

# A Suggestion of an Application of Blended Learning in MET Through a Harmonized STCW Model

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**ABSTRACT:** The article addresses the problem of modern maritime education and training in the perspective of computer technologies development, especially the internet. Computer-based training is being a standard for the maritime industry for almost 25 years, but there is still no unified approach on the use of this teaching method in MET. Authors suggest to open a conversation on harmonization of standards regarding CBT in the industry and wider implementation of this teaching method into STCW training process via a blended learning approach, where theoretical part of the course may be taken online, while the practical part is taken in the training facility.

## 1 INTRODUCTION

Blended learning has been a trendy sound and expression for last 15-20 years and many educational institutions around the world have been implementing the aspects of blended learning into educational programs, with more or less success along the way. As MET is following the global trends in educational developments, lagging behind was not an option.

But what is blended learning and how effectively can we make use of it to increase the professional standards, skills and competences of now day seafarers who are already under heavy pressure from recent developments in fields of data and electronic navigation?

In the Handbook of blended learning (by Curtis J. Bonk and Charles R. Graham, 2007) Professor Graham refers to blended learning as follows: *"The rapid emergence of technological innovations over the past half-century (particularly digital technologies) has had a huge impact on the possibilities for learning in the distributed*

*environment. In fact, if you look at the four dimensions (Space, Time, Fidelity and Humanness) distributed learning environment are increasingly encroaching on instructional territory that was once possible only in face-to-face environments."*

## 2 THE PROBLEM

It is no longer the question to blend or not to blend if we are to stay in the pace of the developments, but how to do it in a most effective way, considering the remoteness of the profession we are discussing. This brings us to CBT (Computer-based training) which has been a standard for the marine industry for odd 25 years preceded by famous Videotel (now KVH Videotel) instruction video's as firsts attempts to distant (on the job) learning and training. Industrywide there is a broad offer of CBT's available with Seagull being the most known one for the better percentage of the seafaring population and the offered programs cover most of the needs of the

shipping companies if an employee is staying in the same company for many years to come. But if not?

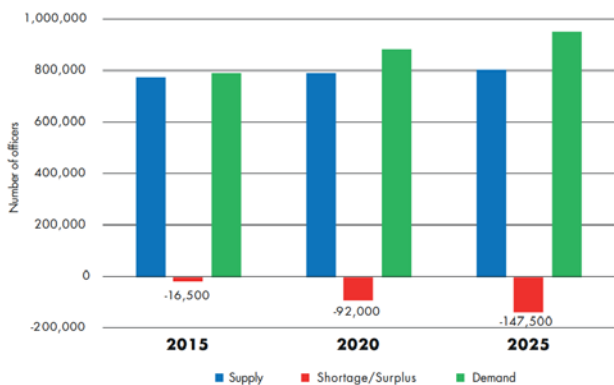


Figure 1. Worldwide supply and demand of seafarers. Source: BIMCO Manpower Report 2015.

Recent studies have shown that the retention rate of employees for the shipping industry has drastically changed over last 15 years and company loyalty is no longer the main factor for seafarer when choosing his or her place of work. Salary, skills, flag, convenient rotation schedules, secondary benefits, possibilities to grow within the company, easiness to change from sea to shore (and vice versa) are being pulled to the front pages. At the same time, BIMCO manpower report 2015 predicts a shortage of roughly 150.000 seafarers by 2025 and if we are not promoting careers at sea and enhancing the levels of maritime education and training worldwide, a serious blow to the global economy is a real and thinkable scenario.

Noticeable enough, the various offered CBT programs are not “compatible” when switching companies and seafarer has to undergo the same or similar skill training from the scratch from a different supplier since the company rules dictate so. Also, often this training has to be completed in “own” rest time.

But do either the conventional face to face or the online learning alone satisfies necessary competence criteria outlined in STCW convention and required by the industry?

The rapid growth of technologies, constant aspiration to increase the level of automation, strictness of regulations and operations efficiency dictates the necessity to apply new methods which will be able to bring together several sides of the learning process, such as e-learning, conventional classroom teaching, on-job learning in a harmonized manner.

### 3 REGULATIONS AND TEACHING METHODS

Section B-I/6 of STCW code “Guidance regarding training and assessment” mentions two options:

- in-service training and assessment; and
- distance learning (and e-learning),

as a part of mandatory STCW training, and provides a simple list of requirements for implementation. It contains guidance for training by distance learning and e-learning stating that governments should

ensure that any distance learning and e-learning programme:

- is provided by an entity that is approved by the Party;
- is suitable for the selected objectives and training tasks to meet the competence level for the subject covered;
- has clear and unambiguous instructions for the trainees to understand how the programme operates;
- provides learning outcomes that meet all the requirements to provide the underpinning knowledge and proficiency of the subject;
- is structured in a way that enables the trainee to systematically reflect on what has been learnt through both self-assessment and tutor-marked assignments; and
- provides professional tutorial support through telephone, facsimile or e-mail communications.

Additionally, for assessing a trainee’s progress and achievements by training by distance learning and e-learning next criteria should be applied:

- clear information to the trainees on the way that tests and examinations are conducted and how the results are communicated;
- have test questions that are comprehensive and will adequately assess a trainee’s competence and are appropriate to the level being examined;
- procedures in place to ensure questions are kept up to date;
- the conditions where the examinations can take place and the procedures for invigilation to be conducted;
- secure procedures for the examination system so that it will prevent cheating; and
- secure validation procedures to record results for the benefit of the Party.

On the other hand, IMO Model course 6.09 “Training course for the instructors”, specifies several remote teaching methods, such as

- Computer-based teaching
- Distance learning/E-learning
- Massive Open Online Courses (MOOC)

However, neither STCW code nor any of IMO model courses give guidelines on where exactly computer-based learning can be applied as part of existing IMO model courses, which creates certain ambiguity on STCW courses flag state approval stage.

The “Competence” as per STCW consists of three components: knowledge, skills, and experience. Learning may provide a person with the first two components: knowledge and skills, where experience is gained via continual repetition of a certain task in different circumstances.

In other words, we may name knowledge and skills as *software* and *hardware* learning.

Where *software learning* implies work with different forms of teaching media, such as book, poster, video or electronic learning media, with or without human trainer / assessor.

*Hardware learning* implies the practical performance of certain tasks, which allow a person to gain required skills, and which, considering modern technologies, in some cases may be done with or without human trainer / assessor.

Industry-related professional education and training are usually divided into several stages:

- initial education (college, BA, BSc, etc.);
- post-graduate education (MSc, PhD, etc.);
- continuous professional development (CPD).

If the first two stages imply long term academic credits when students choose to dedicate a big amount of time to learning, CPD involves various short-term courses on-demand as required by industry in limited time amounts.

In most of the cases, the majority of software learning may be implemented remotely, without the physical presence of student and teacher in the classroom or at the training site.

The situation is opposite with hardware learning, especially when certain equipment and simultaneous practical assessment are necessary to reach the defined learning objectives.

Seafarers starting from their cadetship spend at least half of their lifetime remotely not only from the place of living, but they also may reside on considerable distance from the available educational facility, which makes even more expensive and problematic to provide a classroom training, when necessary. Therefore, with the help of the modern technologies such training can be distributed, where software part maybe mainly done remotely from a convenient location within a given timeframe and only hardware part is done in the classroom.

This approach is generally called *blended learning*.

As per IMO Model course 6.09:

*“Blended learning is a kind of learning where a trainee blends or mixes a range of methods involving instruction, digital and online media learning.*

- *To combine or mix modes of web-based technology to accomplish an educational goal;*
- *To combine various pedagogical approaches (e.g. constructivism, behaviourism, cognitivism) to produce an optimal learning outcome with or without instructional technology;*
- *To combine any form of instructional technology (e.g. audio, video, web-based training) with face-to-face instructor-led training; and*
- *To mix or combine instructional technology with actual job tasks in order to create a harmonious effect of learning and working.”*

*E-learning* is understood very differently, varying from reading a pdf copy of a book or an html page filled with text and pictures to a computer-based training with high level of interactivity and high demand for the user actions.

Also, e-learning may be provided in the form of Massive Open Online Course (MOOC) or Webinar - it is an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as filmed lectures, readings,

and problem sets, many MOOCs provide interactive user forums to support community interactions.

It is necessary to mention, that it is still may be necessary to bring students together for short reviews and discussion of theoretical part of the training. As specified by *Chen et al. (2017)* compared with the traditional face-to-face interaction, e-learning is still lack of direct emotional communication, and team learning environment.

Also, it works much more effective, when each student studied the subject on his/her own pace and passed a test assessment before meeting the other students, as they may learn with different speed and preliminary distant learning with assessment brings students on the almost similar theoretical level. The objective of the classroom session in this case is to make sure that they all are sharing the same mental model, and to minimize misunderstanding that may be caused by individual learning. Such training session may be done either in the classroom or via webinar, or by mixing both methods.

Hardware learning (practical part) may also be done differently. Depending on the course some assignments may be completed:

- **remotely**, using appropriate **software** (such as online simulators or remote desktops). It especially efficient, when students are taking a course on software usage, i.e. ECDIS or planned maintenance systems;
- in a **class** on a **simulator**, i.e. bridge simulator, engine control room simulator, lifeboat simulator, etc. Examples are: ship handling, maritime resource management, dynamic positioning;
- in a **laboratory** or at a **polygon** using **training equipment**, i.e. switchboard, life raft, fire extinguisher, etc. Examples are: majority of STCW A-VI courses, BOSIET course;
- on a **virtual reality (VR)** simulator. VR technologies are quickly developing and already becoming the nearest future of the educational process. The idea of bringing people from the same bridge team who live in different locations on the globe to the same virtual training room is not only very exciting but also very cost-effective, reducing both logistics and hardware costs.

Therefore, in our opinion, it is important to update existing IMO model courses and develop unified standards and guidelines for remote training, considering:

- acceptable e-learning delivery methods (book, CBT, webinar, etc.);
- development of online tests (time limits, number of attempts, number of questions, etc.);
- knowledge assessment criteria (minimum pass-mark, examination procedure, anti-fraud procedure, appeal procedure);
- remote/classroom training ratio.

#### 4 BLENDED LEARNING MODEL FOR MET

A simple blended training flowchart, which may fit a vast majority of existing STCW courses is shown on figure 2.

It is proposed to divide the training in 5 consequential stages. Where the **first stage** assumes self-learning, when student works with the assigned media and has to finish studying within the required deadline.

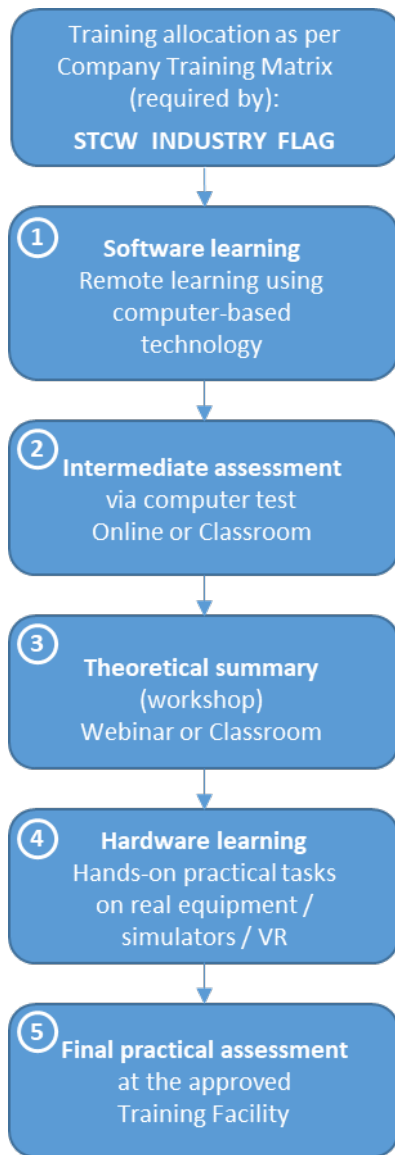


Figure 2. Generic blended training flowchart.

On the **second stage** student has to take a test, and it is up to administration or training provider to decide, rather this test may be taken online or in classroom and which level of supervision has to be implemented.

**Third stage** is a pre-practice theoretical summary, which also may be mixed into **fourth stage** of practical hands-on training in a form of exercise briefings or workshops, also active learning techniques as mentioned by *Kunieda et al.* (2017) may be more applicable on this stage.

The practical assessment shall be the final and the most important part of the blended training scheme, where student shall actually demonstrate that gained knowledge also allowed to gain a required skill to approve competence.

This scheme was practically implemented by authors during the last two years for non-mandatory training, having many positive feedbacks both from the students and from the industry.

#### 5 CONCLUSIONS

We suggest to open a discussion and to harmonize the standards for computer-based training among different shipping companies by making use of far advanced integration of blended learning where the seafarer will be able to enhance his skills, improve his knowledge level and understanding of what has become a digitally demanding job and contribute to enhancing of safety standards in the industry.

Big advantages of blended learning, is possibility to work in your own pace, have access to a platform for support (face to face through webinars or on site while conducting practical components in the simulator), being able to access the platform on ship or on shore where instructors will facilitate the needs of an individual or the company and cater to them with greatest attention possible having only one ultimate goal: professional, skilled and competent seafarer for the industry.

This may be achieved by splitting conventional training into the remote and classroom parts. Where the theoretical material may be studied online and practical part of the course and the final assessment are taken at the approved training facility.

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