

## Distance Learning Courses for Seafarers

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### ABSTRACT

The requirements of STCW 78/95 Convention need levels of knowledge, understanding and skill for all seafarers on each level of responsibility. Traditional methods of teaching require classroom, equipment, teachers or instructors. Now more and more subjects and themes may be prepared as computer programs for self-learning by seafarers for tutor distance supervision only. These programs should include self-tests and self-assessment to prepare for final exams. It is true, however, that another part of the training process is real practice on ships and exercise on simulators.

The paper presents new original general methods of using the CD-ROM and Internet for the training of seafarers. The main goals are specially focused on criteria for self-assessment during manoeuvring training. This idea is the invitation for all IAMU members to create in co-operation a new approach for seafarers training in respect of STCW 78/95 requirements.

### 1. Introduction

The 21<sup>st</sup> Century is regarded as the starting point of the era of a computer-based society. The term era of the computer-oriented society implies that there are coming changes encompassing the whole of the world population. Developments of computer technologies will globalise many fields of life. Capital, information and goods have gained unprecedented mobility (range and time). The diverse effects of this process include social, economic and political aspects. Educational services are one type of goods. These undergo the process of globalisation as well. The technology enabling such changes is advancing amazingly fast. The implementation of what today may seem to be a vision will not take generations or even years, but days. If we do not take up the challenge created by the new educational system, we might just neglect a chance of enhancing safety at sea by further improving the training quality through widened access to systems increasing this quality. Training aims at imparting knowledge and skills. Both the STCW 95 Convention and maritime administration regulations define the required training and certification of seafarers. Training courses for seamen fall into two groups: *voluntary* and *obligatory*. The latter are training courses for a certificate indispensable to perform a particular function. This type of training is the subject of further considerations.

The idea of Open & Distance Learning (ODL) was introduced about 30 years ago when the Open University was set up in Great Britain. Today, using networks such as Internet or subjects prepared on CD-ROM we do not have to travel to participate in classes at a school based anywhere in the world. The only requirement for the school is to have the necessary hardware and software. The computer enables us to take part in classes in (virtual) navigation, shiphandling, power plant operation, electrical engineering laboratory etc. It is sure that our knowledge of English may be tested too. The advantage of the system is that access is ensured at any time from any computer connected to the network. Course books, CD-ROM or audio and videotape materials support the educational process.

ODL gets rid of most formal barriers hampering access to knowledge acquisition and opens opportunities for self-instruction in convenient time and place; similarly, progress in one's studies may be evaluated. This system of learning, instead of the direct teacher-learner contact, offers such ways of communication as e-mail, telephone, Internet, videoconferences and others. Permanent access to knowledge is offered to anyone interested: learnt material may be revised, the knowledge and skills may be checked without participating in a conventional course. This is essential for refreshing and updating one's knowledge.

The methodology puts emphasis on interactive learning which makes the process much more effective. Although group interactivity is limited, individual work with a computer is more intensive. When training centres are located far away, trainees save substantially on travelling and accommodation expenses. As far as voluntary training by ODL approach is concerned, it will be offered only if it proves profitable.

## 2. Limitations

The implementation of ODL for obligatory training requires solving problems grouped in four categories:

1. Legal — distance learning has to be recognised as an authorised form of education. The criteria for such recognition have to be defined, problems of recognising certificates issued by foreign centres, taking exams in a centre outside the jurisdiction of a maritime administration and recognising exam results, legal and organisational exam requirements have to be met by examiners and examinees.
2. Economic — profitability of this type of training, fees, payment arrangements.
3. Organisational — satisfying all the requirements of maritime administration supervision, access, manner of paying fees etc., unification of training contents and exam criteria, co-operation between training centres.
4. Methodological — clear-cut definition of the contents of knowledge and skills constituting the ODL subject. It is known that there are skills that may only be acquired on a simulator, in a lecture room or training ground. Although there is no doubt that the ODL is effective in imparting knowledge, acquiring skills is not so obvious.

First of all, what is lacking is a legal framework for recognising the ODL outcome. The regulations of many countries allow only such training facilities as lecture rooms or training grounds. Another essential problem today is the cost of creating relevant programs (tools for simulation programs — availability and price); these costs are so high that even leading training centres cannot afford them.

Solving economic, organisational and methodological problems seems possible. Legal issues, however, have to be considered on a forum of institutions supervising training centres. The solutions provide a basis for devising training courses covered by certification resulting from STCW 95 Convention. Is therefore the idea of ODL for maritime training bound to be successful? It seems that the basic necessary conditions are approved criteria and programs for ODL run by marine training centres and detailed examination procedures interrelated with the system.

## 3. General idea

The diagram in Fig. 1 presents the requirements structure of the STCW 95 Convention on the level of management. Without questioning this structure, which is in force today, we obtain a certain schematic system which must be filled with content. This content should be as follows:

1. indispensable knowledge in the scope of each subject (module),
2. check-up tests along with established criteria of passing,
3. simulation programs for training with the possibility of selecting variables,
4. simulation programs for testing skills.

Knowledge covering the subject scope should be skilfully portioned (it should include definite initiation levels) and be imparted through text, figures, photographs and short films. The menu should include a link of definition blocks of terms applied, and it should be made certain that there is a possibility to seek out entries through headwords.

Tests checking the level of knowledge should always be drawn out of a base of questions covering the whole subject matter imparted in the module. Not more than 30% of the base content should be taken out in a single drawing. In order to rule out the possibility of passing a test at random it is suggested that the number of tests taken should be limited to five at the most.

At the present moment simulation programs allow a training of abilities in an ever wider scope. Training programs should provide the possibility to select variables, which determine the difficulty level of the task. The difficulty level selected by the student combined with the criteria should, at the end of the task performed, give the training advance level compared with the general requirements of this module on a relative scale.

Simulation programs for skill testing should be drawn out from a certain package of simulation tasks, where the result should be evaluated with consideration to the difficulty level of the task performed. Besides the adequacy of simulation models applied it is of essential significance to select objective criteria permitting to assess the quality of the performance. As in knowledge testing, it is suggested that the number of drawings should be limited to five at the most. It should be stressed that at the present moment even professional simulators do not have modules of assessing the quality of task performance, or have them built-in in a limited form. This is an ideal setting for scientists to demonstrate their skills in working out such assessment systems.

#### 4. Example

The presented example of a schematic module structure concerns the Navigation function and the problem "Manoeuvre and handle a ship in all conditions". It is focused on the theme Berthing and unberthing under various conditions of wind, tide and current without tugs. According to the conception presented the model should be constructed taking into consideration the following (Fig.2):

1. GENERAL VIEW OF THE SUBJECT.
  - 1.1 Knowledge — range and connections with other functions
  - 1.2 Knowledge test — point of view and criteria
  - 1.3 Skills — general idea and possibility (training)
  - 1.4 Skill test — general approach and criteria
  - 1.5 Terms (Glossary)
2. SHIPS
  - 2.1. Size and parameters
  - 2.2. Characteristics of manoeuvring
  - 2.3. Ship's movement - general approach
3. AREAS
  - 3.1. Classification
  - 3.2. Depths, dimensions
  - 3.3. Limitations
4. PROCESS
  - 4.1. Ship's movement ahead
    - 4.1.1 using main engine (propeller)
    - 4.1.2 using rudder
    - 4.1.3 using bow thruster
    - 4.1.4 using anchor
  - 4.2. Ship's movement astern
    - 4.2.1 using main engine (propeller)
    - 4.2.2 using rudder
    - 4.2.3 using bow thruster
  - 4.3. Berthing
    - 4.3.1 berth-ship contact
    - 4.3.2 using ropes
    - 4.3.3 hazards
5. EXTERNAL ELEMENTS
  - 5.1. Wind
  - 5.2. Current
  - 5.3. Tide
6. SITUATIONS
  - 6.1. Berthing by starboard side
  - 6.2. Berthing by port side
  - 6.3. Berthing by stern first
  - 6.3. Berthing with anchor
  - 6.4. Unberthing
7. FINAL TEST: analysis, conclusions

When constructing criteria of ship manoeuvring the focus should be on the following:

- The vessel's swept path,
- The energy emitted on fender devices during the first contact,
- The size of ship's propeller current (using strong manoeuvres),
- Manoeuvring tactics (courses and speeds of the vessel on approaching)
- Time of the manoeuvre performed.

The present state of knowledge is at present sufficient to define the above-mentioned criteria and evaluate them automatically while the simulation is being performed.

## **5. Conclusions**

The present progress noticed in information science and communications translates to all areas of human life, and so it is in education. New methods applied for working out teaching materials are today only half-measures. The method of distance learning which avails itself of technological progress is gaining significance. The method is applied in an ever wider scope in education on every level of it, university education included.

Distance learning is not used in the training of sailors today, which is due to a number of causes. Lack of international legal norms in this scope should be counted among the most important ones. There is no clear leader in the matter to take over the conduct of such a project, its coordination and liability with regard to its content. This role has so far been played by IMO; but the question should be posed if a society of the kind of IAMU might not be the initiating party; a society that groups institutions training sailors on the highest level; an institution acting on a global scale throughout the world, which assembles a large intellectual potential of persons best acquainted with methods and needs of sailor training. There can be only one answer; IAMU is the institution that should be the leader in this matter.

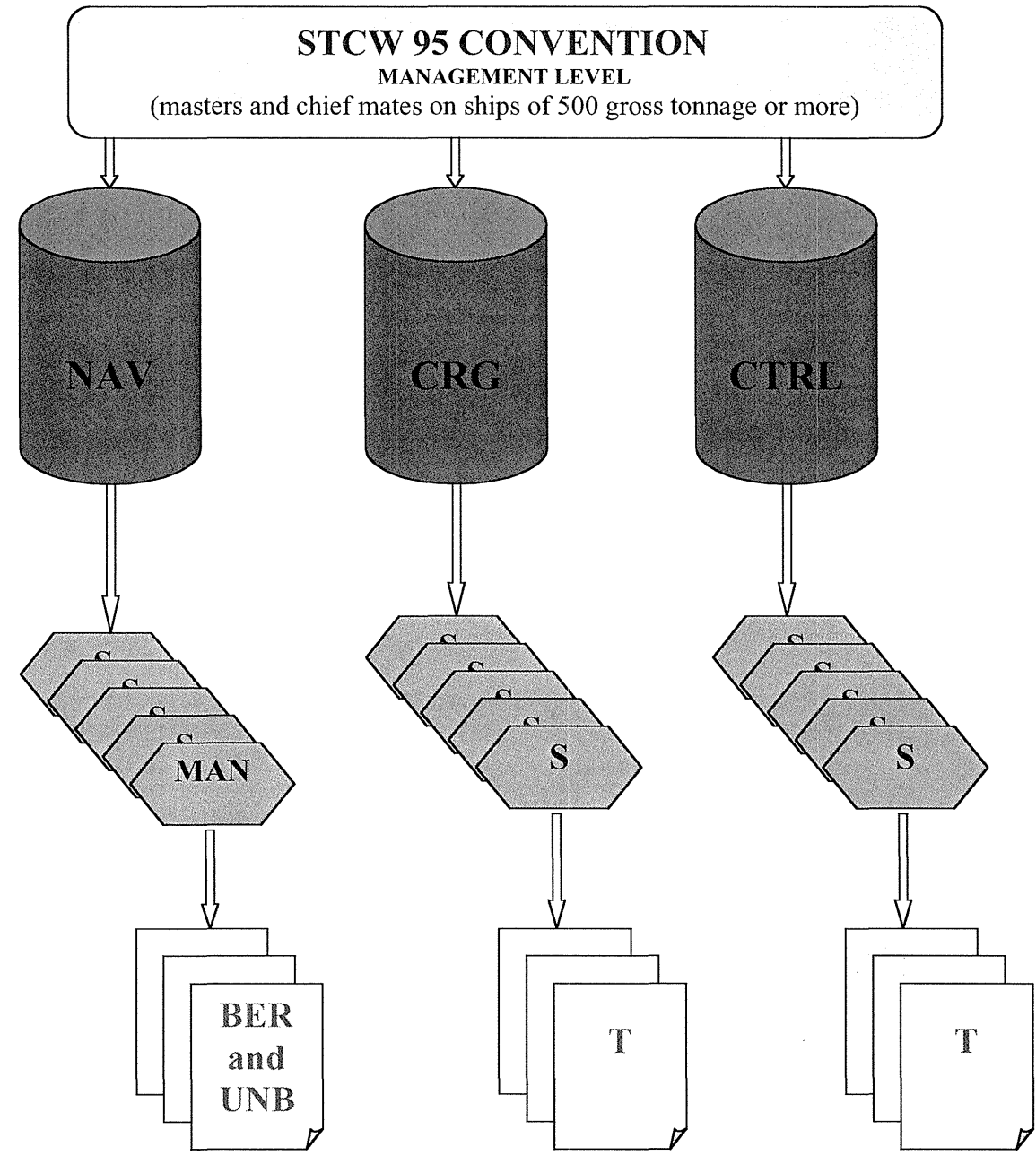
Finances are another problem. With the back-up of governments, IMO finances some projects bound with the safety of navigation, sailor training included. Existing courses are updated and new model courses are started, recommended by STCW 95 Convention. The question that arises in this situation is whether in the 21<sup>st</sup> century model courses are not out-of-date; whether one step forward should not be made to implement a different form of such courses that would assume a change in sailor training in the near future.

Considering all conditions I suggest what follows:




1. Initiating work within the scope of IAMU aimed at creating a program of a new system of training and examining sailors, based on the norms currently in force.
2. Raising the problem of distance learning at the forum of IMO by national delegations.
3. Using the materials (programs) created within the framework of the program carried out for training one's own students during normal and extramural studies.

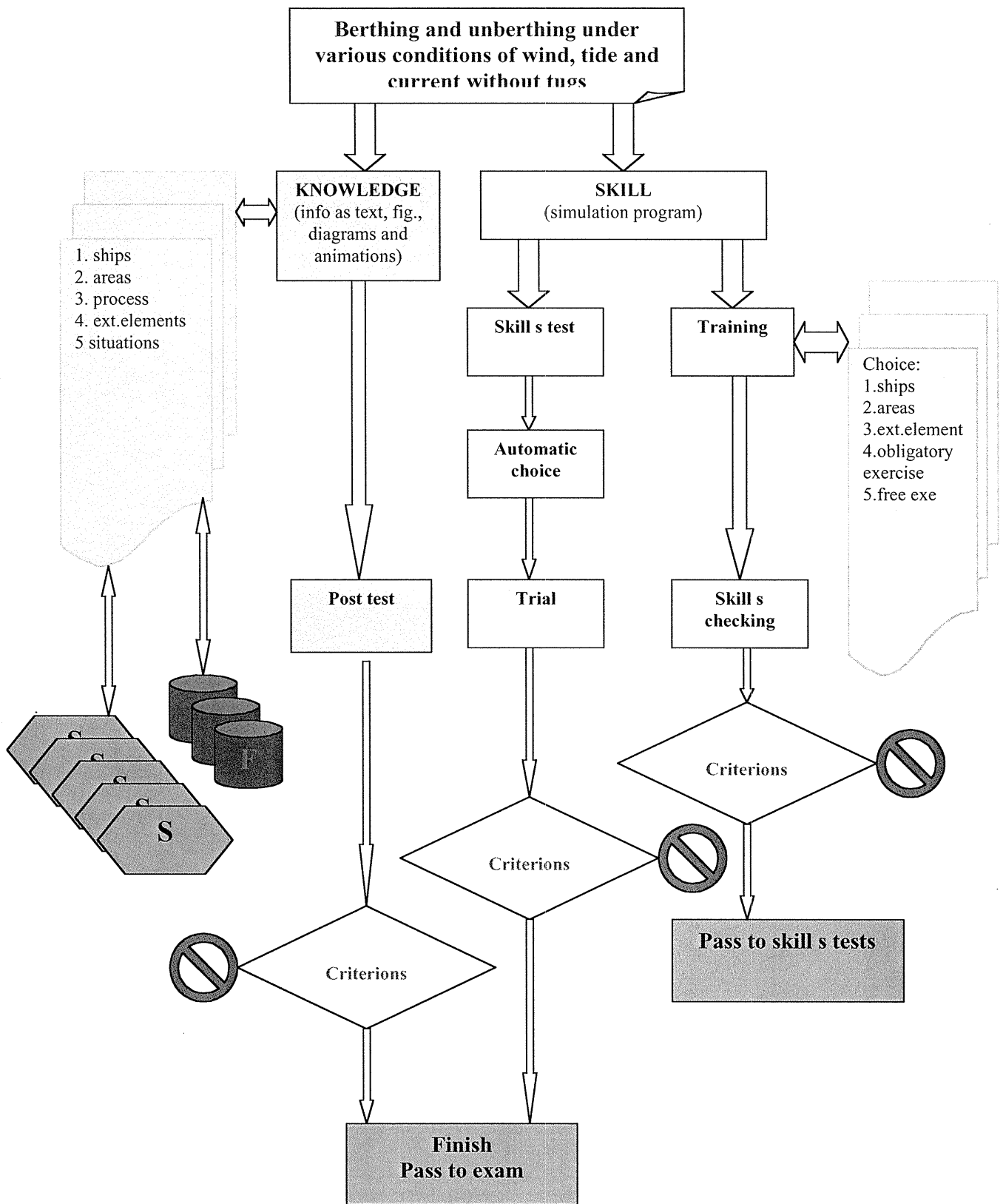
## **References**

Young, Ch. (2000); Presentation to the International Association of Maritime Universities (IAMU). Inaugural Assembly. June 2000.



**Legend:**

-  Functions:
- NAV — Navigation at the management level
- CRG - Cargo handling and stowage at the management level
- CTRL — Controlling the operation of the ship and care for persons on board
-  S — General subject
- MAN — Manoeuvre and handle a ship in all conditions
-  T — General theme
- BER and UNB — berthing and unberthing under various conditions of wind, tide and current without tugs.



**Fig. 2. Block diagram of the scenario of the theme Berthing and unberthing under various conditions of wind, tide and current without tugs**