process. The discussion about the contents and the form of the questions is carried out via e-mail, by using the discussion forum of Moodle or by face-to-face at the workshops. During the NetOSKAR project, the question producers met each other twice a year at the workshops. See Figure 2.



Figure 2: From the workshop at Lisbon in November 2004

### 3 Experience

#### 3.1 The technology

An internet based development platform was the right choice for this kind of activity. Moodle offers all the basic tools and functions necessary in NetOSKAR to support network-based operations. It is also easy to use the question database for online courses. This feature is convenient for teachers and those who are responsible for training of personnel in companies.

Presently the possibility to convert questions into other formats is limited, but tools are under development by the Moodle community. Some special features have already been added to Moodle by the NetOSKAR project in order to make management of the question database more efficient. In conclusion, the selected software platform suits quite well for NetOSKAR for the reasons mentioned.

### **3.2 The network**

The most valuable feature of NetOSKAR is the network of MET specialists. It is said that sometimes the process is as important as the product of the process. This is the case with NetOSKAR. It has been very fruitful to get specialists from different MET organisations to work together. Personal contacts with colleagues in another MET institute are valuable, but working together and discussion about the knowledge assessment is even more so. When two teachers share opinions about assessment of the knowledge on a particular STCW-95 subject, they have to discuss many things: what is important and what is not; what the students are supposed to know after the training; why some matters should be weighted more than the others; what is the correct terminology; what are the important concepts; and even about how the subject should be taught. This is really the core of training seafarers. This kind of co-operation is inspiring, eye-opening and can help individual teachers in the development of their own work. This kind of grassroots level co-operation between individual teachers may be as fruitful in the development of the quality of a maritime education and training program as the co-operation on the organisational level or even the work carried out by international committees to develop new rules and standards for training. A community of hundreds of teachers working together and sharing knowledge and exchanging opinions is a huge resource and a powerful tool in the development of the training of seafarers. The larger the NetOSKAR network gets, the bigger are the benefits of the membership for the organisations and for individual teachers.

### **3.3 The project**

The goals of the NetOSKAR project were quite realistic and the progress has been according to the plan. Perhaps the biggest challenge is the limited time to complete the project. Development and testing of the technology and the procedures takes time. The most time consuming phase is the establishment of the network itself. Everything should be up and running within 30 months from the beginning. The "critical mass", i.e. at least 20 new member organisations must be reached to ensure the continuity of NetOSKAR. From the project leader's point of view, the co-operation between the partners has been very fluent and fruitful. All members of the NetOSKAR project have made excellent contributions to achievement of the targeted goals.

## **4 Conclusions**

The NetOSKAR project for establishing an international network of maritime education and training experts in order to develop and maintain a database of questions on STCW-95 subjects has been described in this paper. Development of new questions is carried out by small teams or pairs of specialists on a given STCW95 subject. The experience gained from the grassroots level co-operation among training professionals has been very encouraging. Exchange of opinions



and experience with colleagues via the internet and during workshops can give new, fresh ideas and help individual teachers in developing the course content and training procedures. The development platform of the NetOSKAR question database is Moodle, which has proven to be the correct choice. Moodle supports network-based operations, it is widely used around the world and it is very cost-effective. Control of the quality of the questions is crucial. In NetOSKAR quality control of the question occurs during its whole lifetime. The critical question and challenge for the future of NetOSKAR is to get new member organisations to join the network in order to reach the "critical mass". One possible solution to this would be to integrate NetOSKAR with existing co-operation networks between MET institutes.

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