Train-the-Trainer course

Competency Based Training and Assessment

Inland Waterway Transport

Didactical Manual

IWTCOMP Project

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Definitions

In this didactical manual, the following terms have the meanings set forth below:

Apprentice
- A person learning in a practical training environment, under supervision, in which professional hands-on experience is acquired.

Assessor
- A person who evaluates the success of the learning process.

Best practice
- A method and/or a process used to establish the extent to which a learner has achieved particular knowledge, skills, attitude (competence), confirming that certain assessed learning outcomes achieved by the learner correspond to specific outcomes that are required for a module or qualification

Candidate
- A person undergoing an assessment.

Candidate trainer
- A participant in the Train-the-Trainer course.

Competence
- The level of proficiency to be achieved for the proper performance of functions on board inland waterway vessels in accordance with the agreed standards or levels of knowledge, understanding and demonstrated skills.

Competency-based education
- An approach that focuses on the mastery of learning outcomes.

Competency-based learning
- A system of education based on trainees demonstrating their ability to act effectively in a job or situation.

Competency-based assessment
- A unit used to define and understand the knowledge, skills and attitude required to perform a job effectively.

E-learning
- Learning conducted via electronic media, typically on the Internet.

Examinee
- A person undergoing an exam.

Examiner
- A person who evaluates knowledge, reactions or qualifications, and who administers examinations in schools, colleges, or universities on behalf of an official institution (e.g., Chamber of Industry and Commerce).

Instructor

- A person who instructs in a practical training environment, creating situations in which professional hands-on experience can be gained. Although often used as a synonym for 'teacher,' an instructor may have teaching aims and methods that are often quite different.

Operator

- A person who operates a training vessel or simulation system in practical training environments.

Provider

- A training or educational institution that offers simulator-based training courses. Providers are responsible for ensuring that the content, organisation and implementation of a course comply with set standards. They also ensure that staff are well qualified, i.e. suitable and experienced, based on standard criteria.

Skill

- A task or group of tasks performed to a specified level of proficiency which typically involves the manipulation of tools and equipment, or expertise that is knowledge or attitude-based.

Student

- A person who is enrolled in an educational institution.

Teacher

- A person who teaches in an educational programme, and who is committed to providing a learning environment in which knowledge and competencies can be acquired. Teachers enable students to transfer their knowledge to real-life-situations and to solve problems by relying on the knowledge gained.

Teaching method

- A principle and/or an approach used for learning/instruction/training.

Teaching aid

- An object (such as a book, picture, or map) or device (such as a DVD or computer) used by a trainer to enhance or enliven trainees' instruction.

Trainee

- The collective term for an individual enrolled in an educational programme. A trainee may be referred to as an apprentice, candidate, student, or examinee.

Trainer

- The collective term for an individual who teaches in an educational programme and whose job entails assuming various roles, e.g. instructor, teacher, examiner, and assessor. Trainers must be qualified and experienced in both inland navigation and teaching, and must possess the specific knowledge and pedagogical skills to be responsible for different types and levels of training.

Module 1 Overview of the Tables of Competences and requirements for competency-based training and assessment

1.1 Background of the CESNI Standards of Competence

Since 2008 IWT stakeholders are cooperating towards the harmonisation and modernisation of professional qualifications in inland navigation. In 2009 the first concept of the **S**tandards of **T**raining and **C**ertification in **I**nland **N**avigation (STCIN) has been proposed in detail in the PLATINA Deliverable 3.8. STCIN allows for integration into all existing educational and training IWT systems. In addition, it enables easier access for career-changers in the inland navigation working environment.

The overall aim of is the creation of a "level playing field" by establishing common standards with regard to the professional competencies of nautical personnel, quality criteria of teaching instructors or the attributes of learning tools such as simulators, training ships or practical learning equipment.

Ideally, when a person has undergone education and training according to the new standards, relevant authorities in all European countries will know that this person has proven knowledge and skills in a pre-defined catalogue of competencies.

Reaching a harmonised system of education, training and certification for the IWT sector through the implementation of the new standards is desirable as it provides for qualified personnel and aligns standards of control by competent authorities through the implementation and maintenance of the EU IWT member states.

The harmonized standards for competence were intended to ensure that all inland navigation personnel in Europe are properly educated and trained, adequately experienced, skilled and competent to perform their duties in a manner that provides for the safety of life and cargo and protection of the waterways.

The PLATINA **J**oint **W**orking **G**roup (PJWG) evolved from the Round Table on "Education and Training" organised by the Central Commission for the Navigation on the Rhine (CCNR) in June 2008. On this occasion, such stakeholders as the social partners and the predecessor of EDINNA called for a comprehensive approach to tackle challenges for a harmonised description and a common understanding of IWT personnel professional competencies.

In order to achieve full support and a consensus-oriented common understanding of the new competency based approach, PLATINA established the PJWG on professional competencies. Members of the PJWG are the **social partners -** consisting of representatives from the European Barge Union (EBU), the European Skippers Organisation (ESO) and the European Transport Workers Federation (ETF) who meet regularly at the "Sectorial Social Dialogue Inland Navigation" in Brussels.

Members of **EDINNA,** the educational IWT network, participate in the JWG and propose draft texts relating to the competency tables. The secretariats of the Central Commission for the Navigation on the Rhine (CCNR), Danube Commission (DC) and Sava Commission (SC) participated in the meetings of JWG or were regularly informed.

As a first step, the PJWG developed recommendations for professional competencies for two levels of responsibility. These competencies were developed from a "safety" point of view and take into account the highest sub-levels of responsibility.

The PJWG understands "competencies" as the real and individual ability to apply theoretical knowledge, practical skills and attitudes subject to concrete, daily changing situations at the workplace with reference to personal and social activities.

The distinction between *Operational level* and *Management level* was chosen in order to display the two core functions on board a barge and in order to facilitate easier access for career-changers from other transport sectors such as maritime transport or other professions related to IWT, for example. This flexible classification was chosen due to the various names of existing job descriptions and functions used in the different countries and river basins. Instead of "comparing existing" names and functions, a new approach was chosen that all parties could relate to.

The PJWG agreed on seven chapters of professional competencies for two levels of responsibility:
1. Navigation
2. Cargo-handling, stowage and passenger transport
3. Controlling the operation of the ship and care for persons on board
4. Marine engineering and electrical, electronic and control engineering
5. Maintenance and repair
6. Communication
7. Safety, health and environmental protection

The topics of the chapters can be linked to the maritime STCW Code in order to accommodate career-changers from related industries to a greater extent than was so far possible. The PJWG concluded these professional competencies and introduced them in the Sectorial Social Dialogue in Brussels. The CCNR disseminated the professional competencies to their committee for social, employment and educational issues with the document STF (11) 21 as of 23rd September 2011. The UN-ECE Working Party on Inland Water Transport distributed the competencies with the informal document SC.3/WP.3 No. 10 (2011) on 15th May 2011.

Development of consolidated tables of professional competencies
As the core competencies can only be a very general description, it was agreed to develop these core competencies further and to define a new 2nd column of consolidated STCIN tables with: theoretical knowledge, practical skills and proficiency.
Suggestions and examples relating to:
· methods for demonstrating competence, and
· criteria for evaluating competence,
which form the 3rd and 4th column of the consolidated tables are necessary to have a complete effect on the consolidated tables.

In order to develop the consolidated tables, EDINNA was integrated into the PLATINA consortium by means of a contract amendment.
EDINNA came up with a first draft of a working document on core competencies at both the operational (OL) and the management level (ML). The competencies at the OL and ML have been agreed upon in the meantime. The competencies can and will, however, be adapted as necessary - e.g., due to changes in the market.

The STCIN was intended to cover the following issues in various chapters:
(a) General Provisions
(b) Qualifications of instructors and supervisors
(c) Standards governing the use of training equipment such as simulators, training ships, laboratories
(d) Mandatory requirements for functions on board - operational level

(e) Mandatory requirements for functions on board - management level
(f) Supplements: i.e. mandatory requirements for ML on ships transporting dangerous goods or passenger vessels
(g) Certificates
(h) Training and assessment criteria
(i) Quality system
(j) Criteria for recognition of IWT institutes

For the beginning, the decision was made to concentrate on the two core functions on board an IWT vessel: boatman as part of the OL and boatmaster on ML. Since Inland Waterways is a fast-changing sector, new technological demands on board must be met via a regular actualisation of the competencies for operational and management level after discussion and by mutual agreement of the joint working group.
The PJWG started the discussions for the 2nd column at the beginning of 2011 and finalised the tables by March 2012. Minutes of the meetings have been kept and approved in German.
Later on, at its plenary session in June 2015, the CCNR adopted a resolution creating a European committee for drawing up common standards in the field of inland navigation (Comité Européen pour l'Élaboration de Standards dans le Domaine de Navigation Intérieure – CESNI). The creation of this new working body is in line with the desire of the CCNR, shared by the European Union, to reinforce governance at the European level, particularly in the field of regulations governing inland navigation.
The purpose of the new committee is to bring together experts from the Member States of the European Union and the CCNR and representatives of international organisations with an interest in inland navigation. The CESNI group has been divided into two subgroups: one of them dealing with technical CESNI/PT requirements and the other one being in charge of professional CESNI/QP qualifications. Since the creation of the CESNI/QP, considerable work has been done to date in terms of competency standards. Furthermore, in 2018, seven meetings of CESNI/QP group for working on professional qualifications and competencies standards are envisaged.
On 27 December 2017, the Official Journal of the European Union published Directive 2017/2397 on the recognition of professional qualifications in inland navigation, repealing Council Directives 91/672/EEC and 96/50/EC. In January 2018 this new EU Directive on the recognition of professional qualifications in IWT, including the CESNI standards for competence, came into force. The deadline for transposition into national law is in January 2022.

1.2 Requirements for competency-based education, training and assessment

The consolidated tables were developed step by step - always starting with the operational level of a chapter, then defining the management level.
EDINNA proposed the content for the 2nd column, which was then distributed to the EDINNA members as well as the members of the PJWG and which served as a discussion paper for the different meetings of the PJWG.
The various comments, changes and alterations from the different organisations were integrated into the document until one final version could be agreed upon within the PJWG.
The knowledge, skills and proficiency in the 2nd column were developed subject to some preconditions. In order to understand and use the CESNI standards correctly, an **introductory framework** is necessary.

The introduction for the **operational** level should fit into the overall concept and could include the following points with regard to column 2 of the competencies.
Any candidate who wishes to obtain a qualification certificate for the operational level must have a good command of the competencies listed in chapters 1-7 (column 1) as well as the knowledge, skills and proficiency (column 2). The education and experiences required for the obtaining of such competencies are based on the tables as well as on national requirements – if existent. The theoretical knowledge and practical skills are required equally for all types of vessels and all waterways. Additional requirements may nevertheless be formulated under certain conditions.

For the **management** level, this introduction could read as follows:
Any candidate who wishes to obtain a qualification certificate for the management level must have a good command of the compulsory competencies for the operational level as well as the knowledge, skills and proficiency as laid down in the tables. In this way, the theoretical knowledge and practical skills from the operational level are covered and deepened for management level. The theoretical knowledge and practical skills are required equally for all types of vessels and all waterways.
To gain better insight into the differences between the Operational Level and the Management Level, the essential competences at the OL and ML, as presented in the Directive 2017/2397, are compared in the table below.

No.	Essential Competence	Operational level The boatman shall be able to:	Management level The boatmaster shall be able to:
0	Supervision		— instruct other deck crew members and supervise the tasks they perform, implying adequate abilities to perform these tasks.
1	Navigation	—assist the management of the craft in situations of manoeuvring and handling a craft on inland waterways. The boatman shall be able to do so on all types of waterways and in all types of ports. In particular, the boatman shall be able to: — assist in preparing the craft for sailing, in order to ensure a safe voyage under all conditions; — assist with mooring and anchoring operations; — assist in the sailing and manoeuvring of the craft in a nautically safe and economical way.	— plan a journey and conduct navigation on inland waterways, including being able to choose the most logical, economic and ecological sailing route to reach the loading and unloading destinations, taking into account the applicable traffic regulations and agreed set of rules applicable in inland navigation; — apply knowledge of the applicable rules on the manning of craft, including knowledge of resting time and on-deck crew members' composition; — sail and manoeuvre, ensuring the safe operation of the craft under all conditions on inland waterways, including in situations that involve high traffic density or where other craft carry dangerous goods and require basic knowledge of the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN); — respond to navigational emergencies on inland waterways.
2	Operation of craft	— assist the management of the craft in controlling the operation of the craft and in the care of persons on board; — use the vessel's equipment.	— apply knowledge of inland waterway shipbuilding and construction methods to the operation of various types of craft and have basic knowledge of the technical requirements for inland waterway vessels, as referred to in Directive (EU) 2016/1629 of the European Parliament and of the Council (1);

			— control and monitor the mandatory equipment as mentioned in the applicable craft certificate.
3	Cargo-handling, stowage and passengers transport	— assist the management of the craft in the preparation, stowage and monitoring of cargo during loading and unloading operations; — assist the vessel's management in providing services to passengers; — provide direct assistance to disabled persons and persons with reduced mobility in accordance with the training requirements and instructions of Annex IV of Regulation (EU) No. 1177/2010 of the European Parliament and of the Council (1);	— plan and ensure the safe loading, stowage, securing, unloading and care of cargoes during the voyage; — plan and ensure the stability of the craft; — plan and ensure the safe transport of and care for passengers during the voyage, including providing direct assistance to disabled persons and persons with reduced mobility in accordance with the training requirements and instructions of Annex IV of Regulation (EU) No. 1177/2010.
4	Marine engineering and electrical, electronic and control engineering	— assist the management of the craft in marine, electrical, electronic, and control engineering to ensure general technical safety; — perform maintenance work on marine, electrical, electronic, and control engineering equipment to ensure general technical safety.	— plan the workflow of marine engineering and electrical, electronic and control engineering; — monitor the main engines and auxiliary machinery and equipment; — plan and give instructions in relation to the pump and the pump control system of the craft; — organise the safe use and application, maintenance and repair of the vessel's electro-technical devices; — control the safe maintenance and repair of technical devices.
5	Maintenance and repair	— assist the management of the craft in maintaining and repairing the craft, its devices and its equipment.	— organise the safe maintenance and repair of the craft and its equipment.
6	Communication	— communicate generally and professionally, which includes the ability to use standardised communication phrases in situations with communication problems; — be sociable.	— perform human resources management, be socially responsible, and take care of the organisation of workflow and training on board the craft; — ensure good communication at all times, which includes the use of standardised communication phrases in situations with communication problems; — foster a well-balanced and sociable working environment on board.

7	Health and safety and environmental protection	— adhere to safe working rules, understand the importance of health and safety rules and the importance of the environment; — acknowledge the importance of training on safety aboard and act immediately in the event of emergencies; — take precautions to prevent fire, and use the firefighting equipment correctly; — perform duties, taking into account the importance of protecting the environment.	— monitor the applicable legal requirements and take measures to ensure the safety of life; — maintain safety and security for persons on board, including providing direct assistance to disabled persons and persons with reduced mobility in accordance with the training requirements and instructions of Annex IV of Regulation (EU) No. 1177/2010; — set up emergency and damage control plans, and handle emergency situations; — ensure compliance with requirements for environmental protection.

Conclusions

The competency-based training and assessment represents an ongoing effort intended to be a major step forward toward recognition of professional qualifications in inland waterways transport. To date, the essential competences requirements have been accepted and published in Directive 2017/2397 of the European Union.

Module 2 Understanding competency-based learning

It is useful to begin with a few definitions as applied in this course.
Competence is a cluster of related abilities, commitments, knowledge and skills that enable a person (or an organisation) to act effectively in a job or situation. Competence indicates sufficiency of knowledge and skills that enable someone to act in a wide variety of situations. Because each level of responsibility has its own requirements, competence can occur in any period of a person's life or at any stage of his or her career.[1]
'**Competence**' means the proven ability to use knowledge and skills required by the established standards for the proper performance of tasks necessary for the operation of inland waterway vessels.[2]
Competency-based education, which focuses on the mastery of learning outcomes rather than on academic achievement through fixed time structures, is an approach that has the potential to offer trainees an efficient, less costly path to an IWT degree, employability, and enhanced professional skills.
Competency-based learning refers to systems of instruction, assessment, grading, and academic reporting that are based on trainees demonstrating that they have learned the knowledge and skills they are expected to learn as they progress through their education.
Note:
The main goal of competency-based learning is to ensure that trainees are acquiring the knowledge and skills that are deemed to be essential to success in IWT education, careers, and adult life.
There are a lot of definitions in use to describe the concept of competences. One way we could look at it within this project would be: the ability of a trainee to act self-contained and effectively in a job or situation based on commitments, knowledge and (above all) skills. This definition sounds "digital". That means the trainee has a competence (digit 1) or not (digit 0). A definition that sounds more analogue is mentioned in the Competency Tables. "Analogue" means that there are different levels possible to fulfil the competence; there are different degrees of fulfilment for a competence: **"Competence"** means the level of proficiency to be achieved for the proper performance of functions on board inland waterway vessels in accordance with the agreed standards or levels of knowledge, understanding and demonstrated skills.
As we would like to correspond with a definition already in use within the IW&T sector, we choose to use the following definition as given by the PLATINA **J**oint **W**orking **G**roup (PJWG): "The real and individual ability to apply theoretical knowledge, practical skills and attitudes subject to concrete, daily changing situations in the workplace with reference to personal and social activities[3]."

As far as **Competency-based learning** is concerned, we will use a simplified definition.
Competency-based learning refers to a system of education that is based on trainees demonstrating their ability to act effectively in a job or situation.
Competency-Based learning (CBL) or Competency-Based Education (CBE) is somewhat different from the learning or education to which you may be accustomed.

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[1] http://www.businessdictionary.com/definition/competence.html
[2] DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the recognition of professional qualifications in inland navigation and repealing Council Directive 96/50/EC and Council Directive 91/672/EEC, Brussels, 18.2.2016 COM(2016) 82 final
[3] D3-13_Consolidated_STCIN_tables_of_competencies_26-04-2012_(final_draft).doc

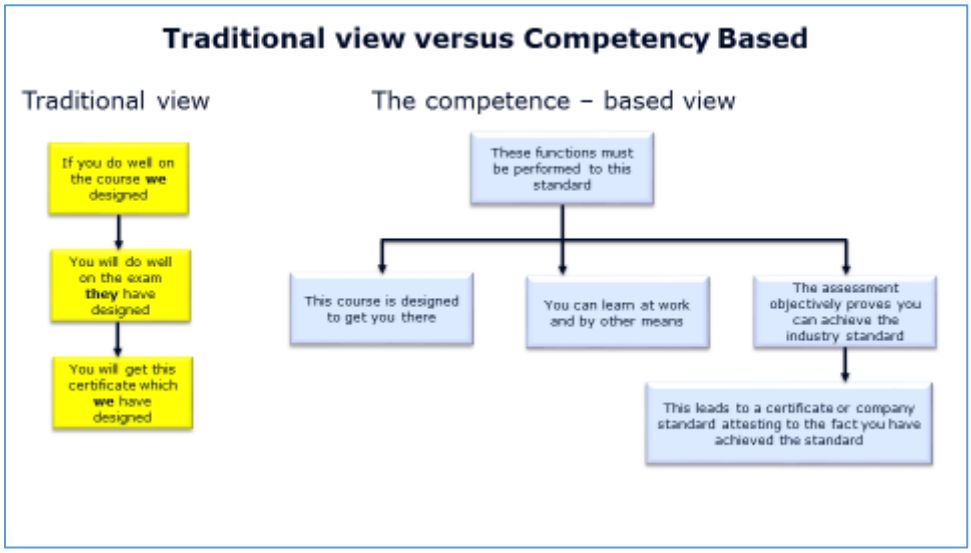


Figure 1: Traditional versus Competency-based

A few key differences between traditional and CBL can be seen in figure 1. One item of special note is that, by the end of the program, you will have achieved a measurable industry standard. The participant should now be ready to enter the work force and fulfil a specific function, thus the competencies listed are directly related to a function.
See figure 2. In this table, you will see that being competent to apply the traffic regulations is one component of the function: "Plan a journey on inland and maritime waterways and conducts navigation on European Inland waterways".

The boatmaster chooses the most logical and economical sailing route to reach the loading and unloading destinations, taking into account most efficient sailing time schedule according to actual circumstances. 1.1 Plans a journey on inland and maritime waterways and conducts navigation on European inland waterways. Is able to:			
Column 1	Column 2	Column 3	Column 4
COMPETENCE	KNOWLEDGE, UNDESTANDING AND PROFICIENCY	METHODS FOR DEMOSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
2. Respect and apply traffic regulations applicable to navigation on inland waterways to avoid damage.	Knowledge and ability to apply the rules of the road for the inland waterway being sailed to avoid damage (collision) National and international police regulations applicable to the waterway being sailed	1.	

Figure 2: Competency Tables excerpt

Module 3 Best practices (methods and techniques) used in competency-based education and training

3.1 Demonstrate the use of Teaching Methods/Activities

This part is to ensure the trainees understand and correctly use competency-based teaching methods in training for the IWT sector. Effective teaching can be achieved largely by the activities that are in proportion to the levels and features of trainees. All too often, trainees complain that instructors do not take their characteristics into account and thus teach in the same way for every trainee, not differentiating their teaching to meet the needs of the trainees and the content. A competency-based teaching and training activity is the result of the trainees who possess the same competencies at the operational level (OL) and managerial level (ML) respectively, who respond quickly and adapt to the tasks.

Activities 3.1.1---Deliver teaching sessions using a variety of styles (4. hours)

This activity is designed to ensure the trainee instructor has a real command of competency-based teaching methods, old or new, to satisfy the trainees' needs. This also supplements flexibilities to the trainees' toolbox so that they can have more options at hand to deal with one or two subject matters instead of just one unpopular method.

Questions and Answer

This method is quite important. Through questioning, an attempt is made to ascertain and evaluate the knowledge of trainees with regard to the subject. This method ensures participation. The trainer should ask questions and the learner should be encouraged to ask questions.

Trainers/Instructors ask questions for a number of reasons, the most common of which are:

- to interest, engage and challenge trainees;
- to check on prior knowledge and understanding;
- to stimulate recall, mobilising existing knowledge and experience in order to create new understanding and meaning;
- to focus trainees' thinking on key concepts and issues;
- to help learners to extend their thinking from the concrete and factual to the analytical and evaluative;
- to lead trainees through a planned sequence that progressively establishes key understandings;
- to promote reasoning, problem-solving, evaluation and the formulation of hypotheses;
- to promote trainees' thinking about the way they have learned.[4]

There are several advantages and disadvantages to using the Question and Answer teaching method in a classroom setting.

[4] http://oer.educ.cam.ac.uk/wiki/Types_Of_Question

Advantages	Disadvantages
• It can be used in all teaching situations. • It helps in developing the trainees' power of expression. • It is helpful to ascertain the personal difficulties of the trainees. • It provides a check on preparation of assignments. • It can be used to reflect a trainee's background and attitude. • It is quite handy to the trainer when no other suitable teaching method is available.	• It requires a lot of skill on the part of trainer to make a proper use of this method. • It may sometime mar the atmosphere of the class. • This method generally is quite embracing for timid students. • It is time consuming

If you ask the wrong questions, you'll probably get the wrong answer, or at least not quite what you're hoping for.

Asking the right question is at the heart of effective communications and information exchange. By using the right questions in a particular situation, any person can improve a whole range of communications skills. For example, the trainee can gather better information and learn more; he/she can build stronger relationships, manage people more effectively, and help others to learn too.

In the video "Questioning Techniques", instructors and trainees can explore some common questioning techniques, and when (and when not) to use them. https://youtu.be/ImfU12epYcI

The kind of question asked will depend on the reason for asking it. Questions are often referred to as 'open' or 'closed'.

A **'closed' question** usually receives a single word or very short, factual answer. For example, "Are you a boatman?" The answer is "Yes" or "No"; "What is your job?" The answer is the name of the job.

'Open' questions elicit longer answers. They usually begin with **what, why, how**. An open question asks the respondent for his or her knowledge, opinion or feelings. "Tell me" and "describe" can also be used in the same way as open questions. Here are some examples:

- What happened in the engine room?
- Why did the fitter react that way?
- Tell me what happened next.
- Describe the circumstances in more detail.

Open questions are good for:

- Developing an open conversation: "What did you get up to on vacation?"
- Finding out more detail: "What else do we need to do to repair the main engine?"

- Finding out the other person's opinion or issues: "What do you think about those changes?"

Closed questions are good for:

- Testing the trainee's understanding: "So, if I get this qualification, I will get a raise?"
- Concluding a discussion or making a decision: "Now we know the facts, are we all agreed this is the right course of action?"
- Frame setting: "Are you happy with the service on board our vessel?"

A misplaced closed question, on the other hand, can kill the conversation and lead to awkward silences, so are best avoided when a conversation is in full flow.

Another type is the '**funnel' question**. This technique involves starting with general questions, and then homing in on a point in each answer, and asking more and more detail at each level. It's often used by inspectors or surveyors taking a statement from a witness:

"How many people were involved in the fire?"*"About ten."*
"Were they officers or ratings?"
"Mostly ratings."
"What sort of ages were they?"
"About forty or fifty."
"Were any of them not wearing the protective clothing?"
"Yes, several of them were not wearing safety helmets or gloves."
"Can you remember who sounded the fire alarm?"
"Yes, I remember seeing oiler Newson shouting "Fire in the engine room".

When using funnel questioning, the instructors should start with closed questions. As he/she progresses through the tunnel, he/she may start using more open questions.

Funnel questions are good for:

- Finding out more detail about a specific point: "*Tell me more about Option 2*."
- Gaining the interest or increasing the confidence of the person you're speaking with: "Have you used the practice training book?", "Did they solve your problem?", "What was the attitude of the boatmaster?"

Questions may be used to provide a framework for a lesson, but when used they must be carefully controlled. In such a situation, the instructor should know the answer to the question before it is asked. Probable wrong answers and strategies to deal with them should also be considered.

Consider which of the following questions would be most useful for testing a trainee's knowledge.

1) What firefighting equipment do we have onboard our training ship??

2) What is SOLAS?

3) What data do you record in service record books?

4) What is the difference between a rope and a line?

5) How would you organise safe access to craft whether sailing, moored or at anchor?

6) What is the procedure to connect the training ship to the technical shore-based facilities?

7) What is the procedure for shutting down the main engine?

8) What traffic regulations applicable to navigation on inland waterways to avoid damage (e.g., collision) do you know?

9) How often should a ship be surveyed in a dry dock?

10) What are the benefits of an immersion suit?

11) What does it mean if a VHF message begins with the word "Mayday"?

When using questions, the trainee instructor must decide how to control the class. If all of the class tries to speak at once then nothing is achieved. The question may be put to the class as a whole or the question may be put to an individual. Some trainees may be more willing than others to answer questions. The trainee instructor must try to get as many responses from as many trainees as possible; so the questions should be spread around the class. Questions should be clear and asked in a language that the trainees can understand. Simple questions should be asked before complicated ones. The answers should be treated tactfully. A correct answer should be praised. If an answer is partly correct, the correct elements should be praised before the incorrect elements are addressed. It is important to find the reason behind an incorrect answer. No one should be made to look or feel stupid as this may affect his or her willingness to participate. Sometimes asking in a different way, breaking the question into smaller sections or offering simple clues, may help.
When a trainee asks a question, the instructor will not always know the answer. In this situation, the instructor should respond by advising the trainee where to find the answer or by offering to find the information. Incorrect information should never be provided.

Lecture

Lecture is the oldest teaching method applied in educational institution. This teaching method is one-way channel of communication of information. Trainees' involvement in this teaching method is just to listen and sometimes pen down some notes if necessary during the lecture, combine the information and organise it. The learners always appreciate a concise, stimulating and well-delivered lecture.
To lecture effectively, the instructor needs to understand the objectives, prepare for the lecture, become very familiar with the subject matter, identify and prepare supporting aids to illustrate the points. For example, the lecture can be used to introduce and explain the CESNI standards and other IWT instruments, transfer knowledge about emergencies and damage-control plans, or explain safety and security rules and regulations for persons on board, for safety, health and environment, etc.

The lecture method serves four basic purposes:

- to motivate,
- to clarify,
- to review and
- to expand.

Before starting to prepare a lecture, the teacher must be able to answer four basic questions:

- Who is your audience? - WHO
- What is the purpose of your lecture? - WHY
- How much time is available - HOW LONG
- What is the subject matter? - WHAT

The objectives of lecture are to:

- Give general information on a subject
- Gain acceptance for a new point of view
- Change basic attitude
- Teach a particular skill

A good lecturer must take care of: time available, the audience, subject matter, posture, appearance, manner, gesture, voice, vocabulary, use of audio-visual aids & blackboard.

One of the problems in this method is to grab the attention of trainees in the classroom. Another big problem is that a too-large group of trainees in the classroom cannot follow the theme.

During a typical lecture, an instructor stands in front of a class and presents information for the trainees to learn. Today's technology, however, gives instructors the ability to incorporate sound and visuals in a lecture. An instructor can write on a whiteboard or use a video projector. Texts can be shared via a document camera and graphics can be used in presentations. All of these methods will provide visuals for trainees.

There are a number of factors that can make a lecture successful or unsuccessful. These factors can include:

- Acoustics in the room
- Dynamic quality of the lecturer to hold the audience's attention
- Length of lecture
- Amount of information in the lecture
- Topic of lecture

It is important to be aware of one's own body movements and facial expressions and to speak clearly, loudly and use simple language.

Here are some recommendations for an interactive lecture:

1. Do not lecture more than five minutes without interruption;
2. Explore the experiences of the trainee to enrich the subject that is being presented;
3. Ask questions continuously to be sure that concepts are being duly grasped;
4. Give rise to doubt;
5. Propose issues related to the topic being treated, ones that require reflection;
6. Stop the lecture at certain moments to present slide shows, pictures, objects, etc.;
7. Use a projector to illustrate and lay out parts of the lecture;
8. Show prints, maps, etc. to support verbal concepts;
9. Use, as much as possible, the framework for exercises, illustrations, schematics;
10. Make constant recapitulations;

11. Oral language is the crucial element for good communication from the instructor, so that deserves the attention;
12. At the end of the lecture, review the key points of the subject presented, with active participation from the trainees;

Below is a summary of some of the advantages and disadvantages of using the lecture as a competency-based teaching method:

Advantages	Disadvantages
• Covers a lot of material in a short time; • Useful for large groups • Can be adapted to any kind of learner • Can precede more practical training techniques • Students' listening skills develop. • The instructor has more control than in other situations.	• Emphasises one-way communication • Psychologically this method is acceptable because individuals are not alike. The instructor delivers the same lecture to all types of trainees without recognising individual differences. • Learner's role is passive • The instructor needs skills to be an effective presenter • The technical language used in the lecture can be above the standard of the trainees. They will not be able to take full advantage of the lecture. • Lectures are often forgotten by the trainees soon after, while learning is retained if activities are experienced. • Attention level is not the same while trainees are listening to the lecture.

In conclusion, when delivering a lecture, consider the following steps:

- ✓ **Introduce the topic**—tell the learners what you're going to tell them
- ✓ **Tell them what you want to tell them**—present the material using visual aids
- ✓ **Summarise the key points you've made**—tell the learners what you've told them
- ✓ Invite the learners to ask questions

Demonstration

A demonstration is a presentation of a method for doing something. It is used to teach a specific skill or technique and/or to model a step-by-step approach. The demonstration allows trainees to see the instructor as an active learner and a model. It allows trainees to observe real signs and how they work. It can be used to illustrate points or procedures efficiently, stimulate interest in a particular topic. To carry out an effective demonstration, the following should be taken into account:

Pre-demonstration planning:

- Be clear in mind about what you are going to demonstrate;
- Analyse the skill(s) you are going to demonstrate:
    - Identify the main steps of the activity and
    - Break it down into basic operations and procedures;
- Try to simplify without sacrificing essential skill(s) components; and
- Organise the equipment needed and prepare any teaching aids that will help trainees understand what is involved.

Carrying out the demonstration:

- Make sure everyone can see
- Arouse the interest of the trainees
- Describe what you intend to do and why
- Present the complete activity first, so that trainees know what they will have to do
- Reveal the main steps of the activity and identify the problem areas
- Describe each step, showing the skill the trainees will form
- Adjust the speed of your movements to suit your trainees
- Inspire confidence in trainees as you go along
- Try not to over-impress or be too absorbed in your demonstration. Remember that the instructor's goal is to help trainees to achieve competence
- When finishing the demonstration, check that trainees have fully understood. Ask participants to recap the main points of the activity. This will help to identify gaps in knowledge and reinforce learning.

Trainees need to practice new skills in order to achieve a positive result. In providing trainees with individual practice, instructors should:

- Plan specific times when individual training is to be undertaken;
- Arrange the environment with care;
- Ensure that, when trainees begin, they have an achievable objective in mind;
- Ensure that trainees are using the correct procedure from the start of the activity;
- Instil some enthusiasm during the activity;

- Listen to what is going around you to identify those trainees that might get bored, confused, or give wrong advice to each other;
- Allocate your time fairly among trainees;
- Provide accurate feedback for trainees; and
- Encourage and praise trainees for what they are doing or trying to do.

This teaching method can be used to demonstrate a wide range of activities on board IWT vessels, such as: the use of GMDSS equipment and bridge navigational aids, safe cargo loading, stowage, securing and unloading, berthing, ship manoeuvrings, etc.

Advantages	Disadvantages
• Easy to focus learner's attention • Involves learners when they try the method themselves • Shows practical applications of a method • Any simple or complex skill becomes easy to understand.	• It can be used only for developing skills • Only the attention of the learners is invited toward the activity demonstrated. They are not free to discuss it • Due to poor economic conditions, there may be a scarcity of audio-visual aids and equipment.

Before deciding to use a demonstration, the instructor needs to be aware that:

- Requires planning and practice ahead of time;
- Demonstrator needs to have enough materials for everyone to try the method;
- Not useful in large groups;
- Requires giving feedback to learners when they try themselves.

To ensure a good demonstration, the following steps need to be considered by the instructor:

- ✓ Introduce the demonstration—what is the purpose?
- ✓ Present the material you're going to use
- ✓ Demonstrate
- ✓ Demonstrate again, explaining each step
- ✓ Invite the learners to ask questions
- ✓ Have the learners practice themselves
- ✓ Discuss how easy/difficult it was for them—summarise

Role-play

This is a teaching method in which trainees act out characters assigned to them. The trainers provide the information regarding the situation. Two or more individuals enact parts in a scenario related to a training topic. Role-play becomes a very useful teaching method when trainees develop and practise important social and interpersonal skills - conducting drills, briefing and debriefing sessions, etc., for example. It enables trainees to evaluate their performance and feelings in certain situations and develop skills in simulated real-life conditions without the consequences of real-life failure. The instructor structures and facilitates the role-playing and conducts the follow-up discussion. The participants will then act out the scenario and afterwards there will be reflection and discussion about the

interactions, such as alternative ways of dealing with the situation. The scenario can then be acted out again with changes based on the outcome of the reflection and discussion. In addition, role-playing can be used to clarify and demonstrate attitudes and concepts, plan and test solutions to problems, help trainees to prepare for a real situation, and deepen the understanding of real situations.

Role-play is a very useful teaching method as it:

- Helps to change trainee's attitudes
- Enables trainees to see the consequences of their actions on others
- Provides an opportunity for trainees to see how others might feel/behave in a given situation
- Provides a safe environment in which participants can explore problems they may feel uncomfortable about discussing in real life
- Enables trainees to explore alternative approaches to dealing with situations

To ensure a successful role-play, it is necessary to consider:

- Warming up the group;
- Selecting the trainees;
- Setting the stage;
- Preparing the observers;
- Enacting;
- Discussing and evaluating;
- Re-enacting; and
- Generalising.

Role-play is a very flexible teaching method because it requires no special tools, technology or environments. Students could work through a role-play exercise just as effectively in a lecture hall as on board a vessel, for example. However, technology can provide significant advantages, and even new possibilities, for using the method as a learning activity.
At the simplest level, technology such as voice recorders, video cameras and smartphones/tablets allow traditional face-to-face role-play exercises to be recorded and stored online for later reference, analysis and reflection. This can allow an exercise to be revisited at a later date and re-evaluated based on subsequent learning and experience. In the case of injuries, medical care, first aid, man overboard etc., role play can produce a desirable outcome.

Another advantage of using technology is that it can enable external participants to take part in the role-play. Tools such as Blackboard Collaborate, Skype and Google+ Hangouts all provide an online space where live conversations, including video, can take place. This means that a person with experience or expertise in the area being role-played can take one of the parts, producing a much more realistic experience for the trainee. For example, the instructor could play the role of a boatmaster while trainees play the role of boatmen during a briefing/debriefing session. All of these tools can be accessed freely over the internet and require only a microphone and speakers/headphones, meaning the technical barriers are quite low. These tools are also useful for role-playing among trainees in situations in which they are all available at the same time but can't physically meet, such as on distance-learning courses or during voyage periods.

Advantages	Disadvantages
• Active participation - energising and fun • Time-efficient • Engages the group's attention • Delivers complex concepts in a simple manner	• Participants may be too shy and reluctant • Can be threatening to some • It can become 'too much fun' and disrupt the task • Participants can get too involved and lose • objectivity • Participants can overact and show off - the observers may not observe well or take notes • • The observers may take 'sides' based on their preconceptions

In order to provide a valuable role-play activity, the instructor should:

- ✓ Prepare the actors so they understand their roles and the situation
- ✓ Set the climate so the observers know what the situation involves
- ✓ Observe the role play
- ✓ Thank the actors and ask them how they feel about the role play—be sure that they get out of their roles and back to their real selves
- ✓ Share the reactions and observations of the observers
- ✓ Discuss different reactions to what happened
- ✓ Ask the learners what they have learned and develop principles
- ✓ Ask the learners how the situation relates to their own lives or jobs
- ✓ Summarise.

Case study

Many learners are more inductive than deductive reasoners, which means that they learn better from examples than from logical development starting with basic principles. The use of case studies can therefore be a very effective teaching method.

A case study is a capture of real life situation. This is a learning technique that consists of presenting trainees with a real-life situation and requiring them to explore it by acting out the roles of those represented in the situation in order to find the solution to the underlying problem. Cases provide information outlining a problem-based scenario, where decisions involving value judgments are involved. Learning takes place by discussing the various aspects of a situation or problem. This could be real or imaginary and needs to be well organised if it is to be used effectively. A case study often assesses why something went wrong, discusses common problems in a typical situation and promotes group discussion and group problem-solving. Therefore, with this learning tool, trainees have an active role, while the trainer is only a guide.

The general technique is that the background theoretical knowledge should be introduced to the trainees and key aspects should be highlighted. The information provided for the case study should be read through and any points that the trainees raise should be clarified. The situation should be assessed from more than one viewpoint to illustrate different aspects of the case study.

Regarding the steps of this methodology, firstly, the case must be presented to a group of trainees. Then the group must be divided in small groups. Thereafter, trainees should be given time to discuss and reflect about the subject. Finally, the ideas must be consolidated. A good atmosphere for discussion must be developed. Trainees must be made to feel confident that they can express their opinions freely. The management of the discussion of the case study is not easy and requires practice.

Advantages	Disadvantages
• The trainee can relate to the situation; • Uses relevant, real situations; • Develops problem-solving skills; • Involves an element of mystery; • The hypothetical situation does not involve personal risks; • Encourages trainees to think about situations and make decisions in complex situations.	• Time-consuming to produce good cases; • Difficulty in validating when there is no quantifiable solution; • Close relationship to 'real-life' may be difficult to achieve; • The case study may be too general to focus on a specific issue; • Case studies written by someone else contain the writer's perceptions, feelings and ideologies which may lead to distortion of the objective reality.

Before deciding to use a case-study, the instructor must be aware that:

- The case must by closely related to the learners' experience
- Problems are often complex and multi-faceted
- There is not always just one right solution
- Requires a lot of planning time if you need to write the case yourself
- Discussion questions need to be carefully designed

The key points for a successful case study are as follows:

- ✓ Introduce the case
- ✓ Give learners time to familiarise themselves with the case
- ✓ Present questions for discussion or the problem to be solved
- ✓ Give learners time to solve the problem/s
- ✓ Have some learners present their solutions/answers
- ✓ Discuss all possible solutions/answers
- ✓ Ask the learners what they have learned from the exercise
- ✓ Ask them how the case might be relevant to their own environments
- ✓ Summarise

Breakout groups

Breakout groups are effective in enhancing intellectual problem-solving skills where the trainees have the chance to talk together and improve self-understanding. It is believed that small group work is one of the most effective ways to develop insight into a task and hone a trainee's competence. Success requires proper management that involves the appropriate layout of seating, the task, the expectations from the trainees, etc. It is recommended that groups be clearly told what time they will assemble again. For instance, trainees can be divided into groups to discuss the optimum way for a stowage plan in the context of cargo loading and discharging.

Breakout groups teaching method

- Enhances problem-solving skills
- Helps participants learn from each other
- Gives participants a greater sense of responsibility in the competency-based learning process
- Promotes team work
- Clarifies personal values

Advantages
• Trainees develop greater control over their competency-based learning • Participation is encouraged • Allows for reinforcement and clarification of lesson through discussion

The instructor has to be aware of the following things before starting a breakout group discussion:

- The task given to the group needs to be very clear
- The group should be aware of time limits for the discussion
- Participants should be able to listen to each other, even if they don't agree
- Group discussion should not be dominated by any one or two people
- Questions help guide the discussion
- Everyone should be encouraged to participate

The instructor also needs to be aware of the following steps in order to enjoy a valuable breakout group method of instruction:

- ✓ Arrange the trainees in groups of four to seven
- ✓ Introduce the task that describes what should be discussed
- ✓ Ask each group to designate a discussion facilitator, a recorder, and a person to present the group's findings to the larger group
- ✓ Check to make sure that each group understands the task
- ✓ Give groups time to discuss—this should not require the instructor's involvement unless
  the trainees have questions for the instructor
- ✓ Have one person from each group summarise the findings of the group (this could
  be a solution to a problem, answers to a question, or a summary of ideas)
- ✓ Identify common themes that were apparent in the groups' presentations
- ✓ Ask the trainees what they have learned from the exercise
- ✓ Ask them how they might use what they have learned

Practical work

Practical work or laboratory work is seen as an integral part of most science and engineering courses and offers an environment different in many ways from that of the "traditional" lecture or discussion of theoretical issues. Practical work involves the teaching of manual and applied skills, developing problem-solving skills and improving understanding of scientific enquiry methods. In the training of survival skills at sea, medical

care, marine-, electrical-, electronic-, control engineering to ensure general technical safety etc., trainees can achieve enhanced skill and deftness by more practice.
For example, during practical work in a workshop or on board a vessel in port, the boatman:

- learns to identify the spare parts of electrical, electronic and mechanical devices;
- follows the technical procedures regarding the replacement of different spare parts of the devices, taking into account the limits and the characteristics required by the maintenance instructions.

  Or the boatmaster:

- monitors different operating regimes of the main and auxiliary engines in order to obtain optimal energy efficiency of the main and auxiliary engines
- practices on telegraph remote controllers of the main engines

Simulation

A simulation is an enactment of a real-life situation. It allows trainees to experience decision-making in "real" situations without worrying about the consequences of their decisions. It is a way to apply knowledge, develop skills, and examine attitudes in the context of an everyday situation. Simulators provide a learning platform in which all elements of learning can be integrated into a valuable learning experience. Use of a simulator can, with correct assistance, produce positive results on a broad spectrum of attitudes, skills, or cognition.[5] Simulation is the exercise that places trainees in situations that model a real-life environment. It requires trainees to play the role, make decisions, and face the consequences. It has been used with great success in inland navigation such as IWT radar operation. Radar simulation equipment must be capable of simulating the operational capabilities of navigational radar equipment that meet all applicable performance standards. Radar simulation must be able to

- operate in relative motion head-up mode (inland navigation)
- model weather, tidal streams, current, shadow sectors, spurious echoes and other propagation effects
- generate shorelines and navigational buoys
- create a real-time operating environment incorporating at least two ship stations with the ability to change own ship's course and speed, and include parameters for target ships and appropriate communication facilities

Simulation can be used to show the real effects of alternative conditions and courses of action. In the simulator context, skill implies a combination of mental and physical dexterity in the face of audio and visual cues to perform tasks to meet specific objectives, with the implication that such skills will transfer to the real world. The trainer's role is to:

- facilitate the education and training of the trainees
- educate with an emphasis on conceptual knowledge, basic skills, and an introduction to the actual work
- train with an emphasis on the actual tasks and the work to be performed in an authentic setting
- examine/assess performance and competency of both individual learners and teams

[5] Train the Trainer Course for Inland Navigation Simulator Training, p.6

An example:

Function: Wheelhouse Operation–Navigation at the Management Level

Competences addressed by wheelhouse operation simulator for navigation at the management level

Competence	Full Mission Ship Handling Simulator [6]	Multitask Simulator	Limited Task Simulator
Plan and conduct a passage and determine position	X	X	
Manoeuvre and handle the vessel under all conditions	X		
Use external communication systems	X	X	
Use of RADAR to maintain safety of navigation	X	X	X
Operate Inland ECDIS and use different information for navigation (e.g. AIS data)	X	X	X

The use of simulation as a competency-based teaching method has its advantages and disadvantages:

Advantages	Disadvantages
• Simulation is practical. Rather than sitting through a training lecture, trainees can practice what they have learned and quickly learn from any mistakes without serious implications. • Simulation allows trainees to purposely undertake high-risk activities or procedural tasks within a safe environment without dangerous implications. • Simulation can improve trainees' skills and allow them to learn from error. • Learners are able to gain a greater understanding about the consequences of their	• Simulation is not always able to completely re-create real-life situations. • Simulation is time-consuming • Simulators can be very expensive and require constant updates and maintenance. • Not every situation can be included. • The results and feedback are only as effective as the actual training provided. • Simulator instructors need to be trained on how to use the software and/or hardware and this takes time and costs money. • No real consequences for mistakes may result in students underperforming and not being

[6] See also Standard for certification of maritime simulator systems (DNV 2011)

actions and the need to reduce any errors. • Learners address hands-on and thinking skills, including knowledge-in-action, procedures, decision-making, and effective communication. • Simulated learning can be set up at appropriate times and locations, and repeated as often as necessary. • Simulation learning can be customised to suit beginners, intermediates and experts to hone their skills so to speak. • Feedback can be given to trainees immediately to allow them to understand exactly what went wrong and how they can improve. • Trainees don't have to wait for a real situation to come up in order to learn.	fully engaged in the training, thus producing inaccurate results.

A simulator lesson is effective when the following criteria are met:

- The trainee is able to apply the knowledge learned.
- The training objectives for each topic were identified and followed.
- The curriculum content was organised and easy to follow.
- The simulation exercise was pertinent to the learning objective.
- The roles were appropriate to the exercise, and the briefing session was useful for the exercise.
- The assessment criteria were clearly explained at the beginning of the exercise.
- The conduct of the simulation exercise was realistic and achieved learning and assessment objectives.
- The debriefing session achieved its objective, which was to summarise the lessons learned and to reinforce learning objectives.
- The simulation time was sufficient for developing skills outlined in the learning objectives.
- The training aids and audio-visual aids were properly used.
- Class participation and interaction were encouraged.

In order to provide a valuable simulation activity, the instructor should:

- ✓ Prepare the learners to take on specific roles during the simulation
- ✓ Introduce the goals, rules, and time frame for the simulation
- ✓ Facilitate the simulation
- ✓ Ask learners about their reactions to the simulation
- ✓ Ask learners what they have learned from the simulation and develop principles
- ✓ Ask learners how the simulation relates to their own lives
- ✓ Summarise

Brainstorming

Brainstorming is a large or small group activity that encourages trainees to focus on a topic and contribute to the free flow of ideas. By expressing ideas and listening to what others say, trainees adjust their previous knowledge or understanding, acquire new information and increase their levels of awareness.

Brainstorming can be used to generate many ideas in a short space of time and can be effectively used as part of a training session, course, or management meeting. The activity is also a key element of hazard identification within risk management. Trainees get some time to start thinking creatively and then list as many ideas on a flipchart or white board as possible. The brainstorm team can single out the most appealing ideas. For instance, there are many reasons attributing to the causes of casualties on board or damage to cargo. It is a good idea to brainstorm the reasons and offer precautionary measures.

In brainstorming, an idea is welcomed and no justification is needed. The method is particularly appropriate at the beginning of a topic to identify existing knowledge and provide a framework for learning.

Brainstorming's main purposes are to:

- focus trainees' attention on a particular topic
- generate a quantity of ideas
- teach acceptance and respect for individual differences
- encourage trainees to take risks in sharing their ideas and opinions
- demonstrate to trainees that their knowledge and their language abilities are valued and accepted
- introduce the practice of idea-collection prior to beginning tasks such as writing or solving problems
- provide an opportunity for trainees to share ideas and expand their existing knowledge by building on each other's contributions.

However, brainstorming must be well conducted, with certain ground rules clarified from the very beginning. These are:

- Trainees express possible answers, relevant words and ideas;
- Trainees' ideas are accepted without criticism or judgment and usually summarised on a whiteboard by the instructor or by one trainee who acts as the coordinator;
- Trainees cannot comment on other learners' suggestions;
- Ideas are then examined, usually in an open class discussion format.

It is important for the instructor to:

- establish a warm, supportive environment

- emphasise that a quantity rather than the quality of ideas is the goal, and that it's okay for students to think outside the box
- discourage evaluative or critical comments from peers during the ideas-gathering phase
- encourage and provide opportunity for all students to participate
- initially emphasise the importance of listening to expressed ideas, and model the printing and recording of the ideas, then read each contribution to the group.

In order to achieve an effective brainstorming session, the instructor should take into consideration the following:

- ✓ In a small or large group, **select a leader and a scribe** (or this may be the instructor).
- ✓ **Define the problem or idea to be brainstormed**. Make sure everyone is clear on the topic being explored.
- ✓ Set up the rules for the session. They should include:
  - o letting the leader have control
  - o allowing everyone to contribute
  - o suspending evaluation of ideas until all ideas are gathered
  - o the validity of all contributions
  - o recording each answer, unless it is a repeat
  - o setting a time limit and stopping when that time is up.
- ✓ **Start the brainstorming**. Have the leader select members of the group to share their answers. The scribe should write down all responses, if possible so that everyone can see them. Make sure not to evaluate or criticise any answers until the brainstorming is complete.
- ✓ Once you have finished brainstorming, go through the results and **begin evaluating the responses**. This can be done quickly by a show of hands to rank the ideas.

Computer-based teaching

Computer-based teaching is a method of presenting a pre-programmed schedule of events using a computer. The events can comprise audio, text, photographs, graphics and moving pictures in the form of video and animations in any combination. Instructors need to adapt the computer-based teaching to the number of trainees, and to the needs and abilities of the trainees. For example, in RiverSpeak English training[7], oral practice and writing on a computer with limitless opportunities to repeat will be more appealing to the trainees than the traditional class delivery.

In a computer-based teaching method, trainees complete exercises and view materials on a computer screen rather than receiving the information from written material or an instructor's presentation.

Advantages	Disadvantages
• The multimedia capabilities of computer applications -- including images, video, text,	• Computer-based teaching is often used in classes where the high number of trainees makes

[7] https://www.imlpbooks.com/books/RS

and audio -- provide a rich and engrossing experience for trainees. • The formats are easier to customise to each trainee's learning style and pace. A trainee who is a visual learner, for example, can focus on the video content in a lesson or activity, even pausing the video occasionally to digest the content fully. In addition, when trainees are asked to enter content or test answers in instructional applications, the computer checks responses, which makes evaluation and grading easier for instructors.	personal attention from the instructor nearly impossible. In such an environment, it's difficult for instructors to survey the entire class -- and thus easy for trainees to be distracted by the computer's other uses. • Computer-based teaching requires a substantial initial investment. This could increase educational inequality between rich and poor schools.

Distance learning / E-learning

Distance learning or E-learning refers to the use of various kinds of electronic media and information and communication technologies (ICT) in training and may encompass computer-based or web-based self-study, as well as real-time training and collaboration[8]. There are many definitions concerning e-learning. Some synonyms like web-based training, computer-based training or online learning are already examples of the variety of interpretations. However, all these names do not capture the total of e-learning. The broadest definition of e-learning is learning supported by electronic devices (computer, tablet or phone).

E-learning links for trainee and trainee instructor are an increasing feature of modern approaches. The World Wide Web and internet have created a new way of delivering lectures at a distance (E-learning). It can be synchronous (instructor-led) or asynchronous in form (self-paced individual study) or it can incorporate both. However, with such developments as webinars and chat functions, synchronous learning is used more and more.

It can transcend the space, reduce education costs and offer a trainee an opportunity to learn in his/her free time. Programmed software, computer and internet are considered to be the most important preconditions for E-learning. It has been proven that on-board training via distance/E-learning can be more effective.

This methodology has also evolved toward *blended learning*, in which computer-based activities are used in conjunction with face-to-face or classroom-based teaching.

[8] The definition of e-learning on the Oxford Dictionary is “learning conducted via electronic media, typically on the Internet”. *See* http://oxforddictionaries.com/definition/english/e-learning . We may also find the term “distance-learning”, as this methodology is a form of this type of learning (the source of information and the learners are separated by time or distance or both), although it may be blended with classroom-based learning and therefore with “physically present-learning”. Besides, the expression “on-line learning” is likewise used, even though in this case it involves the use of internet or intranet.

E-learning also offers different ways to bring information to the student. With animations, sound and text, the students' senses are triggered in different ways.

A typical distance learning unit may consist of a unit guide, a study guide supplemented by a book of selected readings. E-learning links for trainee and trainee instructor are an increasing feature of modern approaches. The World Wide Web and internet have created a new way of delivering lectures at a distance (E-learning). It can reduce education costs and offer a trainee an opportunity to learn in their free time. Programmed software, computer and internet are considered to be the most important preconditions for E-learning. It has been proven that on-board training via distance/E-learning can be more effective.

This method of instruction takes advantage of modern technology and overcomes timing, attendance and travel difficulties. Thus, instructor and trainees must be equipped with basic knowledge of technology and it is suited to distance training and flexible training. Besides, it is less expensive to support and is not constrained by geographic considerations. In fact, it can cost a great deal to transport trainees to a training facility or simply to have this facility, and the time required for instructors to travel to various locations in order to train trainees can also be a problem. With this methodology, a single instructor can teach dozens or hundreds of individuals quite quickly and at much less cost. On the other hand, trainees with scheduling or distance problems can benefit, because distance training can be more flexible in terms of time and can be delivered virtually anywhere.

E-learning and training can involve a great variety of equipment. CD-ROM and DVD can be used to provide learning materials.
This methodology includes numerous and various types of pedagogical methods or tools, such as[9]:

- **Virtual learning environment (VLE):** An online space provided by the institution to support e-learning (internet or intranet). All forms of digital media can be delivered using its various tools. Trainers can post announcements, assignments, check on course activity, and participate in class discussions. Trainees can submit their work, read and respond to discussion questions, and take quizzes.
- **Personal learning environment (PLE):** A concept of understanding that trainees use a range of networks, combining both institutional and personal networks and devices to learn.
- **Blackboard Collaborate** is a fully redesigned, high-quality, browser-based web conferencing solution that makes distance teaching and learning simple, crystal-clear, and worry-free. Speedy launching and simple deployment mean trainers and trainees can focus on teaching and learning with less hand-holding. And with broadened device support, including Chromebooks, participation is possible anytime, anywhere[10].
- **Moodle:** An Open Source VLE that is commonly used.

[9] We took most of these methods or tools' description from http://www.jiscdigitalmedia.ac.uk/guide/introduction-to-elearning , as well as from http://searchcio-midmarket.techtarget.com/definition/distance-learning .
[10] https://www.blackboard.com/online-collaborative-learning/blackboard-collaborate-features.html

- **Podcast, either video or audio:** A method of delivering multimedia content. Podcasts can also be used to very good effect, again to supplement lectures or to get trainees to interact outside taught sessions.[11]
- **Discussion forum:** A communication tool for posting messages, work, comments or opinions. Often text-based but some offer the ability to use multimedia.
- **Blog:** A way of posting educational material online, normally organised by date and topic category. Images, video and audio can be shared with this tool. Blogs typically allow commenting, which can be a useful feature for teaching and learning.
- **Webinars:** are an effective alternative or supplement to traditional lectures, using programs such as ***Elluminate Live!*** This is a communication tool that includes integrated Voice over IP and teleconferencing, public and private chat, quizzing and polling, emoticons, and a webcam tool. The software includes several visual tools, including whiteboard, application sharing, file transfer, and web tour. The software also includes a record feature that allows the moderator/instructor to record the class for others to watch later as well as a graphing tool, breakout rooms for group work, and timer. The whiteboard supports the uploading of presentations for viewing on the whiteboard for class or meeting
- **Web 2.0:** This is essentially a leveraging of some of the more recent developments to support better interaction including social features. Many of these 2.0 web services provide community tools for sharing and commenting on resources, such as video.
- **Whiteboards:** Interactive whiteboards ("smartboards") allow instructors and trainees to write on the touch screen, so learning becomes interactive and engaging.
- **Voice-centred technology**, such as CD or MP3 recordings or Webcasts.
- **Video technology**, such as instructional videos, DVDs, and interactive videoconferencing.
- **Computers, laptops, tablets, mobile devices**.

E-learning is a new methodology based on the use of new web technologies. Like any teaching method, E-learning has both advantages and disadvantages, which must be known to improve the competency-based education and training in real teaching environments:

Advantages	Disadvantages
• The trainee/instructor is able to link the various resources in several varying formats. • It is a very efficient way of delivering courses online. • Due to its convenience and flexibility, the resources are available from anywhere and at any time. • Everyone from part-time trainees to those working full time - can take advantage of web-based learning.	• The face-to-face learning experience is missing, which may matter to some of the trainees. • Most of the online assessments are limited to questions that are only objective in nature. • There is also the problem of the extent of security of online learning programmes. • The authenticity of a particular trainee's work is also a problem as online just about anyone can do a

[11] http://www.thepodcasthost.com/podwhating/author/colinmcgray-2/

• Web-based learning promotes active and independent learning. • As trainees have access to the net 24x7, they can train themselves anytime and from anywhere. • It is a very convenient and flexible option; above all, trainees don't have to depend on anyone for anything. • Learners can train themselves on a day-to-day basis, but also on weekends or whenever they have free time. There is no hard and fast rule. • Through discussion boards and chats, trainees are able to interact with everyone online and also clear up any of their doubts. • The video instructions that are provided for audio and video learning can be rewound and seen and heard again and again if trainees do not happen to understand the topic first time around.	project rather than the actual learner itself. • The assessments that are computer-marked generally have a tendency of being only knowledge-based and not necessarily competency-based. • Computing illiteracy of trainees or low knowledge about computers tools available and reticence facing new technologies; • Trainees with low motivation or with bad study habits may fall behind; • Instructor may not always be available when trainees are studying or are in need of help; • Technical problems • It demands more time from the instructor, who has to manage all the activities and the trainee's requests or doubts.

Mentoring

Mentoring is a tool that organisations can use to nurture and grow the trainees. It can be an informal practice or a formal programme. Mentors demonstrate, explain and model. The mentor's job is to promote intentional learning, which includes capacity-building through methods such as instructing, coaching, providing experiences, modelling and advising. Successful mentoring means sharing responsibility for learning regardless of the facilities, the subject matter, the timing, and all other variables. Applying this approach to on-board training will yield a good result.

It should be kept in mind that the mentor is a helper, not a supervisor or evaluator, and a very special person, a model of professionalism.

Being a trainee mentor instructor can be daunting, especially with your first few trainees. They could be prone to mistakes or errors in judgment and benefit greatly from the guidance of an experienced instructor. As their mentor, the instructor can give them helpful feedback and guide them toward the best and most effective competency-based teaching methods. A mentor should possess the following essential qualities:

- A range of interpersonal skills to fit a variety of professional encounters and situations.
- Good working knowledge of a wide range of teaching methods, alternative modalities of learning, and styles of teaching and learning that affect trainee's achievement.
- Ability to use coaching processes that foster increased self-direction and self-responsibility of the trainee.
- Effective communication skills.

- Understanding the stages of instructor trainee development within the context of how adults learn.

Here are several mentoring tips and strategies to be followed by any instructor:

- Present demo lesson plans featuring a variety of teaching strategies. Discuss them afterward.
- Allow the trainee to develop and prepare original teaching plans.
- Provide oral and written feedback regularly.
- Plan effective learning assessment with your trainee.
- Provide feedback on their classroom presence, i.e. how they navigate the classroom, their style of expression, having a professional appearance, etc.
- Provide guidance in the use and care for the school's laboratory or vessel's supplies and materials.
- Implement collaborative teaching where the trainer takes turns instructing with the trainee.

Obviously, good interpersonal skills are crucial to an instructor's professional success. In addition to being a role model in the classroom, the instructor will have to learn the appropriate levels of professionalism expected of a trainer - whether in the classroom, at a staff meeting or in any other public setting. Assist the trainee in learning the appropriate norms for discussing with both their trainees and their colleagues when outside of the classroom. Emphasise having respect for others, honouring cultural diversity and maintaining professional behaviour. The instructor should strive to help integrate the trainee into the school's environment as a colleague and an equal.

Blended teaching and learning

The Blended approach to teaching and learning uses a combination of online and face-to-face teaching and learning modes and methods. A course (or module, programme or other form of teaching) may be mostly online with minimal face-to-face contact or mainly taught face-to-face with some content or interaction online. The balance between face-to-face teaching and online content depends on what the instructor involved decides.

It is used:

- To combine or mix modes of web-based technology (e.g. live virtual classroom, self-paced instruction, collaborative learning, streaming video, audio, and text) 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. videotape, CD-ROM, web-based training, film) 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.

Blended learning incorporates content, assessment and the interactions (exchanges, discussions etc.) between trainees and instructors and amongst trainees themselves. As in all teaching and learning experiences, the best combination of the above (online or face-to-face) maximises the benefits and capabilities of each mode. Some online courses have a lot of discussion forums or real-time chats; others have more videos of lectures or demonstrations. Assessment can take different forms, and even exams can be taken fully online.

Online content may include videos, slide shows, presentations, screencasts and so on. Forms of interaction may be synchronous (at the same time) or asynchronous (at different times). A variety of tools is available for all aspects of blended learning.

Blended teaching and learning as a competency-based method of instruction have their advantages and disadvantages, as follows:

Advantages	Disadvantages
• **Saves money.** The use of e-textbooks, which can also be accessed on computers, tablets and e-readers, may also help drive down costs. • Improves efficiency: o It allows instructors to use a combination of digital instruction and one-on-one face time to improve efficiency in the classroom. o Instructors can streamline their instruction to help all trainees reach their full potential. o When trainees are using technology to support their learning, instructors can use the additional class time to give struggling learners the individualised attention they need. • **Time Saving**. Blended learning can help boost instructor productivity: rather than making paper copies, stapling and distributing to trainees; assignments and handouts can be posted online for easy access. Trainees can review online materials for homework and research can take place at home, which will give more time for discussion in the class and personalised teaching time. • **Personalises learning**. Blended learning is able to personalise education in a way that a more traditional classroom setup simply cannot. Traditional teaching although differentiated does not allow trainees with varying	• Lack of a firm framework to encourage trainees to learn • A high level of self-discipline is required, learners with low motivation or bad study habits may fall behind. • Absence of a learning atmosphere in e-learning systems • Failure to obtain funds to purchase new technology leads to lack of adequate e-learning strategies, as well as training for instructors.

academic skill levels to take extra time or work ahead as they may need. Blended learning allows trainees to work at their own pace, making sure they fully understand new concepts before moving on.	

Seminar/workshop

A **workshop** is defined as an assembled group who share a common interest or problem. They meet together to improve their individual skills in a subject through intensive study, research, practice and discussion. Teaching workshops, labs, and tutorials allow instructors to enjoy the benefits of teaching small groups of 10 to 25 trainees. Small groups, as opposed to large classes, are more easily student-centred. Small groups can help trainees learn to collaborate and communicate, and the group process itself becomes a learning tool. Participating in classes can help trainees to learn:

- successful collaboration and effective task sharing techniques
- inter-personal skills
- listening skills
- verbal communication skills
- about the synergy that can result from group discussions - a group can often produce a higher quality solution to a problem than an individual is capable of alone.

Also, effective small group teaching presents several benefits:

- Clear learning goals
- Active participation
- An accepting, non-threatening group climate
- Cooperative rather than competitive process
- Equal distribution of leadership functions
- Enjoyable group experience
- Course content is covered
- Evaluation as an integral part of the learning process
- Students attend regularly
- Students come prepared

The workshops are organised to develop the psychomotor aspects of the trainee regarding, for example, practices of new innovations in IWT. Trainees are expected to do some practical work to produce instructional teaching and testing material. Sufficient time has to be given to the trainee in advance so that he/she can research the topic properly and prepare the presentation. In a seminar/workshop, trainees can discuss any subject related to inland waterways transport - for example, about IWT convention before its entry into force and how to make adaptions to the domestic situation, or show how to assemble the new IWT equipment/devices, or new teaching activities to enhance training outcomes.

When planning a workshop, the following steps should be followed:
Before the workshop, the instructor should:

1. **Define the objectives**. What is he/she trying to achieve? What is most important? What are the learning goals for the session? The answers to these questions will determine the instructor's choice of teaching methods, the sequence for the competency-based learning activities, and the appropriate evaluation strategy.

2. **Determine the teaching method**. Once the instructor has determined his/her learning objectives for the workshop, he/she should think about the most appropriate teaching method to help meet those goals. The final content and format of the workshop will be influenced by the subject matter, by the instructor's teaching goals, and by the trainees' past experiences with the topic.

3. **Be flexible.** Planning ahead is important, but it's also important to build in some backups for when things don't go according to plan.

During the workshop itself the instructor should:[12]
1. Create a relaxed atmosphere for learning. If this is his/her first class, the instructor introduces himself/herself and has the class get to know each other. Then the instructor opens himself/herself up to questions and suggestions.
2. Outline the objectives for the workshop. The instructor explains to the class what he/she hopes to accomplish in the available time; outlines what is expected of the trainees and the purpose behind all the tasks; provides a schedule, setting benchmarks that trainees can aim for; gets feedback on where the class stands and is prepared to make some changes to best meet the needs of the trainees.
3. Encourage active participation and allow for problem solving and/or skill acquisition.
The instructor involves the group in all phases of the workshop; invites questions, group discussion, and debate; encourages the trainees to learn from each other – if a problem is presented, allows the class to offer their solutions rather than giving them the answer.
4. Provide relevant and practical information. Although active participation and interaction are essential to a successful workshop, trainees must also feel that they have learned something. It is best when the instructor begins class with a mini-lecture, setting the tone for the activities, covering the required knowledge, and ensuring a common ground for all trainees.
5. Vary the activities and style. It is advisable that the instructor keep the workshop flowing at a pace that keeps trainees' attention, leaving room for the group to slow down or speed up.
6. Summarise the workshop and request feedback from the class. It is beneficial to have the instructor leave time at the end to restate the learning objectives and what he/she hoped to achieve; synthesises the main points and ties the activities in to concrete learning goals for the course; asks trainees to summarise what they have learned during the workshop and if they found the method helpful.

However, there are several advantages, and disadvantages in using this teaching method. Here they are:

Advantages	Disadvantages
• Trainees are usually very motivated • Practical application of learning or instruction to the real world and the world of work • Skill development including communication, team work and presentation	• Trainees attending may have a broad range of skills (computer and language) • May have difficulty getting a room if classroom space is in short supply • May be hard to fit everything that you want to cover into a single workshop

[12] Adapted from Steinert: http://www.ipssw2011.com/files/Workshop%20Tips.pdf

• Hands-on learning, problem-solving and development of creative solutions • Information about professional activities to be performed on board inland waterways vessels, with workshops providing a practical insight into each skill to be acquired • Development of an understanding about the IWT environment	• Handling large classes for hands-on practice may be difficult.

The **seminar method** is the most modern and advanced method of teaching. Seminars are simply a group of trainees coming together for the discussion and learning of specific techniques and topics. Usually there are several keynote speakers within each seminar, and these speakers are usually experts in their own fields, or topics. Several topic reviews are scheduled each day throughout the seminar, and attendees can usually make their choice of topics from among these scheduled events. Every one present is supposed to take active part in the following discussions. It familiarises the trainees with the selected topic more extensively. It allows them to interact with the practical problems that are faced during research work. It is an informal method of teaching.

The procedure for conducting a successful competency-based seminar is the following:

- ✓ A topic is allotted to the trainee from the syllabus as per his/her choice or interest. At least fifteen days are given for preparation of the topic. The date of the seminar is fixed on the same day of allotment.
- ✓ Necessary books and articles, lists of reference books are provided to the trainees as per their requirement from the library. Trainees go to the library and search the required material, data and prepare their own notes. They also use the internet facility.
- ✓ The collected information and data are checked and rearranged by the instructor. Now the setting is ready for the final seminar.
- ✓ The trainee delivers the seminar in the class. The use of maps, diagrams and charts, along with the blackboard, is allowed for explaining the topic. If a trainee wishes to use PowerPoint, this is also permitted.
- ✓ After presentation, the topic is open for discussion. Questions are asked by the trainees and they are answered by the seminar coordinator. If necessary, the instructor interferes and takes part in the discussion.
- ✓ The details of the topic and other related information that is not included in the seminar is further given by the instructor. On an average, twenty minutes are available for one trainee. The duration of time may change.

Field visit

This method allows trainees to make direct contact with the real-life experience defined as the main output of training and can be used to consolidate the knowledge, the skills and

to generate awareness. The field visit must be designed to allow the trainees to interact and participate in the different experiences and also to apprehend the environment of work-in-progress. This method also allows the implementation of new ideas and changes to trainees' perception about a specific field of expertise.

Advantages	Disadvantages
▪ Allows the trainees to observe and ask questions to the professionals involved; ▪ Consolidates the importance of the competency-based training; ▪ Generates a lot of involvement of the trainees.	▪ High cost and high difficulty in preparation of the field visit; ▪ Dependence on the host availability.

Recommended presentation and assessment techniques

Instructors are expected to demonstrate teaching activities which reflect knowledge of various methods of learning. For example the classroom should be equipped with teaching aids such as a computer, projector, presentation application software and videos, etc. It is better to ask trainees to compare and contrast the pros and cons of different teaching activities so that a full picture is established. Sharing individual practice and experiences with each other would be desirable.

Written or oral forms of feedback and comments on the simulated teaching may be used to evaluate this activity. Assessment should take account of the suitability of the various teaching arrangements, which will promote a cooperative effort between instructors and trainees.

3.2 Select the appropriate teaching techniques/aids

Subject matter details

The objective of this part is to provide trainees with the knowledge of the various teaching aids and the opportunity to have hands-on experiences. Using appropriate teaching aids is an integral part of a successful lesson. More importantly, new technology and teaching aids are effective ways to motivate trainees and increase the appeal of the classroom.

Trainees should be made to appreciate why different teaching aids are used. Among other factors, the diversity of learning styles means that the use of different teaching methods and aids can allow each learner to have an enhanced learning experience.

Activities 3.2.1---Demonstrate the use of various teaching aids (4 hours)

This activity allows trainees to practise using a range of teaching aids as listed below for the purpose of familiarisation. The right use of teaching aids is essential to successful lesson delivery.

Boards and flipcharts

The most commonly used aids are boards and flipcharts, so these are the first aids that the trainees should consider. Boards of various types are available to most instructors. The types include chalkboards, whiteboards, magnetic boards and flipcharts. The instructors should begin by introducing the trainees to the principles of board work by asking them to make a list of the advantages and the disadvantages of boards. This should be followed by a review of the different types of boards and flipcharts that are available.

The trainees should be asked to produce a checklist for the use of boards and flipcharts in the classroom. This should include most of the following:

- Ensure all of the learners can see the board clearly - check this yourself
- Remove any old work from the board before you start
- Keep any writing or diagrams simple and clear
- Make sure that any writing is large enough to read
- Items can be emphasised by using colour, underlining, using capital letters
- A little colour adds emphasis but too much becomes messy and confusing
- Do not use abbreviations or symbols if these can be avoided
- Do not write words vertically or at odd angles
- Use a template if a frequently drawn diagram has to be accurate
- Do not try and talk to the class while facing the board

SMART boards

SMART boards are a sophisticated replacement of the traditional overhead projector. The interactive board turns a typical classroom into a fun learning environment. It enriches classrooms in several ways by providing hands-on collaboration and creating the perfect learning setting.

There are several advantages of bringing in a SMART interactive whiteboard into a classroom setting. Here are the top 8 advantages of this state-of-the-art technology in the education industry.

1. Provide flexibility	• allow many different forms of media – including photos, illustrations, maps, graphs, games, and video to be displayed. • enrich the classroom experience and help to expand the nature of content that can be used in learning. • make learning more dynamic owing to the different forms of presenting information.
2. Enhanced teaching/learning experience	• provide new ways for instructors to teach, and for the trainee to learn. • support a wide variety of learning styles. For instance, visual learners can watch as their instructors use the whiteboards to project visual elements, whereas audio learners can listen and have discussions. • Boards come with touchscreen capabilities that allow tactile learners to touch and interact with the board.
3. Interact and share	• The interactive nature of SMART boards offers learners an opportunity to share and participate in the instructional process. • Every trainee has an opportunity to participate or contribute to the presentation and/or discussion via notebooks and tablets. In addition, the boards provide for rapid assessment whereby learners can receive immediate feedback.

	• Instructors and trainees are able to identify individual strengths and weaknesses in various subject areas and isolate areas/topics that need more focus or review.
4. Low-Maintenance	• are neat and easy to use. There are no hassles cleaning or maintaining whiteboards. The data on the screen can be modified using a specialised highlighting tool or pen. There is no need for using unhygienic chalk or marker pens.
5. Access to online information & tools	• allow learners to easily access a rich database of online resources. – Instructors can use the wide variety of online information sources such as knowledge databases, online video and news items to reinforce their lessons. • Trainees can quickly access the wide range of powerful tools and resources to conduct research and supplement their usual study material.
6. Environmentally friendly	• offer instructors an entirely different way of presenting information to learners, which eliminates the need for writing, printing or photocopying. • contribute to eliminate waste and pollution, from over-utilisation of paper and ink.
7. Technology Integration	• allow for integration of various technologies in order to improve the learning experience. For instance, it is possible to attach tools such as microscopes, document cameras, cameras or video cameras to a whiteboard to aid in instruction. It is also possible to integrate the interactive learning tools with a wide range of software applications.
8. Communication	• allow collaboration and distance learning environments. • increase trainee-to-trainee collaboration and overall participation in the lesson. • simplify the learning process for learners. Trainees will find it easy to engage with lessons and gain a better understanding of the overall lesson. It is an ideal tool for any classroom setting.

Electronic slides

Microsoft PowerPoint is a powerful tool for creating effective presentation programmes. With PowerPoint, the instructor can create slides, notes or printed transparencies. It provides the instructor a versatile tool for enhancing visual presentations in conjunction with projection systems, integrated whiteboards or other facilities.

With PowerPoint, instructors can use, text, photos, illustrations, drawings, tables, graphs and movies to effectively walk an audience through a presentation. PowerPoint is used for both educational and business purposes because it allows for easy and creative presentations. However, as with any form of presentation, using a PowerPoint presentation has both advantages and disadvantages.

Advantages	Disadvantages
• can be created easily, one does not need to be a design expert to prepare an amusing presentation. • to progress through a slide show, the presenter only needs to click a button; this allows the presenter to maintain eye contact with the participants and use his/her hands for emphasis. • features a pleasing appearance and interesting graphics, which keeps the participants interested. • can be projected onto a large screen for use in a large auditorium or lecture hall. • you do not have to be a great orator or prepare a speech; as you prepare the presentation, you educate yourself on the topic simultaneously. • the content can be presented in the form of bullet points. Thus, images, pictures and videos become an integral part of presentation to display creativity and invite attention.	• often trainees end up preparing presentations that are either filled with images or are just plain text. • the system requirements involved: a computer, projector, screen, electricity; dim the lights in the room to allow for proper viewing. • the risk of technical difficulties: the success of the presentation depends entirely on the proper functioning of technology. • Presenters use it as a dodge and congest the slides with their ideas, so that they have to speak less or not at all. • If the synchronisation of content and imagery is not balanced, it might turn out to be a clumsy creation.

One important point that the instructor should make the trainee aware of when devising a presentation is **understanding his/her target audience**. It helps a great deal in brainstorming, creating and presenting too.

PowerPoint presentations combined with videos can be successfully used to transfer the knowledge for almost every competence at both the operational and the managerial level, for example,

- regarding the specific rules and regulations, any boatmaster sailing onboard inland waterways vessels must ensure compliance with the requirements for

environmental protection with regard to e.g. fuel efficiency, bunkering, emission levels, shallow-water effects, connection to shore power and waste management
- materials available on board such as winches, bollards, ropes and wires considering relevant work safety measures, including the use of personal protective and rescue equipment
- communications with the wheelhouse using VHF and intercom communication systems and hand signals
- the characteristics of main European inland waterways, ports and terminals
- connection and disconnection of push/barge combinations using the required equipment and materials
- planning a journey and conducting navigation in difficult situations
- traffic regulations applicable to navigation on inland waterways to avoid damage (e.g. collision) and appropriate actions to take in the event of an emergency situation (beaching, collision, grounding, etc.);

Handouts

The purpose and use of handout material should be reviewed. Trainees should establish why handout material is used in their own teaching. There should be some theoretical input on the design of handout material. Many lectures/classes involve some types of handout material and there are several different styles. Some examples are included for reference and for discussion.

Handout: Example 1 (Extract)

CESNI- European Code for Inland Waterways
REDUCED VISIBILITY – NAVIGATION BY RADAR
General rules for navigation in reduced visibility; use of radar

Vessels underway shall	proceed at a safe speed as required by the reduced visibility and the presence and movements of other vessels and local circumstances. They shall use the radiotelephone to give other vessels the necessary information for safety of navigation.
Small vessels underway in reduced visibility shall	use ship-ship channel or the channel prescribed by the competent authorities.
When stopping because of reduced visibility, vessels shall	keep clear of the fairway as far as possible.
Vessels proceeding on their course shall, when meeting another vessel, shall	keep to the right as far as is necessary to allow passing port to port.
Towed convoys shall	proceed immediately to the nearest safe berthing or anchoring areas if communication with visual signs between the towed vessel and the motorised vessel is not possible.
For towed convoys proceeding downstream	navigation by radar is prohibited except for reaching the nearest safe berthing or anchoring areas.

Video Projectors

The trainee should demonstrate overlay and reveal techniques. Trainees need to compare the advantage and disadvantage of video-projectors. Practical work in small groups with trainees making presentations on a video projector is necessary.

Advantages:	
Easier Note Taking	• enable instructors to create bulleted PowerPoint presentations or other highly organised notes for the class. • trainees can take better notes with the ability to discern which information the instructor displays is most useful to them. Additionally, trainees can ask the instructor to repeat a slide if they missed information, or even ask the instructor to e-mail the presentation for further review.
Greater Teaching Versatility	• release instructors from being bound to chalk and dry-erase boards to present information to their learners. • instructors can now use films, slides, and images to teach trainees about a variety of subjects. • the Internet is more useful since projectors can display web content to an entire class, rather than each trainee accessing information on individual computers, if they are available.
Better Use of Class Time	• require a simple click of a button or mouse, thus, freeing valuable class time. • instructors can more easily prepare all notes prior to class for easy presentation and spend less time repeating or rewriting information that is now accessible with a simple click.
Better Trainee Presentations	• prepare class projects that they can now create in PowerPoint or other electronic media. • presentation creation will go faster with each participant using their own computer to create their section of the presentation. • presentations on a projector reduce the need to make copies of materials to pass out to classmates as they can now be displayed to the entire class to view at once.

Disadvantages / Limitations:	
Dark room often required	Front projectors look their best in a darkened room, just like a movie theatre. When you view in a dark room, you get maximum contrast and sparkle in the picture. If you are trying to create the "movie theatre" experience, this is not really a disadvantage since you want a dark room anyway.
Maintenance required	All projectors operate on lamps that need to be replaced periodically. The frequency of lamp replacement depends on the

	model and on your usage, but many projector users replace lamps every two to three years. Most projectors have air filters that need to be cleaned or replaced every couple of months. Failure to keep filters clean can reduce lamp life and increase the chances of dust getting into the unit and creating fuzzy spots on the projected image.
Installation can be more involved	If you plan to ceiling mount it, you may need to hire some help to run power and signal cables through the walls. Furthermore, if you are using a projection screen as well, then hooking a fixed screen to the wall, or installing an electric retractable screen on or in the ceiling adds further steps to the installation process. If the projector does not have physical lens shift capability, the job of ceiling mounting to fit a screen must be done with particular care.

Ship Models

Ship models can be helpful in allowing trainees to gain a better picture of a process. Some models such as a ship model and buoyant model can be very elaborate. A simple model of a derrick can be made to illustrate the operation. It is important that the model is neither too simple nor too complex.

Manned scale-model ships

Manned models are fully scaled model ships used in the professional training and development of mariners in the art of handling a ship. The models are in fact a form of simulation, and have the same power to weight ratio as its full-sized counterpart.

Manned model training complements bridge simulator training but the emphasis on the models is on the final phase of berthing a ship rather than bridge teamwork training, which is best carried out on a computerised bridge simulator.

Scale manned models are model ships that can carry and be handled by at least one person on an open expanse of water. They must behave just like real ships, giving the boatmaster the same sensations. Physical conditions such as wind, currents, waves, water depths, channels and berths must be reproduced realistically. Manned models are used for research (e.g. ship behaviour), engineering (e.g. port layout) and for training in ship-handling (e.g. pilots, boatmasters and boatmen). They are usually at 1:25 scale.

The aim of training on manned models is to enable inland-waterway personnel to acquire or to develop manoeuvring skills through a better understanding of a ship’s behaviour as it sails in restricted water conditions at manoeuvring speed. Manned models are considered by both maritime and river pilots as the next best thing to a full-scale prototype for understanding a ship's behaviour. Trainees participating in courses using scale manned models will form and improve their skills and competencies in berthing, getting underway and overtaking other ships in canals, under a wide range of conditions, involving cross-currents, wind, rudder failure, etc. Instructors have to explain and demonstrate to trainees that scale models are complementary to computer simulators. While manoeuvres with currents, waves, tugs, anchors, canal effects, etc. are reproduced more accurately on scale models, numerical simulators are more realistic when it comes to the bridge environment. Moreover, boatmasters, boatmen and pilots will develop and acquire new skills and a better understanding of a ship's behaviour in restricted water conditions at manoeuvring speed.

The trainee must be clearly informed that training on manned models is still the best way to acquire some reflexes which, when the time comes, will make all the difference between being good and being the best. Training on the scale models provides experience that could

never be gained on real ships for the simple reason that neither ship-owners nor local authorities would allow such risks to be taken.
Here are some advantages of using scale models as teaching aids in competency-based education and instruction:

Advantages:	
Nature is at work on scale models	The unforeseeable character of squalls, shallows, currents and waves calls for an immediate, appropriate reaction, without any repeat or automatic response. And when things go wrong on the scale model, the pilot really feels his ship run aground or collide with another ship, river bank or berth.
Hydrodynamic effects are correctly reproduced	This gives a better simulation of hydrodynamic effects such as interactions between ships (for example in a canal), interactions between the ship and berth, little under-keel clearance and the use of anchor dredging or tugs in various operating situations.
The effect of wind on a manned model is better understood	Wind is a factor in the everyday life of pilots, boatmasters and boatmen sailing on inland waterways vessels throughout the world. The design of manned model rivers, canals and locks is such that the wind element will vary in different parts of them. This allows a course to be structured in such a manner as to introduce wind as and when required. Extreme wind conditions are encountered in the real world. If they occur at a manned model centre, with care they can be used in various scenarios to demonstrate how well control can be maintained.
Ship models behave exactly like real ships, only much faster	Reality will be much slower than the model, thus leaving quite a lot more time to react. Manned models sharpen the ship-handlers' natural senses of perception and anticipation and enable the ship's behaviour as a whole to be appreciated. These skills are paramount when manoeuvring a full-size vessel.
Scale models allow the skipper to make mistakes.	Scale models allow experimentation on ship behaviour to explore unknown fields beyond the limits of safety. Periodic training on scale models will maintain ship-handling skills at the highest level and periodic evaluations will show it.
More manoeuvres can be carried out	Because of the scaling factors of the models, 5 times as many manoeuvres can be carried out on a model as opposed to a bridge simulator, or the real ship.

From the above it follows that manned models may reproduce the following much better than electronic simulators:

1. Realism of emergency situations. Training on manned models assures the psychological aspect of training when comparing with electronic simulator by better feeling the effects of groundings, ramming and collisions. Environmental effects such as wind and current are also much more visible from the wheelhouse of training models.

2. Close proximity realism. There is complete realism when two models are meeting or overtaking in close proximity, when the models are in the final stage of berthing or when negotiating a very narrow passage. All physical phenomena in those situations are reproduced properly, and the hull is reacting naturally – something that cannot be done even in the best electronic simulators controlled by mathematical equations.

3. Anchoring and other special manoeuvres. Manned models are specifically advantageous in performing some traditional manoeuvres of this type such as the use of dredging anchor, anchoring in current, wind and in difficult situations. Such manoeuvres are not realistic in electronic simulators because of modelling difficulties.

4. Manoeuvres in current and tide. As the Training Centre is equipped with current generators and restricted water areas simulating river estuaries, manned models are particularly suitable to exercise manoeuvres in such areas. Current generated which is non - uniform, vertical and pulsating provides a very realistic environment allowing for rapid comprehension of the influence of changing hydrodynamic forces on the hull, the influence of momentum when manoeuvring, etc.

5. Understanding physical phenomena. When performing specific manoeuvring exercises and something goes wrong, the trainee can immediately see that the result is wrong and understand why this is so. Further explanations by staff may help to understand the physical phenomena and to perform the exercise correctly next time.
Electronic simulators cannot meet all training needs. Manned models are particularly suitable for meeting a certain range of training requirements, offering an excellent transition stage between training on electronic simulators and training onboard real ships. They are not considered an alternative to electronic bridge simulators, but as a supplementary method of training, which is geared to meet different requirements.

Onboard training
Today's ship owners, managers and operators are under constant pressure to demonstrate that the vessels they operate are safe - both in the material sense and in the ability of the crew to operate them safely. Training (practical exercises) and practice on board cargo vessels are valuable for forming all competences at both the operational and the managerial level, for example:

- practicing berthing and departure manoeuvre;
- use of VHF and intercom communication systems and hand signals;
- convoy set-up and disentanglement manoeuvre and anchor manoeuvres.
- characteristics of a given inland waterways including locks and lifts to respecting traffic regulations, avoid damage, environment pollution, etc.
- navigate the vessel when in an unavoidable collision situation in such a way that damage to cargo and persons will be as limited as possible;
- take appropriate actions after a collision and assess the damage and control the situation.
- cleaning tanks, safety, loading procedure
- preparations, to loading/unloading, keeping watch and administration
- use of deck equipment, anchor and winches

Simulator

All parties involved should ensure that the aims and objectives of simulator-based training are defined within an overall training programme, and that specific training objectives and tasks are selected so as to relate as closely as possible to shipboard tasks and practices.

In conducting simulator-based training, trainers must ensure that:

- trainees are adequately briefed beforehand on the exercise objectives and tasks and are given sufficient planning time before the exercise starts
- trainees have adequate familiarisation time on the simulator and with its equipment before any training or assessment exercise commences
- guidance given and exercise stimuli are appropriate to the selected exercise objectives and tasks and to the trainee's level of experience
- exercises are effectively monitored, supported by audio and visual observation of trainee activity and pre-and post-exercise evaluation reports
- trainees are effectively debriefed to ensure that training objectives have been met and that operational skills demonstrated are of an approved standard
- the use of peer assessment during debriefing is encouraged; and
- simulator exercises are designed and tested so as to ensure their suitability for the specified training objectives.

When simulators are used to examine/assess the ability of candidates to demonstrate levels of competency, examiners/assessors must ensure that:

- performance criteria are identified clearly and explicitly and are valid and available to the candidate
- examination/assessment criteria are clearly established and explicit to ensure the reliability and uniformity of the examination/assessment and to optimise objective measurement and evaluation, so that subjective judgments are kept to a minimum
- candidates are briefed clearly on the tasks and/or skills to be examined/assessed and on the tasks and performance criteria by which their competency will be determined
- examination/assessment of performance takes into account normal operating procedures and any behavioural interaction with other candidates on the simulator or simulator staff
- scoring or grading methods to examine/assess performance are used with caution until they have been validated

The prime criterion is that a candidate demonstrates the ability to carry out a task safely and effectively to the satisfaction of the examiner/assessor.

Simulated systems can be used to train: vessel handling and manoeuvring, navigation, radio communications and main and auxiliary machinery operation.
In inland navigation, using so-called **Full Mission Ship-Handling Simulators** is recommended. Their performance requirements must at least meet those for inland waterway vessels. Compared to simulators designed for limited tasks (e.g., radar operating), Full Mission Ship-Handling Simulators are complex both in terms of the equipment fitted and in the operations to be performed. This implies greater responsibility on the part of the instructor, who must be prepared to intervene in the design and conduct of training and assessment exercises when using these simulators.

Audio and video

Suitable audio-visual material should be provided for the trainees to review. A list of possible commercial videos should be provided by the instructor. Trainers should decide which key points are relevant and make up some suitable questions for trainees to answer after viewing the material. Training videos, if used in an interactive way, can stimulate learning, increase enjoyment and enhance the message. When using a training video, the instructor should have a clear purpose in mind and understand why it is being shown and how it will contribute to the overall objectives of the programme or activity.

There are a lot of videos to be used by instructors in competency-based training on a subject matter. Below we present some of them:

- Safe Line Handling Practices for the Inland Waterways https://www.youtube.com/watch?v=ldUFS51f60o
- Inland Navigation Europe - https://www.youtube.com/watch?v=UK-4F8DxAz0
- Skipper inland Navigation (1-4) - https://www.youtube.com/watch?v=72aGQK3RQGQ
- Inland Navigation Jobs - https://www.youtube.com/watch?v=Ha3xnhXoJKs
- Passing moored ship in a canal with manned ship models at Port Revel Ship-handling Training Centre - https://www.youtube.com/watch?v=9jwb0-r0haw
- Failed Ship-to-Ship underway manoeuvre - Port Revel Ship-handling - https://www.youtube.com/watch?v=YvyNMIEZbG4

E-learning platforms

Information technology has become cheaper in recent years, and various presentation packages are available. The trainee instructor needs to assess how useful an individual package will be for the trainees and whether it represents an effective use of the trainees' time. To do this, the trainee instructor must try and use the package in the way in which a trainee would use it.

An e-learning platform is an integrated set of interactive online services that provide instructors, learners, and others involved in education and training with information, tools and resources to support and enhance education and training delivery and management.

The functionality of e-learning platforms typically includes access to learning content and tests, communication and collaboration tools for trainees, and course management and assessment facilities for instructors.

Numerous e-learning platforms are available today. Some of today's most popular platforms are the commercial systems Blackboard Collaborate, Clix, and Desire2Learn, and the open-source platforms ILIAS, Moodle, OLAT, etc. Moodle is the most widely used learning platform in the world. There are now over 83,000 registered Moodle installations serving 120 languages, and there are 100 million users of this learning management system across the globe. In education and training, a customised Moodle VLE (virtual learning environment) has a number of advantages:

1. It saves instructors time in creating and assessing class work
2. It reduces costs as there are no licensing fees
3. It facilitates trainees, instructor and trainer's engagement by allowing access to learning resources 24 hours a day, and both asynchronous and real-time communication, depending on permission levels.

Here are a few things any instructor needs from a quality E-Learning Platform:

- Focuses on content that improves performance on the job
- Breaks down complex courses into more comprehensible parts
- Equips learners to discover content objectives on their own
- Understands that trainees can add to and expand training content
- Displays content in ways that increase understanding and effectiveness

Massive Open Online Courses (MOOC)

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 among trainees, professors, and teaching assistants (TAs). Subjects like lifeboat releasing operations, oil-water separator operations, etc. can be made into MOOC for trainees to learn.

Many MOOCs use video lectures, employing the old form of teaching (lecturing) using a new technology. Because of massive enrolments, MOOCs require instructional design that facilitates large-scale feedback and interaction. The two basic approaches are:

- Peer-review and group collaboration
- Automated feedback through objective, online assessments, e.g. quizzes and exams

Advantages
• MOOCs offer a large number of learners the opportunity to study high-quality courses online with prestigious universities and training centres, often at no cost. • They are ideal for independent study and users can select courses from any institution offering them. • MOOCs do not always lead to formal qualifications. There are no entry requirements. • Video-based, they offer interaction either through peer review and group collaboration or automated feedback through objective, online assessments (including quizzes and exams)

Gamification

Gamification is a new concept as a maritime, aviation and inland waterways training technique and educational tool. In general, it is any game-like program with a primary intent other than simple entertainment. For our purposes, the primary intent is training or education.

Instructors can think of gamification as the combination of a simulator (e.g. bridge simulator) with a reward system. The intent is to increase a trainee's motivation in learning. Studies have shown that gamification:

- improves participation rates
- improves teamwork
- increases time on task
- deepens engagement
- causes trainees to return to training more often
- improves training completion rates

One example is **ShipSim** – made by VSTEP in the Netherlands. This game can be used by instructors in IWT education and training for learning and training in seamanship and

navigation and as a club activity just to teach boatmen the basics on ship-handling and proper orders to the helm.

According to the ShipSim website (http://www.shipsim.com), ShipSim is a "… game that pushes the boundaries of simulation gaming … Featuring stunning visuals, accurate vessel behaviour, famous locations and ports all over the world and missions based on actual events".

There are numerous benefits. They include increased motivation, increased engagement, and the teaching of complex content that is difficult to teach otherwise. The adoption of such games is less wide-spread than typical eLearning. Trainees are motivated by the desire to earn a credential, pass an exam, or get a job. Most are also motivated by the desire to perform their work safely and efficiently.

Gamification also has other interesting educational attributes. For example, it can be used to teach complex, dynamic concepts by engaging groups of trainees in the learning experience. Teamwork and team dynamics can be experienced by a group of trainees with a game that requires the team to achieve a goal together. This game emulates the teamwork needed in a work environment. This allows members to experience personalities and real team dynamics in person. In addition, the game's goal encourages actual effort.

Gamification also requires higher-order thinking skills such as risk/reward weighting and thinking through problems as a whole and in detail (considering each sub-goal).

Tests and Quizzes

Building a quiz supported by electronic devices gives the instructor different advantages. It offers the possibility of building a library of questions and using these questions multiple times, which saves time. In addition, it gives quick insight into the trainees' results and the strengths and weaknesses of the class.

For the trainee, it provides the opportunity for immediate feedback and insight into what needs extra attention. The feedback given should offer information on how to get extra information about the weaker subjects.

Socrative is a free online tool to enlarge the engagement in the classroom. It is a tool used in synchronous learning. With the tool, the instructor is able to take quizzes with the trainees and evaluate the outcomes in real time or use the reports to get inside trainees and determine the best approach for that lesson. More information can be obtained on: https://www.socrative.com/.

Nearly every learning environment also offers the option to create tests. The instructor can give trainees the possibility of testing themselves throughout the duration of the course, or to take tests at fixed moments.

Webinar

A webinar is an online seminar. Trainees can follow the lesson from different locations. The learning takes place at the same time. Nevertheless, it is also possible to record the webinar and make it available for trainees at a later moment. Most software programs for webinars have features to enrich the webinar - with a poll, a presentation or chat function, for example.

Webinars are very popular due to the fact they are inexpensive and easy to produce and can attract a large number of participants. The main advantage is that no one has to travel to get to a webinar or make any special arrangements or preparations. However, besides its advantages, there can be unexpected disadvantages and problems with running or viewing a webinar.

Here are several advantages and disadvantages of webinars, including:

Advantages	Disadvantages
• Webinars are online, so are easy and convenient to both instructors and participants, as no one has to travel to get to the meeting. • No type of special equipment is needed, the presenter/instructor just broadcasts with a webcam to the participants. Can be set up with very little notice. • Less cost because it is based on the number of trainees who sign up. • Any invitations and registration forms are simple for participants to fill-in online. No need to use the mail so these are less likely to be late or non-existent. • It is possible for any number of trainees to attend since it is online. • It can be recorded so that other people can view even if they can't attend the webinar.	• Internet speed must be adequate to allow participants to view the presentation without distortion or lag time. • Audio may be limited to the instructor/lecturer doing a voiceover and participants can't interact directly. • If audio is allowed, participants or presenters may have to pay for phone charges. • No communication is possible through body language if no video feed is available. • A webinar may not work with all kinds of Internet browsers. • May not work on mobile devices such as tablets, smart phones, etc. which are very popular and used widely. • Other types of technical problems could also occur, i.e. firewalls, slow Internet speeds, system configurations incompatible, etc.

To sum up, a webinar offers great opportunities for both trainees and instructors/lecturers, but if somebody intends to watch one, they should be aware of the possible pitfalls along with the advantages of this type of online training and plan accordingly.

Digital Portfolio / Logbook

In a portfolio, evidence of acquired competencies is collected. A trainee can upload documents to prove certain skills. The portfolio follows a standard for a competence. All of the evidence gathered provides insight into the trainee's progress in the required competence. The portfolio is commonly used in vocational education. As with any other tool in education, the creation and use of Digital Portfolios has its advantages and disadvantages:

Advantages	Disadvantages
• Are portable and can be accessible from multiple locations and by many participants simultaneously; • Encourage new, creative expressions of trainees' ideas and accomplishments; • Non-linear formats and the integration of various media types allow trainees to creatively express their professional knowledge and skills; • Are one of the best ways for trainees to communicate their knowledge and increase their IT skills and confidence; • Offer connections to wider educational communities through electronic communications.	• The creation of digital portfolios requires advanced knowledge and skills and sometimes expensive, high-tech equipment; • Require trainees to know or learn how to use computers, cameras, scanners, photo and illustrating software, and other tools; • Trainees may need instructor support in building a portfolio template, determining what to include in it, and deciding how to describe it; • Trainees may be disappointed when they do not get feedback from readers • Some trainees may spend too much time on fashioning the "look "of their portfolio than highlighting their competency-based learning. • Both trainees and instructors must be aware of the possibility of plagiarism

The learning platform **Moodle** has a new feature: the Competency framework and Learning plan. Moodle is an open source learning platform (https://moodle.org/). It is designed to provide educators, administrators and learners with an integrated system to create personal learning environments. Schools and institutes can download the software to a server to create their own learning environments.

By means of this platform, the instructor can design different modules with the use of activities like assignment, quiz, lesson, glossary or workshop.

With the features "Competency Framework" and the "Learning Plan", it is possible to create a personal learning plan for trainees. As the name indicates, the Competency Framework gives the instructors the opportunity to build a framework around a competency. In this case, the competency tables for IWT of Platina can be used. Different modules and assignments can be linked to the competence, so a trainee can build a portfolio based on the Personal Learning Plan created for the personal goals of the learner.

Recommended demonstration of the use of teaching aids

It is recommended that instructors demonstrate the use of various teaching aids. It is wonderful if instructors can operate or try out teaching aids personally from the very beginning. If trainees are asked to discuss and share the experiences in using some of the teaching aids, this can facilitate and deepen their understanding of the various teaching aids. Comparing the advantages and disadvantages of different teaching aids is a good approach.

It is desirable that trainees be evaluated in their selection of different teaching aids as required; their selection is supposed to cater to the specific class needs.

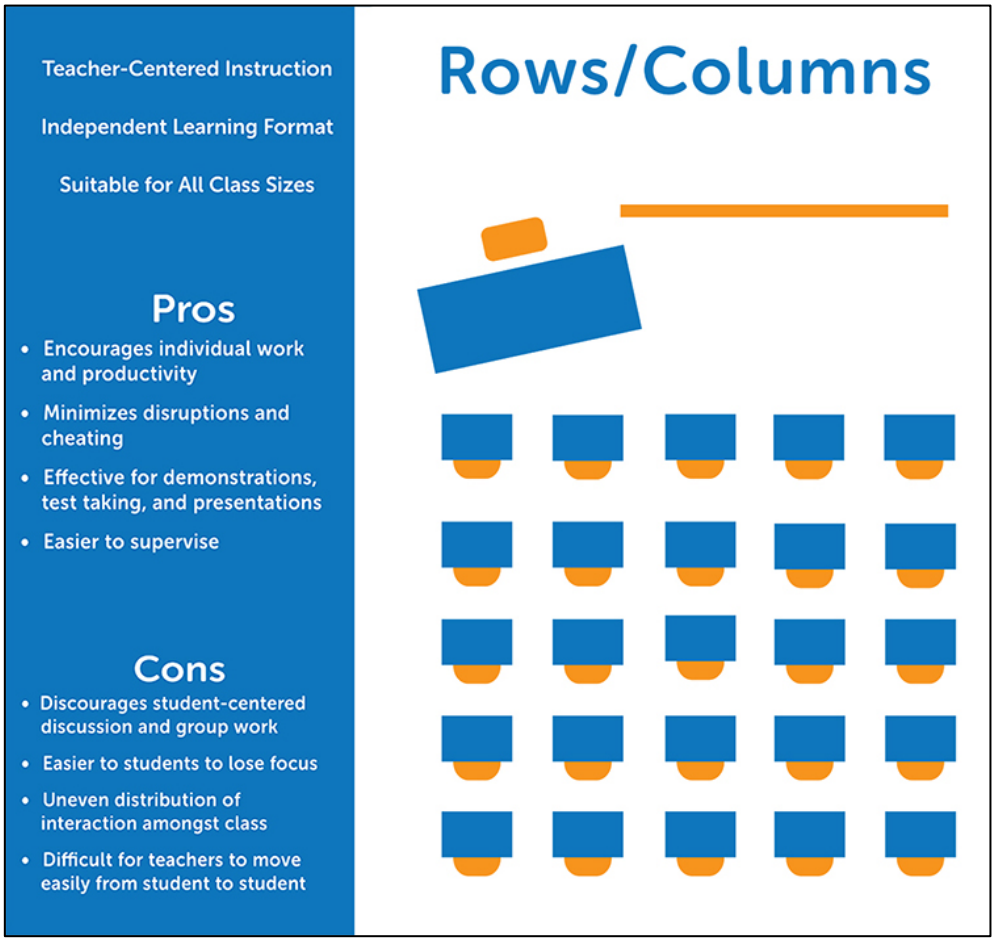
To summarise one very important aspect, the following should be mentioned: the instructor should train the learner in such a way that the trainee understands that various teaching methods and aids can be used together during training or instruction, for example:

- **lectures supported by PowerPoint presentations, photos, videos followed by demonstration and practical activity on board IWT vessels** are suitable in forming all competences at both the operational and the managerial level - for example, presenting European inland waterways including locks and lifts according to navigation agreements, charts/maps, Notices to Skippers/Mariners and other publications;
- **lectures and demonstrations supported by e-learning**: boatmaster
    - monitors main engines and auxiliary machinery and equipment,
    - organises safe use and application, maintenance and repair of the craft's electro-technical devices,
    - describes the electrical panel with fuses and relays
    - learns how to coordinate the safe maintenance activity on board of the ship, etc.;
- lectures and demonstrations supported by e-learning materials, textbooks and videos:
    - The boatman learns how to perform diagnosis and repair of stationary and moving parts of an engine, electrical machines and devices, propellers and turbines
    - Practicing radio communication with real VHF-devices in a training room/in a simulator followed by E-learning module for training examination questions and for preparing the VHF-device as well as for training communication phrases;
- For the practical aspects of skills, **simulations and gamification** offer the opportunity to present scenarios to the trainee that could never be replicated in hands-on training. Therefore, **blending eLearning, simulations and hands-on training** together provides the best skill training outcomes.

Classroom setup[13]

Classroom seating arrangements are as important as the syllabus. They can have an important influence on communication in the classroom. When the classroom setup is in harmony with trainer's teaching style, the students, and the space and furniture you have to work with, the benefits can be endless. But, when it's not, it can be detrimental. Most common configurations are the ones shown in the following diagrams.

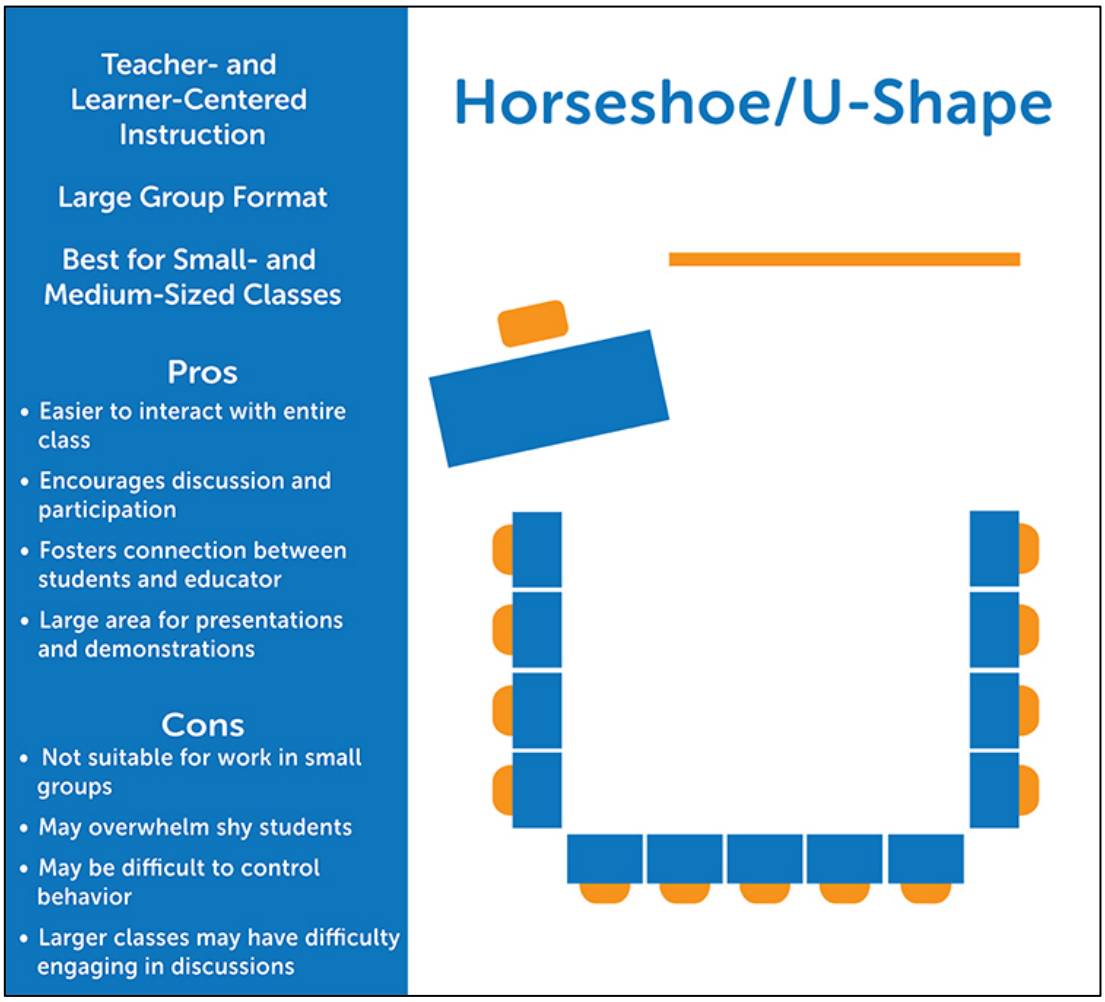
(1)Rows/ Columns



The rows configuration (also known as the columns configuration) is the most common classroom arrangement. This type of setup complements class structures that revolve around teacher-based instruction and presentations. Trainees are more focused on coursework and independent assignments. They are also less likely and/or able to cheat with this layout. Though this seating arrangement can be used with any class size, large classes may often see uneven levels of interaction, since trainees in the front row will participate more while those in the back may lose focus.

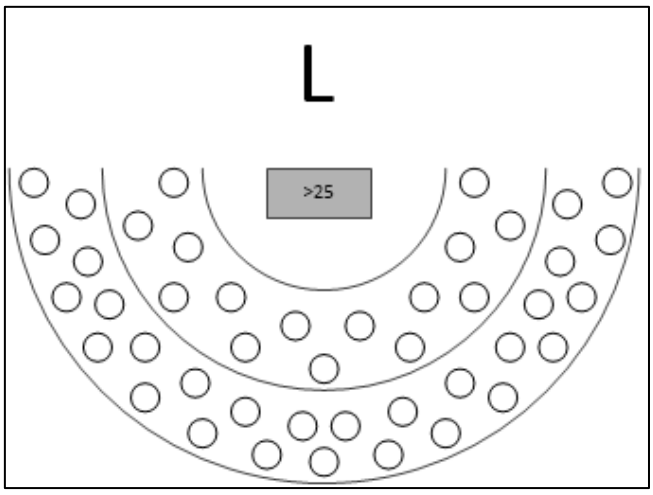
[13] https://www.displays2go.com/Article/Effective-Classroom-Seating-Arrangements-32

(2)Horse-shoe/ U-shaped



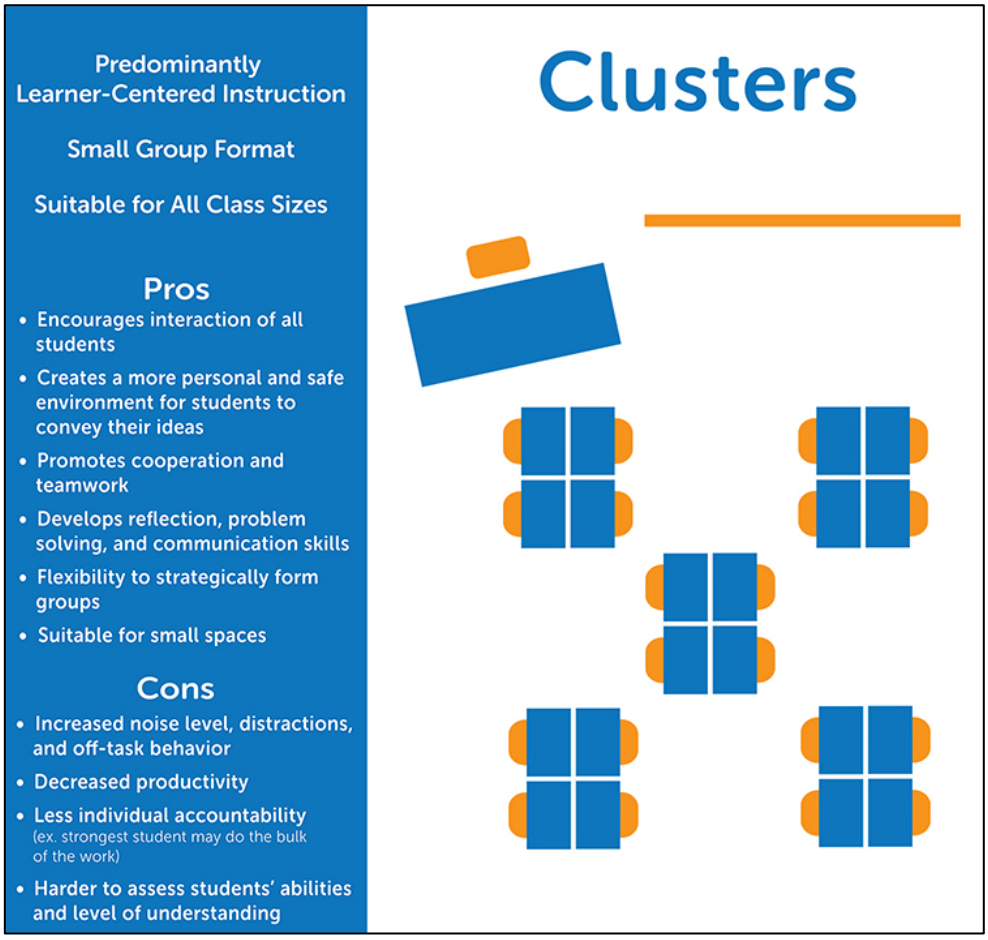
This model supports both student-to-student interaction and teacher-to-student interaction. The class interacts in a large group format, though instructors have ample opportunity to work with trainees one-on-one. Courses that emphasise discussions and presentations typically function well with this configuration.

(3)Lecture Theatre



Advantages	Disadvantages
Effective for demonstrations, test-taking and presentations	Distraction of individual trainees
Minimises disruptions	Weak control of the whole class
Less interaction	

(4) Clusters



Clustering the desks into small groups promotes student-to-student interaction. Trainees develop skills such as communication, problem-solving, collaboration, and more in this arrangement. These clusters offer safe and comfortable environments for trainees to share ideas. This comfort, however, also lends itself to off-task behaviour and a large increase in noise level and distractions.

References:

http://oer.educ.cam.ac.uk/wiki/Types_Of_Question
https://youtu.be/ImfU12epYcI
https://www.imlpbooks.com/books/RS
http://oxforddictionaries.com/definition/english/e-learning
http://www.jiscdigitalmedia.ac.uk/guide/introduction-to-elearning
http://searchcio-midmarket.techtarget.com/definition/distance-learning

https://www.blackboard.com/online-collaborative-learning/blackboard-collaborate-features.html
http://www.thepodcasthost.com/podwhating/author/colinmcgray-2/
http://www.ipssw2011.com/files/Workshop%20Tips.pdf
Safe Line Handling Practices for the Inland Waterways https://www.youtube.com/watch?v=ldUFS51f60o
Inland Navigation Europe - https://www.youtube.com/watch?v=UK-4F8DxAz0
Skipper inland Navigation (1-4) - https://www.youtube.com/watch?v=72aGQK3RQGQ
Inland Navigation Jobs - https://www.youtube.com/watch?v=Ha3xnhXoJKs
Passing moored ship in a canal with manned ship models at Port Revel Ship-handling Training Centre - https://www.youtube.com/watch?v=9jwb0-r0haw
Failed Ship-to-Ship underway manoeuvre - Port Revel Ship-handling - https://www.youtube.com/watch?v=YvyNMIEZbG4
https://www.thecompleteuniversityguide.co.uk/distance-learning/moocs-(massive-open-online-courses)/
http://www.shipsim.com
https://www.socrative.com/
https://moodle.org/
Train-the-Trainer Course for Inland Navigation Simulator Training, p.6
Standard for certification of maritime simulator systems (DNV 2011)

Module 4 Producing a competency-based lesson plan

In the past, traditional curriculum was organised around knowledge and objectives tend to emphasise the instructional process. Competency-based education takes the opposite position: outcomes guide all curriculum decisions. The outcomes in our case are the Competency Tables from CESNI competencies.

4.1 Lesson Plans (Generic elements)

Careful planning of a lesson will not guarantee success, but lack of planning usually guarantees failure. Every lesson should have three main sections: a beginning, a middle and an ending.

Beginning

- Personal introduction
- Review of previous lesson if there was one
- A rough evaluation of why the topic is studied
- An overview of the lesson
- An explanation of why the topic is studied
- A description of how the lesson will be conducted
- A statement of the end product of the lesson
- Explanation on how evaluation if any will be conducted

Middle

- Class details
- Subject (topic)
- Length of lesson
- Expected knowledge and understanding at the beginning of the lesson
- Objectives of the lesson
- Time for each element of the lesson
- Trainee / instructor activity
- Teaching method
- Teaching aids
- Assessment

End

- Review and summarise the main conclusions
- Recap using an overhead projector/board or other
- Ask learners to review their own keynotes from their notes
- Suggest further reading

4.2 Lesson Plans (Competency-based education)

There are no “absolutes” per se when it comes to lesson plan development, regardless of whether it is for competency-based education or otherwise. Offered here are some guidelines that will hopefully save you time and energy.

If you look closely at Column 1 in the Competency Tables (CT), you will see a number of individual competencies - one listed after the other - with the goal being to perform a particular function such as navigate according to navigational agreements with an agent.

The CT offers further guidance:

Column 2: Knowledge, Understanding and Proficiency (e.g. apply the rules of the road, etc.).

The boatmaster chooses the most logical and economical sailing route to reach the loading and unloading destinations, taking into account most efficient sailing time schedule according to actual circumstances. 1.1 Plans a journey on inland and maritime waterways and conducts navigation on European inland waterways. Is able to:			
Column 1	Column 2	Column 3	Column 4
COMPETENCE	KNOWLEDGE, UNDESTANDING AND PROFICIENCY	METHODS FOR DEMOSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
2. Respect and apply traffic regulations applicable to navigation on inland waterways to avoid damage.	Knowledge and ability to apply the rules of the road for the inland waterway being sailed to avoid damage (collision) National and international police regulations applicable to the waterway being sailed		

Figure 3: Excerpt from Competency Tables "Boatmaster"

So this table has provided you with valuable data upon which to begin developing your lesson plan.
It is worthwhile to know how the competence will be demonstrated and how it will be evaluated. If you have a clear idea of these last 2 items, you have all the information you need to develop a solid lesson plan with a clear direction.

4.3 Developing a strategy (Part 1)

So let's look more closely at employing a strategy for the development of a plan. If you start with the subject for the lesson and then start planning a lesson strategy without considering the required end-result or even how it will be assessed, then you can spend a lot of time and energy developing something that may not fit. For this reason you should adopt a different strategy.
Firstly, consult Column 2 and identify what element is to be considered. It's helpful for you to say this to yourself when first developing the plan; "By the end of the lesson the learner will be able to…". In the blank space make sure you insert the descriptor e.g. calculate, apply, collect, interpret etc. You need to correctly define the descriptor because that is precisely what you will observe and subsequently assess. Secondly, consult Columns 3 as to how the competence must be demonstrated and Column 4, which indicates how the competence will be evaluated.
If Column 3 indicates the competence that must be demonstrated on-board a training vessel, then your plan must involve practice/training etc. on-board a training vessel. You cannot simply expect written questions, oral tests etc. to be considered sufficient

preparation. Your PLAN must be designed with this method in mind (on-board training). In addition, you must take into account the way in which the competence will be evaluated. So, to summarise, know the beginning, what you need to prove at the end and how you will prove it. Then fill in the middle.

Key points

1. As in all education, you must be aware of your **target group** to have a starting point for your plan. This starting point will be based (in this case) on the level of competency of the individual. One of the key components of CBL is that the individual should be able to come into and out of a system as they have time or their employer makes allowance. So in theory, not only should the individual possess the previous competency but they will also have the appropriate work experience supporting that competency.
   However, you must be prepared to be disappointed. And you absolutely must have a backup plan in case your group is not at the level you expected. You can have some kind of guarantee of their level only if you implement a pre-course-assessment. This would be considered a wise strategy and one which is often used to determine the baseline for each new group you encounter.

2. For this course, we have referenced **Bloom's Taxonomy** to explain the hierarchy of learning. So, reference the descriptor in the CT. If, for example the Knowledge, Understanding and Proficiency descriptor is to be able to "analyse", then you will have to plan a strategy to help the individual move from the lower levels of cognition (list, define, solves etc.) to the higher level of analysis. And, as you may be fully aware, as you move up the level of cognition, a means of checking for understanding is needed, so again some means to ascertain that one level has been reached before the next one is introduced. It's up to you how often you want to assess the levels, one at a time or employing greater leaps.

3. **Time**. In your plan, try to estimate how much time you will need to allocate to different activities. Your lesson will not simply be a delivery system of data. Competency-based learning is very activity-based. And if you consider for a moment that the individual should be able to walk directly into the work force upon completion, you may realise they should practice a lot of "doing". So be aware of the actual time you spend presenting new or familiar data, consider the method you are using and what the participants are doing during your presentation period. Are they expected to listen for the entire time? Can it be shortened, can they read the material instead, watch a video or participate in an E-Learning session?

4. **Your plan**. As educators, you are now aware that you will spend a lot of time reflecting upon the lesson of the day or even one session on a particular topic. Why did it go well, or not as expected, etc.? What you may not realise is that most of us (at least in the beginning of our careers) develop lesson plans on how **we** would prefer the new material to be presented and what activities **we** would like to have. In other words how **we** think the story should be told. After all, it's our story about that particular subject. So be aware of initial preference in learning and the relation to the Kolb Learning Cycle as discussed earlier. Are you trying to bend the participants to learn in the way **you** would like to learn? Be prepared to modify your plan even though your plan may make more sense to you. After all this is for their benefit, not yours.

Remember: No lesson plan survives contact with participants

Figure 4 provides an example of a lesson plan. Some elements may be missing but the intention is that you get an idea of a layout strategy. There are indications of which chapter in the course book can be used as reference, which PowerPoint slides are used and even titles of handout documents. The green highlighted area denotes an individual task, the blue highlighted area denotes a group task.

A few extra items of value to add to the lesson plan example.
i) If you are executing a course that will have exam questions or tasks, it can be of value to indicate which classroom task, lecture or other has been arranged to address that task or question. If, for example, you know question 1c on the final exam is addressed by the task on Day 1 at 10:30, you can keep the question in the back of your mind and see how the lesson goes. Will they be successful with this question based on the lesson and strategy you have designed? Furthermore, if a particular question on the exam is poorly answered, you will have an idea of the task or lesson to which it relates. This will save you time.
ii) When planning your lesson, remember Kolb version 2 as it was referred to in the lessons. When you give the participants a task, what area of the Kolb is being activated? Choose your activities wisely and always remember to provide support wherever possible gaps may occur.
iii) Consider the technique(s) you are using for your lesson. Lecturing, facilitation, coaching, group work, individual work or other. Why have I chosen that method? Is it suitable?

Train the Instructor (Foundation) Lesson plan (5 day) v1.4

Day/Time	Ch.	Instructor activity	Learner activity	Expected outcome/ Instructor activity details
Day 2	**Tuesday**			
08:30-12:00	**Introduction of learning models and taxonomy** - **Review** - **Bloom Taxonomy** - **Kolb circle of learning** - **Individual and group tasks investigating above items**			
0.25	Review previous day activities – Show screen shot of white board from yesterday? Introduce the topics for the day.			
0.75	2.2.1	1. Introduce Blooms taxonomy	Read, discuss, investigate, reflect	Explain application of Bloom taxonomy using ch 2.2.1 and appendix 2
0.5	Task: Individual task: based on Kolb investigate your own personal learning style			
0.5	2.2.2	1. Introduce KOLB 2. Introduce KOLB version 2 (also on ppt slide ch 2.2.2)	Read, discuss, investigate, reflect	Chapter 2.2.2 provides text for reviewing and Appendix 2 provides useful schematics.
0.5	2.2.2			Put Kolb diagram on board + write student names where they fall in the diagram After Kolb task explain how this relates to the learners as individuals
0.5	1	Review chapter 1 with students. ....this may run into the afternoon session	Match, discuss,	At end on screen show 1.1f & 1.1g document. For maritime students discuss "competency based learning" and STCW structure. Now give Hand-out 1.1c, 1.1d. If necessary view other STCW competencies from 1.1e STCW Part A&B

TtT Lesson plan 5 day v1.2
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Figure 4: Lesson plan example

4.4 Developing a strategy (Part 2)

So far we have covered the basics of developing a lesson plan. But it is worth considering that we have been dealing mostly with the technical side of subject matter. For example: how to facilitate the learning of servicing machinery, adhering to safety rules, or plotting a course etc.. The goal of the CT is to aid in developing a competent individual. But competency goes beyond the technical aspects of performance.

Earlier in this chapter reference was made to: "Observable ability, skills, knowledge, motivation or traits defined in terms of the behaviours needed for successful job performance", Wayne, I. and Simpson, S. (2013).

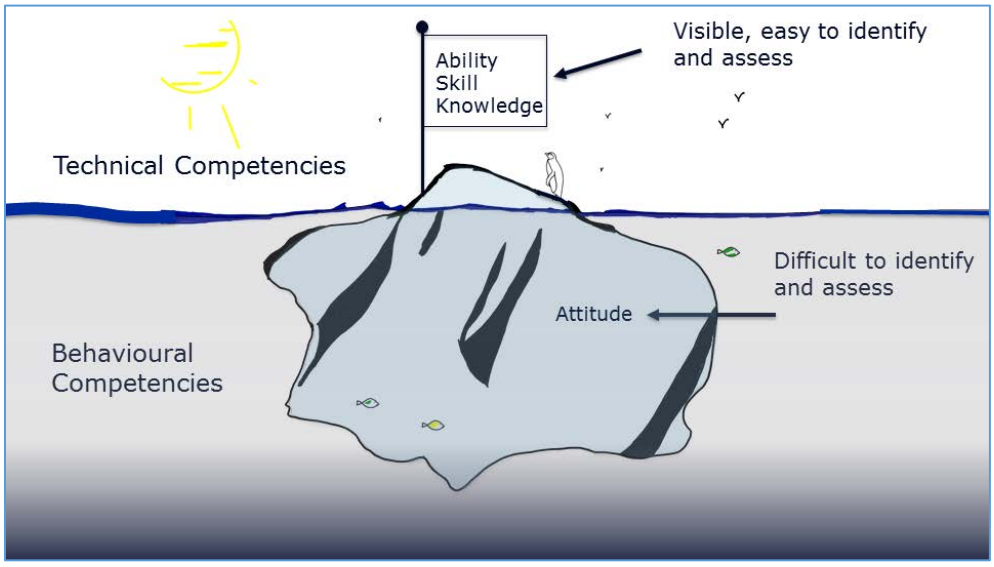


Figure 5: The Iceberg

Where ability skills and knowledge can be relatively easy to spot and assess, the other traits are more difficult. In addition, you will notice that attitude has been included in Figure 5. This can be termed a soft component - difficult to identify and difficult to assess. But some would argue that this is as important or even more so than the hard technical attributes. Imagine for a moment you were asked to choose between 2 new candidates who will work with you on-board.

You have 2 choices.

i) Candidate #1: high achiever in all technical exams, top of his/her class. Knows all the rules and sticks to them.

ii) Candidate #2: reasonable achiever in technical exams, knows technical things well enough, but has very good interpersonal skills, challenges him/herself and existing concepts and ideas, not afraid to speak up when something seems amiss.

Most will choose Candidate 2 and with good reason.

It is a well-documented fact that the majority of incidents at sea involve the human factor, often termed a soft skill. Though new research and understanding of error raises issues with the term human error, human performance, variability and the success of activities, this is still closely related to positive attributes such as challenge and response to the environment, recognition of hazardous thoughts, ability to work with others etc.. The best defence against errors and incidents is to possess the type of attributes we call soft skills. Persons who challenge (the way things normally work), ask questions when unsure and who communicate well are the best defence against things going wrong. Procedures are

designed for work as imagined, not work as done. You all know from personal experience that procedures often don't fit the situation. The individual is still left with the task of how to apply the procedure in an environment of hidden pressure, stress, multiple options etc. How is this related to the design of a lesson plan?
In part 1, we designed a lesson plan for the technical components of competency. But in order to have a truly competent person they must possess an extra skill set.
This extra skill set (Engine Room and Bridge Resource Management) receives some attention in the CT. But in order to aid in the development of a competent individual with an optimal attitude, you can take it upon yourself to start the process. One way is to set the correct environment in your contact moments with the participants. Ask yourself the questions: During my lessons am I accepting challenges from participants, prompting them to ask questions etc.? And am I doing so in a supportive way? Do I encourage dialogue, do I give them tasks that give them a chance to practice teamwork?
Helping to develop this type of atmosphere or "culture" will benefit the individuals greatly and help ensure success in the work environment.
Behavioural competencies are difficult to identify and assess. Because of this, simulators (Engine Room and Bridge) are often used to develop exercises, providing candidates the opportunity to develop and display such attributes.

2. Lastly, **do not** design a lesson plan so that the participant is able to answer **only** the question(s) on the exam. An exam question is only some sort of measure to try and prove some degree of knowledge or other. The participant will never be given that particular question or scenario in the working world. Your goal in the education and training process is to develop someone who is truly competent and able to apply what they have learned in the working environment. They must understand the theory behind the answer rather than just the answer. If you don't approach learning in this way, you are doing the participant an injustice. They need to truly understand the subject from all angles in order to be successful outside of the classroom, simulator or other. The must be able to apply what they learned, yet in a different context, probably at night, in bad weather and under periods of stress.

Summary
In this chapter, we identified not only generic strategies for developing a lesson plan but also strategies for design of a lesson plan for competency-based learning. You should now be able to extract the relevant descriptor and design a strategy to achieve the required outcome. An outcome that relates to a competency in that task or subject.
We also discussed an element that does not necessarily receive much attention in today's education stream yet is vital for successful and efficient performance in the work place. Attitude. Since we are dealing with competency, then you as the educator should attempt to develop an individual who is truly competent in all respects and who includes items such as challenging concepts and his/herself, asking for help if unsure, communicating in a clear fashion, etc.. We need to equip the participant as well as we can before they need to perform in a setting quite different from a nice warm classroom or simulator.

Module 5 Assessment and feedback in competency-based education and training

For this Module 6 (Assessment and Feedback) and that of Module 7 (Evaluation), when dealing with Inland Navigation Simulator Training, reference can be made to “Train-the-Trainer Course for Inland Navigation Simulator” as part of the Leonardo da Vinci Lifelong Learning Programme of the European Commission. The publication provides multiple examples and guidance in the correct use of a simulator for Inland waterways.

In a typical assessment and evaluation process, individual assessments (formative and summative) would be undertaken but would only be a component(s) of a broader evaluation process. The evaluation of the individual is to determine whether the candidate (in this case) has met the required level or competency. So the extra elements outside of the assessment could be a self-assessment, peer review, instructor review, aptitude discussions etc.

Since the terms evaluation and evaluating appear often in this subject, it is useful to define the difference. Evaluation is required when we need to judge or value something. So if we take the item “assessing a developed sailing plan for an upcoming voyage”, we could not only have specific criteria that need to be considered but we could also have criteria that are perhaps not so specific and open to interpretation. This is when we need to evaluate that particular aspect. So with reference to the sailing plan, valuing whether the plan was sufficient or not can be somewhat subjective and requiring judging and evaluating.

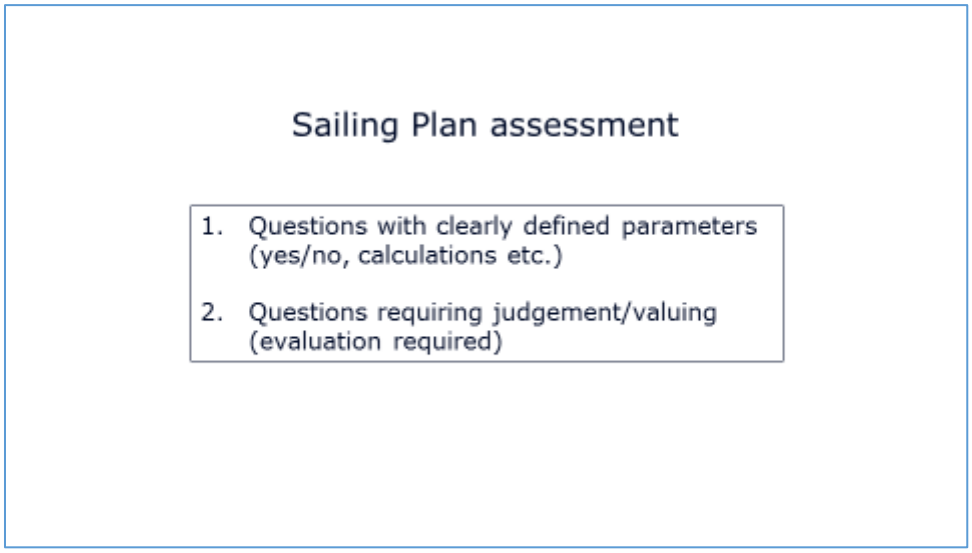


Figure 6: Sailing plan assessment

In the maritime sector, the CT include a Column 3 “Methods for demonstrating competence and a Column 4 “Criteria of evaluating competence”. The CT for inland waterways provides no such guidance. An agreement must be reached between your institute and the authority over what would be considered appropriate. As a suggestion, for this Competence “respect and apply traffic regulations…” we could see the following in Column 3 “Methods for demonstrating competence”:

Examination and assessment of evidence obtained from one or more of the following:
1. approved training ship experience
2. approved simulator, where appropriate
3. theoretical examination
And for Column 4 “Criteria of evaluating competence”:
Lights, shapes and sound signals conform to the requirements contained in the (Inter) national police regulations applicable. Rules of the road of the (inter) national police regulations are recognised and correctly applied at all times.

The boatmaster chooses the most logical and economical sailing route to reach the loading and unloading destinations, taking into account most efficient sailing time schedule according to actual circumstances. 1.1 Plans a journey on inland and maritime waterways and conducts navigation on European inland waterways. Is able to:			
Column 1	Column 2	Column 3	Column 4
COMPETENCE	KNOWLEDGE, UNDESTANDING AND PROFICIENCY	METHODS FOR DEMOSTRATING COMPETENCE	CRITERIA FOR EVALUATING COMPETENCE
2. **Respect** and **apply** traffic regulations applicable to navigation on inland waterways to avoid damage.	Knowledge and ability to apply the rules of the road for the inland waterway being sailed to avoid damage (collision) National and international police regulations applicable to the waterway being sailed		

Figure 7: Excerpt from Competency Tables "Boatmaster"

Assessment should be frequent and continuous especially in Competency-Based Education and Training (CBET) and should make use of formative and summative methods. Formative assessments are often conducted to provide information for improvement of the individual’s performance. Whereas summative assessments makes use of a measurement system against expected outcomes, summative should of course also be used for improvement, the only difference being the existence of a measurement system.

5.1 Theoretical assessment

For this, student assessment is one of the main aspects of teaching and training. Instructors/trainers should know at least the basics of assessment; they must know about the sort of tests and about the quality of tests. They should be able to make good tests that meet the standards of good quality. Instructors must also recognise whether a test, made earlier by others, still meets all the criteria.

What follows is a list of points of attention and/or suggestions for preparing assessments. Although this list may not be complete, it covers at least the requirements of the daily teaching/training practice.

Types of tests

There are several types of tests in teaching/training - all with specific objectives. Some tests that are commonly used in teaching are mentioned below.

- *Prerequisite test* is used to assess whether the students have enough knowledge, skill and attitude to qualify their entry to the first, second, third or fourth year. Furthermore, it may have a predictive function as to the learning results of the student.

- *Progress test* is given to provide feedback to the student (and the instructor) on his/her progress. It indicates how the participant is doing with respect to the determined learning objectives. The results of the progress test may be of a diagnostic nature (see diagnostic test). Most important, however, is that feedback is given to the participants on a regular basis and in an adequate way.

- *Diagnostic test* is used to find out the weak spots or shortcomings of the individual participant, a group of participants or the learning and teaching process. The purpose of these tests is either to give the participant(s) specific additional training so they can keep up with the program, or to adjust the learning/teaching process. You could implement such a test on the first day of the course.

- *Selective test* is used to find out whether and to what degree the student has reached the learning objectives. If the student has passed these tests, he may continue his study or, in the case of a final test, he will receive a certificate of competence.

Quality of tests

Since tests are essential evaluation tools in the learning and teaching process, they should be efficient and effective. They are an important part in maintaining the quality of the learning and teaching process. To ensure that tests/assessments meet the set standards of quality, they should meet the criteria mentioned below.

- **Relevant** Tests should be *relevant*; this means that the test items are related to the subject matter. In other words: they cover the learning objectives. The content of the test must provide a truly representative sample of the range of knowledge and tasks to be measured. The test items also test the levels of learning.

Column 1 of the CT makes use of descriptors such as 'apply'. When developing assessments - written or otherwise - the developers should avoid overusing lower cognitive assessment items like list or define. Being able to list does not indicate the ability to apply.

- **Reliable** Tests are *reliable* when they are reasonably *consistent*; i.e. the results should be basically the same whether the student is faced with any one of the sets of papers or test items that are in use. Consistency in results should also prevail, no matter which assessor scores the papers, on-board assessments or simulations.

- **Valid** Tests are *valid* when they are efficient and effective; validity concerns the integrity of tests. Tests should measure what is intended to be measured. They should be easy and economical to conduct and should be capable of being scored or marked effectively and efficiently. The procedures as to the conduction and marking of the tests and the procedures as to informing the students of the results should be simple and clear. Each test should begin with clear and uniform instructions for the students as to how to do the test.

The lay-out of written tests must be clear and well structured.
The questions and test items must be clearly and completely phrased; they must be short and to the point! Test items are not supposed to be puzzles or riddles, so one should make sure the test items do not contain misleading information or 'trick' questions.
The number of test items should relate to the time allotted for the examination.

Points of attention and suggestions for preparing assessments
Make sure the test is **relevant**, **reliable** and **valid**.
More specifically:

- You will need a lot of time for preparation. It takes time and thought to ensure that your assessment validity achieves what it sets out to do.
- Give clear instructions as to how to do the test.
- Use a variety of techniques – multiple choice questions, structured questions, extended writing, practical, orals and so on – to provide balance and to assess a wide range of skills, abilities and attainments.
- It may be necessary to use several questions and/or techniques to satisfy one learning objective.
- Consider carefully the weight to attach to each part of the assessment to ensure appropriate value is given to all of the skills and attainments.
- Avoid the over-assessment of low cognition items like list, name and define.
- Model answers or solutions with the allocation and distribution of marks should always be prepared.
- Avoid asking questions that are dependent on an answer to an earlier question.
- Take care that there is no disproportion between the time allowed and the difficulty or length of the answers required.
- Avoid trick questions about vague and difficult points.
- Phrase questions clearly and unambiguously and give clear instructions on how to answer.
- If you use past assessment papers for guidance, check whether they really are examining the curriculum you have been teaching.

- Past assessment papers should be checked to determine that they are still relevant, reliable and valid.
- Check the test that you have devised for ambiguities, inappropriate vocabulary, legibility and typing errors. Ask a colleague to check it for you.

5.2 Assessment types

In participant assessment, one can also use objective and/or subjective tests. Instructors should know and understand the difference between these types of tests, so that they can make full use of either of them to assess the students' learning.

Objective testing

In objective tests, *closed questions* are used: this means that there is a set of acceptable versus unacceptable answers. Writing and compiling objective tests may take a long time. The advantage, however, is that the results of these tests can be produced rapidly. Although objective questions are mostly used to assess the basic levels of knowledge, it is also possible to apply well-written objective questions to higher levels of learning.
Examples of closed questions are:

- direct question requiring short answer.
- incomplete statement to complete.
- completion of statement from a given selection of words.
- true/false questions.
- matching blocks/lists.
- multiple-choice questions.

Multiple-choice questions can be used but again refer to Column 1 of the CT to help guide you in the frequency and value of such type of questions.
The multiple-choice question consists of a problem and a list of suggested solutions. The problem may be stated as a direct question or as an incomplete statement and is called the *stem of the item*. The list of suggested solutions may include words, numbers, symbols or phrases; they are called *choices, alternatives or options.*
Marking multiple-choice questions is easy and can be done rapidly. However, constructing multiple-choice questions is rather difficult. It should be done with care; it involves formulating a clearly-stated problem and identifying plausible alternatives.
Both the question and the options should meet the criteria of testing. They should be relevant, reliable and valid.
The following suggestions provide some specific guidelines for constructing multiple-choice questions.

- The item should be meaningful by itself and should present a definite and clear problem.
- The item should include all the information the student needs to solve the problem.
- The item should be free of irrelevant information.
- Avoid negatively stated items as this can be confusing.
- All of the options should be grammatically consistent with the item.
- The options should contain only one correct or clearly best answer.
- All options should be plausible.
- Verbal associations between the item and the correct answer should be avoided.
- The relative length of the options should not give a clue to the correct answer.
- Avoid using options such as 'none of the above' or 'all of the above'.
- Alternate the position of the correct answer in the various questions.

Subjective testing

In subjective tests, *open questions* are being used. They give varying degrees of freedom in answering the questions and solving the problems. These tests are useful for all levels of knowledge and skill.

The responses to open-ended questions must be marked in a consistent way. That's why open questions should contain some directions and constraints so as to guide the response of the student.

Examples of open question are:

- guided response questions.
- structured questions.
- comprehension and interpretation.
- extended writing.
- project work including practical skills and assignments.

For marking subjective tests, model answers/solutions with the allocation and distribution of points should be prepared.

5.3 Practical assessment

Aside from theoretical assessments, the CT will require that you assess tasks in which the individual is actually actively performing. This can come in many forms, from the various activities in the engine room to those activities on deck. Many of the rules that have been identified in part 6.1 Theoretical Assessment also apply in the practical assessment.

To develop an assessment, you need to agree with your colleagues and the authority as to what needs to be assessed, and the accepted method. The rest is up to you, and you will need to be creative.

Try to match the task you are planning with all of the columns in the CT. Ask yourself questions such as the following:

- Will the scenario address the objective (apply, calculate etc.)?
- Is the scenario I am developing realistic? Does it mimic a real situation?
- Have I developed pass/fail criteria in an objective manner?
- Can the participant complete the task in the required time?
- Etc.

It is not an easy task and you may have to make various attempts. Development of practical exercises can be made easier by the use of simulators, both for the Engine Room as well as Deck departments.

Now let's deal with assessing an activity. In order to assess an activity, it is useful to develop a rubric to define specific aspects of the performance and assign an appropriate weight to each element. The weight of the element should reflect the difficulty involved. So, for example, starting a machine correctly (if it involves only remembering the sequence of pushing buttons (***memory***)) should not have the same weight as problem-solving (***analysis***) the poor performance of the same machine. When considering the psychomotor domain, extra attention must be paid to whether we are assessing, judging or valuing **imitation** (copy, mimic etc.) or **naturalisation** (mastering high performance…second nature).

Three examples follow which have been taken from the maritime sector. They are nonetheless good examples of how one can develop an assessment.

Example #1

Used with permission (but with the institute removed to avoid extra debate) is an example of a marking rubric for “Fabrication of a Hexagon nut”. Engineers can debate whether the rubric’s elements are correct in every respect, but this matrix is provided as an example only. It is offers a methodology to assess the fabrication activity of the participant. Note how the marking is as objective as possible rather than subjective. Clear scores are defined for various aspects, which leaves little room for debate or disagreement. Also note an area to record observations after each assessment item. This will not only aid the grading process but can also be used as a feedback mechanism for the participant.

This matrix has indicated only one assessor. It’s possible that the instructor was acting in a double role here as instructor/assessor, but that is unclear. Just bear in mind that some authorities will require 2 assessors and, if the instructor is also permitted to act as an assessor, then he/she must possess an approved assessor’s certificate.

Example #2

Used with permission (but with the institute removed to avoid extra debate).

This example is similar but involves an extra element not yet covered. What you will see is that it provides an example of one format of assessment. You can see a rubric with weighted elements. This is an assessment to evaluate the ship-handling that is required in the maritime sector.

Example # 1(Fabrication of Hexagon nut)

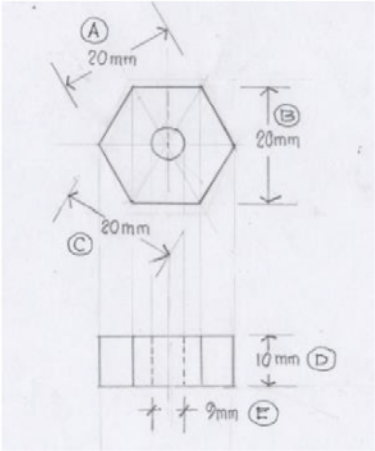
ACTIVITY INVOLVED (Please Check) — HOURS Lec Lab

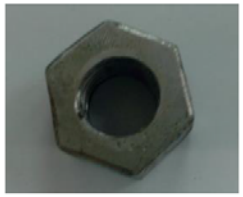
- ❑ Measurement
- ❑ Marking out
- ❑ Hand tools
- ❑ Power tools
- ❑ Drilling
- ❑ Boring/Tapping
- ❑ Heat treatment
- ❑ Cutting:
  - A. Manual
  - B. Power Saw
  - C. Arc
  - D. Gas
- ❑ Joining
  - A. Arc
  - B. Gas
  - C. Manual
- ❑ Forming
- ❑ Shaping
- ❑ Milling
- ❑ Pipe works

MATERIALS USED

Qty	Description	Cost

Total Cost _____





INTENDED LEARNING OUTCOME (ILO)
Fabricate accurately a HEXAGON NUT in a given dimensions

Check List for Inspection Criteria	1	2	3	4	5	√	x	Observation & explanatory details for any box marked "x"
Actual measurement at point - A 5- 20mm, 4- +/- 1mm, 3-+/-2mm 2-+/-3mm, 1-+/-4mm								
Actual measurement at point - B 5- 20mm, 4- +/-1mm, 3-+/2mm 2-+/-3mm, 1-+/-4mm								
Actual measurement at point - C 5- 20mm, 4- +/-1mm, 3-+/2mm 2-+/-3mm, 1-+/-4mm								
Actual measurement at point - D 5- 10mm, 4- +/-1mm, 3-+/2mm 2-+/-3mm, 1-+/-4mm								
Actual measurement at point - E 5- 9mm, 4- +/-1mm, 3- +/-2mm 2-+/-3mm, 1-+/-4mm								
Speed: 5 -1pc in 12hrs, 4- 1pc in 13hrs 3- 1pc in 14hrs, 2- 1pc in 15hrs 1 – 1pc in 16hrs								
Quality: 5- Perfect shape- smooth edges 4- Perfect shape- dull edges 3- Deformed shape – smooth edges 2- Deformed shape – rough edges 1- Unacceptable quality								

Note to the Assessors:

1. More than seventy percent (70%) of the total points gain is considered PASS
2. Students/Trainees has always the privilege to be given a second chance
3. Checked mark (√) – COMPETENT
4. (x) Mark – NON COMPETENT

TOTAL SCORE: _____

RATING = [Total Score / 35] x 100 %

SUPERVISED ACTIVITY

_____
Project Number

[redacted]
MARINE ENGINEERING DEPARTMENT

Name of Student | Project Title | Name & Signature of Instructors | Name & Signature of Assessor

Figure 8: Fabrication of a hexagon nut, rubrics

Example # 2 (Ship Handling)

SHIP HANDLING SIMULATOR COURSE
ASSESSMENT SHEET

Course	**Ship handling**	
Date:	**Objective:**	
Name trainee	.....	Conditions: Wind: Current:

Assessor 1	Name: Signature:	Start position:
Assessor 2	Name: Signature:	Simulation reference number/title:

Assessment	**Objectives** (delete the objective which is not applicable)	**0**	**1**	**2**	**3**	**difficulty factor**	**Max score**	**score**
1	**Plan**							
1.1	Drafted plan is correct					2	6	
1.2	If answer from 1.1 (Plan) is no; then did they revise plan during exercise and create a correct plan					2	6	
1.3	Monitored- correctly - adjusted if necessary					2	6	
2	**Port entrance/departure channel**							
2.1	Entrance channel/ Departure channel					1	3	
2.2	Increase/reduction of speed in a controlled way					2	6	

Figure 9 Ship Handling example rubrics

What you may have realised by now is that a significant amount of thought and energy go into the design of such scoring systems. You will often find it takes several attempts to fine-tune your assessment. For this reason, you must practice it with colleagues prior to subjecting your learners.
Whether you design an assessment for simulator use or for use on actual equipment, the criteria must be approved by your colleagues. For this reason, you should define a team responsible for vetting such assessments as well as instigating a quality-control system. This is not only a practical requirement but should be a condition of certification on behalf of the authority.

Example #2
Though Example # 2 is similar in the fact that a rubric has been used, it possesses an extra component, that being a judgment decision. Look at the first item, for example -item 1.1. A score factor has been indicated. However, an outstanding question still remains: “How do you judge whether the drafted plan is correct?”, “What defines correct?”. This forces us to consider another aspect of assessment, which involves observing and judging. We are now stepping into the territory of assessors’ qualifications, which is a separate course. But for now we will explain the basics of how to deal with such a challenge.

5.4 Assessors and the ORCER Model

Though both statements below are taken from the maritime sector and STCW requirements, they are valid criteria for the inland shipping sector.
Assessor requirements
Any person conducting an in-service assessment of competence of a seafarer, either on board or ashore, that is intended to be used in qualifying for certification under the Convention, shall:

- Have an appropriate level of knowledge and understanding of the competence to be assessed;
- Be qualified in the task for which the assessment is being made;
- Have received appropriate guidance in assessment methods and practice;
- Have gained practical assessment experience; and
- If conducting assessment involving the use of simulators, have gained practical assessment experience on the particular type of simulator under the supervision and to the satisfaction of an experienced assessor[14].

[14] Source: STCW, Section A-I/6

Assessment procedures

Where simulators are used to assess the ability of candidates to demonstrate levels of competency, the assessor shall ensure that:

- Performance criteria are identified clearly and explicitly and are valid and available to the candidates;
- Assessment criteria are established clearly and are explicit to ensure the reliability and uniformity of the assessment and to optimise objective measurement and evaluation, so that subjective judgments are kept to a minimum;
- Candidates are briefed clearly on the tasks and/or skills to be assessed and on the tasks and performance criteria by which their competency will be determined;
- Assessment of performance takes into account normal operating procedures and any behavioural interaction with other candidates on the simulator or simulator staff;
- Scoring or grading methods to assess performance are used with caution until they have been validated; and
- The prime criterion is that a candidate demonstrates the ability to carry out a task safely and effectively to the satisfaction of the assessor.[15]

The above makes reference to simulators. However, the same could be true for on-board assessment. An assessor is always occupied with observing and judging behaviour. Assessors must assess as objectively and reliably as possible, with the exclusion of prejudices and personal preferences. To attain such a level requires special training, not only to practice the steps in the assessment process, but also to become familiar with the tools and to learn a common assessment language and to develop an assessment "culture".

[15] Source STCW, A-I/12 Part 2

ORCER

When we need to observe judge and value **behaviour** we need to use a valid and proven method. One method of observing and judging used by psychologists is the “Wakker methode” which, loosely translated into English, is the "Awake method". The acronym “ORCER” can be helpful.

We can distinguish five phases in the assessor tasks (ORCER):

- ***O**bserving* behaviour during the different exercises. Observe verbal as well as non-verbal behaviour. Emphasis is placed upon what the candidate actually does and says, i.e. actual facts and not on interpretation;
- Making notes (***R**egistration*) during the observation process. This is to justify your observations afterwards and to act as a memory trigger;
- ***C**lassification* of the behaviour in behaviour characteristics;
- Judge and ***E**valuate* the performance; and
- ***R**eport* performance.

The core focus of the assessor’s course is understanding of the dimensions of behaviour, the observation of this behaviour (facts/observations, not interpretations) and to come to a joint and weighted judgment for each dimension and candidate. The assessors are acquainted with the practical tasks and their aspects.

Depending upon your contracting authority, you should be required to undertake such training in order to qualify as a professional assessor.

Example #3 (using the ORCER method)

Assessment for Bridge Resource Management from STCW (Maritime Competency) whilst making use of the ORCER method.

Due to confidentiality issues, not all the required documents will be shown. Furthermore, the documents shown are not complete, nor are the details necessarily accurate. These examples are intended only to provide you with an idea of one type of assessment structure.

Documents required:

1. Exercise description for the Captain. This provides details such as the starting position, type and size of vessel, weather, current and - quite importantly - the task. In addition, reference should be made to the item from Column 1 and/or 2 of the CT, which indicates what we are trying to achieve with respect to the competency requirements.

2. Toolbox to detail sequence of events. This provides details of the traffic situations, time-line and the event(s) that are expected to occur.

3. Assessment sheet. The criteria of assessment must be agreed. This example is taken from the maritime sector as a suggestion only. Note the wheelsman (if any) is not scored for these exercises but a space is reserved for remarks. Another important element in this sheet is the scoring. If you use a scoring system from a score of 1 to 5, for example, then you must establish the criteria for such numbers. It must be clearly defined and must be understood by both the assessors and the participants.

4. Observation form. As per ORCER requirements, this is an observation and recording form. Training in practice is required to successfully use this type of form.

5. Official record sheet for final score recording.

Column 4 (STCW) Criteria for evaluating competence
Operations are planned and resources allocated as needed in correct priority to perform the necessary tasks.

BRM ASSESSMENT SHEET (item 3 above)		
Operations are planned and resources allocated as needed in correct priority to perform the necessary tasks. - Track course with alteration points - Frequency of position fixing/ monitoring stated - Preparations for emergency anchoring are planned - Etc..	Captain (remarks /justification):	Score
	O.O.W. (remarks /justification):	
	Helmsman (remarks):	

Figure 10: Assessment sheet example ORCER

Observation form (item 4 above)				
BRM Observation form	PLN =	Planning of operations	XXX =	xxxxxx
	CRW =	Crew duties and standards	XXX =	xxxxxxx
	XXX =	xxxxxx	XXX =	xxxxxx
Exercise:		Assessor		Date:
Capt.:	O.O.W.:		HELM:	

Time	Observation	PLN	CRW	XXX	XXXX	XXX	XXX	XXX

Figure 11: Observation sheet example ORCER

A few key points regarding assessment w.r.t. CBE:

- All methods of training should be assessed in some way or form. The assessment provides data for the feedback.
- Focus on the approved method of assessment as identified in the CESNI standards.
- You must define the criteria upon which the assessment has taken place.

5.5 Feedback

During the education and training process, you should always provide feedback, whether the tasks given are for practice, training or actually assessment items. There are various ways to provide effect feedback so here are some items:

Experienced educators will recognise this part of the learning process as vital and appreciate the enormous role they now play. Much is dependent upon correct attitude and how they as professionals are able to set up the correct environment and aid the process for the individuals. The following are a set of guidelines for giving feedback in general; they can also be used after practical training.

Tips on feedback or debriefing after practical training
1. Debrief as soon as possible 2. Positive and negative learning experience 3. The candidate first …briefly 4. Encourage the participant to find the solution if a problem exists 5. Relevant 6. Stick to the facts in sequence 7. Summary, let the participant define next steps or need for improvement

Figure 12: Tips on feedback/debriefing

1. As soon as possible

This approach helps ensure the recent activity information is fresh within the minds of the learners. Additionally, it avoids the group discussing the events together without the presence of the instructor. Prior discussion within the group can be dangerous since they may answer their own questions (even incorrectly) such that, when the instructor asks if there are any further questions, there may be no reply.

2. Positive and negative learning experience

See failure as an opportunity to learn and reinforce positive behaviour if witnessed.

3. The candidate first...briefly

A good opening line can be, “How did it go”. If the response is “poorly”, then you can follow with “Why do you think that?”, “Specifically, what do you think went poorly?” If the response is, “It went well”, then you can use the same subsequent questioning. Remember, you are also setting the tone of the discussions creating a positive interactive environment.

4. Let the participant find the solution if a problem exists

Assuming there is room for improvement, prompt the participant to come up with the items and a possible solution. It engenders commitment.

5. Relevant

Ensure the facts you have recorded and the information transferred during the debrief are relevant to the event.

6. Stick to the facts in sequence

Again, record and report on facts but report them sequentially in the correct time frame.

7. Let the participant define next steps or need for improvement

Again, having the participant define his/her next steps for learning or improvement engenders commitment.

General guidelines

Encourage positive self and peer review. This is an effective method for internalising learning and ownership of lessons learned.

Progress slowly and thoroughly through the sequence of events, using your notes and, in the case of using a simulator, the play-back capability if possible. You may decide to re-enter the simulation at a certain juncture, enabling you to reinforce a procedure or improve upon an event.

Always allow plenty of time for the debriefing and feedback. Scheduling a debriefing or feedback session at the end of the day, when the learners are preparing to go home, may not be optimal.

Focus on an analysis of the elements from the simulation or on-board training such as:

- Degree of accuracy
- Response time
- Procedures or best practices followed
- Communications
- Instructions to the other team members (if any)
- Organisation of tasks
- Understanding basic principles
- Application of knowledge to real-life situation
- Prioritising
- Problem-solving
- Judgment and decision-making etc.

Always summarise at the end and relate the discussion to objectives. Asking the students to record their own areas for improvement or those they did sufficiently can be a positive reinforcement tool. Always allow time for self-reflection and try to organise the discussion such that the learners reach the conclusion themselves. Keep a record of the performance during the on-board training or simulation periods such that progress or lack of progress can be monitored during the course.

Summary

In this chapter we have covered:

- How to extract the necessary details from the CT in order to prepare an assessment.
- How to develop both theoretical and practical assessments.
- How to create a rubric for scoring purposes.
- An introduction to observing and judging performance.
- How to provide effective feedback during training or after a final assessment.

One last item of note, which has been mentioned previously but bears repeating. You must always consider the descriptor and task you are trying to achieve. If the competency requires that the individual must be able to apply, calculate, evaluate etc., then you must facilitate the process such that the participant is already at that particular level prior to the final assessment. Test this ability well before the final exam and remember not to dwell on lower cognitive elements such as memory, listing, naming, etc. Competency-based learning is more about observable skills, knowledge and ability.

Module 6 Evaluation (participant and process)

6.1 Participant evaluation

In the previous chapter we discussed assessment and initially focussed on various assessment methods, including the use of rubrics to aid in assigning a score and weight to particular items.

When we talk about the evaluation of an activity, we are dealing with observation and, subsequently, judgment to assign a value. The scoring system in part is identified in the example below by assigning a value - to item 1.1, e.g. But as discussed previously we still need to "judge and value" the performance for that and subsequent items.

SHIP HANDLING SIMULATOR COURSE
ASSESSMENT SHEET

Course	**Ship handling**	
Date:	**Objective:**	
Name trainee	.....	Conditions: Wind: Current:

Assessor 1	Name: Signature:	Start position:
Assessor 2	Name: Signature:	Simulation reference number/title:

Assessment	Objectives (delete the objective which is not applicable)	0	1	2	3	difficulty factor	Max score	score
1	**Plan**							
1.1	Drafted plan is correct					2	6	
1.2	If answer from 1.1 (Plan) is no; then did they revise plan during exercise and create a correct plan					2	6	
1.3	Monitored- correctly - adjusted if necessary					2	6	
2	**Port entrance/departure channel**							
2.1	Entrance channel/ Departure channel					1	3	
2.2	Increase/reduction of speed in a controlled way					2	6	

Figure 13 Ship-handling assessment form example

The system we used for the judgment aspect made use of the ORCER method. Because this can sometimes be subjective, you should always have 2 competent assessors. Attached to the assessment above but not shown is also a general comments section. How much weight you attach to the comments and observation section will depend upon the criteria established at your institute and by the team of experts.

One common method of final evaluation is to view the scores and then have the ability to adjust the final overall score based on the assessors' evaluation of the performance. Two candidates may obtain the same numerical score on paper but the assessors (if justified) still can make a small adjustment to the final mark.

6.2 Process evaluation

As an approved institute for education and training your college/university will have a quality standard system that requires evaluation of your courses and the management system that supports them.

In evaluating your courses, items such as the following should be considered:

- The participants feedback or personal course evaluation
- Feedback from the clients or stakeholders
- Feedback from external auditors
- Self-assessments of the participants and instructors/facilitators
- Peer assessment of the instructors/facilitators
- Review of the lesson plan strategy and equipment (this is of particular interest in light of the developments in simulation, VR, AR, E-Learning etc..)
- Review of the assessment and evaluation system
- Review of levels attained by the participants
- Evidence of scholarly activity to improve the educational professionalism of the instructors

Listed are a few of the benefits from such an evaluation:

1. Demonstration of accountability shown by the institute that sets an example for the staff at all levels.
2. Forces the institute to re-visit their own assessment criteria for such evaluation processes.
3. Opens dialogue for discussion at a national level on standards for such a review. When considering evaluation of a successful training programme you can subdivide the programme into four levels.

1. Reaction level. (The trainees' reaction to the training: enjoyable, difficult, interaction with staff, equipment used, assessment format used)

2. Learning level. What percentage of participants achieved the desired level?

3. Job behaviour. Have the participants been able to successfully apply their new learning into their work environment?

4. The functioning level (efficiency and costs). How has this educational/training system affected the functioning of the organisation?

Due to time and cost restrictions, you may have to focus on only one or two of the above items. It should also be mentioned that stock should be taken of the entry level of the participants. Even though they should meet the prerequisite based on previous levels of competency and experience, there are no guarantees and this should be part of the evaluation process. Time and money may be required to bring some groups to the appropriate level before you start "your" educational lesson plan. For this reason, it is a wise strategy to use an entry-level formative assessment, to establish a baseline.

Evaluation can be considered either or cyclic or progressive.

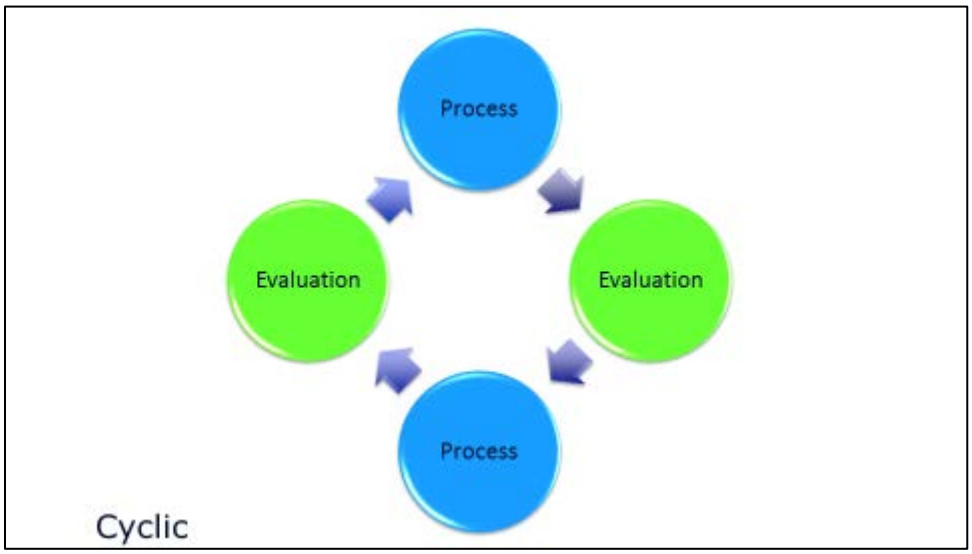


Figure 14: Cyclic course evaluation

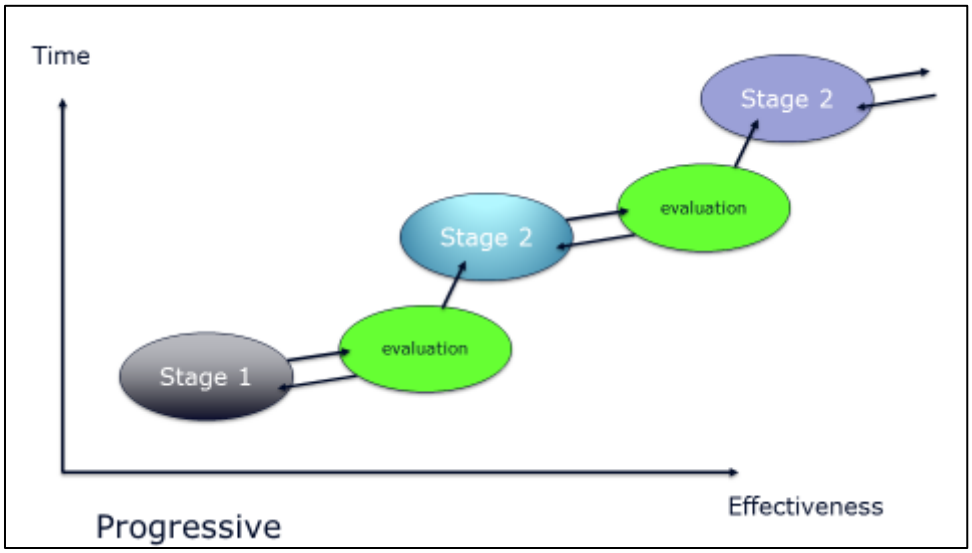


Figure 15: Progressive course evaluation

Module 7 Course design: Developing a new competency-based IWT course

What does course design mean?

Usually one understands course design to mean a preliminary sketch of a course or an outline showing the main features of a course to be executed. In a later phase, this also includes the course development to elaborate or clarify the contents and methods.

Course design and development are phases of instructional systems development (ISD) [ASTD 2008]. In the design phase, the course designer outlines the main features of the course and, in the development phase, the designer makes the course content clear by increasing the level of detail.

There are a number of ISD models used all over the world. Here we want to use the generic, or ADDIE model as our point of reference. The interconnected stages of this model are **A**nalysis, **D**esign, **D**evelopment, **I**mplementation and **E**valuation). It is simple to use, flexible, and versatile. It is cyclical; that is, it enables the instructor to correct the errors made in previous iterations, thus improving the quality of the end-product.

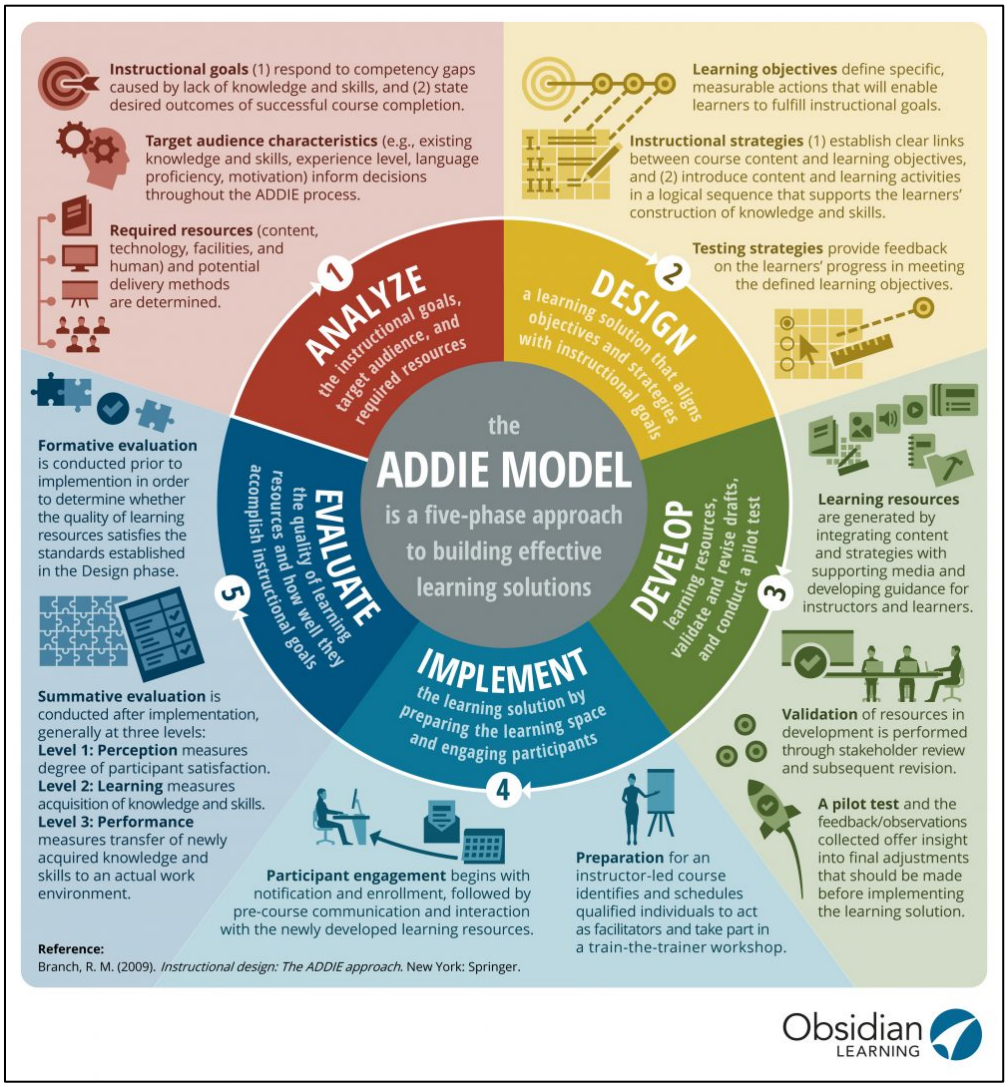


Figure 16: ADDIE model (https://elearninginfographics.com/the-addie-model-infographic/)

In the course design phase, the course designer or the design team plans the course while, in the development phase, the designer/design team develops the actual training materials for the course. In both phases, the trainer/designer makes increasingly precise decisions about what to include in a course and how to convey the content to the learners in a competency-based way. Several factors guide these decisions.

7.1 Analysis

The better instructors study the requirements prior to the course creation, the more effective the resulting course will be. The analysis phase deals with the “who”, “what”, “where”, “when”, “why”, and “by whom” aspects of the design process. The following aspects should be determined:

Who is the primary target audience for the course?
The situation on inland vessels is often characterised by a very heterogeneous crew, which makes it necessary to focus on the individual learners in any competency-based course in IWT. There can be huge differences in general education, language etc. It is also to be expected that the competences already acquired will have a different level or that learners will have very different learning skills.
Considering the above-mentioned aspects, the instructor should be able to answer the following questions:

- Who will the trainees be?
- Are participants in the course domain experts looking to broaden their knowledge, or newcomers just making their first steps?
- What are the common characteristics shared by the target audience? (e.g. knowledge from IWT or an adjacent domain, or the overall computer literacy level, education, language spoken, etc.)
- For which sector is the course designed?

When designing competency-based courses, one of the first steps has to be the analysis of the specific sector for which the course is to be designed. This manual deals with competency-based education in IWT, which makes it necessary to first identify the important factors for competency-based education in IWT.

What are the learning objectives of the course?
The analysis phase determines the knowledge, skills and attitudes to be learned for satisfactory job or task performance. The knowledge, skills and attitudes to be learned are written in the form of competency-based learning objectives.
As the major focus of competency-based education are the skills necessary for fulfilling a certain task, the important factors to be considered are also based on the development of those skills.
Before starting to work on teaching materials, it is vital to determine the main learning objectives and clearly communicate them to everyone involved in the creation of the course. What does the course aim to teach? What knowledge and skills will it impart to the trainees who complete it? The objectives must be described in detail from the outset, and they must be measurable.

First, the PLATINA Competence Tables clearly specify the ‘Knowledge, Understanding and Proficiency’, ‘Methods for Demonstrating Competence’, and ‘Criteria for Evaluating Competence’ for each competence in IWT [PLATINA 2016].

Nowadays, all relevant competences in IWT are mentioned in a directive of the European Parliament and of the Council on the recognition of professional qualifications in inland navigation and repealing Council Directive 96/50/EC and Council Directive 91/672/EEC [EU Directive 2018]. The current tables of IWT competences are referred to as the CESNI Competence Tables.

For each competence of the CESNI Competence Tables, it is necessary to select considered methods for demonstrating the competence and to create an activity-oriented, reality-based learning environment. The use of a simulator may be one of several options for doing this. Each of these competences must first be identified and then matched with an appropriate learning environment.

Several examples of learning activities and objectives for both the Navigational Operative Level and the Navigational Management Level, which can be very helpful in the design of an IWT course, are presented in detail in the 'Course Manual for Inland Navigation Education and Training' [CMINET 2015].
Yet, for the planning of a competency-based IWT course, it is necessary to structure the given content according to the given factors for competency-based education and training. Valuable support in this respect is provided by a structure developed in the mentioned CMINET project (Annex 1).

What are the physical and organisational constraints?
It is important to understand the environment in which the course will be delivered. The following questions should be:

- Are there any limitations imposed by the rules of the organisation that the instructor's designs must take into account?
- Is the overall length of the course or the time allotted to the study of individual modules limited in any way?
- In what setting will the education take place? (classroom/auditorium, simulator, onboard ship, etc.?
- Does the setting meet all the requirements of the course, or can those requirements be met when the need arises?
- Will the setting impact the effectiveness of education?

What are the technical requirements of the course?
During the analysis phase, it is necessary to formulate any technical requirements and limitations of the course, especially the course is to be used for online learning. Instructors should make sure that they know the following details before starting to work on the course and take them into account:

- The bandwidth of the trainees' internet connections.
- Whether the trainees are equipped with the devices necessary for audio playback (sound cards, speakers, headphones, and/or microphones).
- The list of software pre-installed on the trainees' computers.
- The list of browser plugins necessary for participating in the course (Java Virtual Machine, Flash, etc.).
- What browser(s) the trainees will be using to access the course.

What are the structural characteristics of the course?
All the information gathered during the preceding steps of analysis will help you establish the structure of the course. Instructors need to answer to the following questions before they begin:

- Is there any need to split the course into individual modules and include step-by-step instructions?
- At what key points do instructors need to test the acquisition and retention of knowledge?
- What weight is to be assigned to each test?
- Will the modules differ in size and importance?
- How will the trainees use the course material in the future?

How accessible are the knowledge sources?
During the analysis phase, it is important to assess the accessibility of the materials that instructors will use during the creation of the course. The following questions should be answered:

- Who or what will serve as the main source of information?
- Are the necessary information sources available in-house, or will they have to be found elsewhere?
- Is information about the course's topic available on the Internet? Is it easily accessible?
- Are there any materials on the topic that have already been written/created? Perhaps a different course that was used in the organisation before?
- Are there subject matter experts within the organisation that can help the instructors work on the course by sharing their knowledge and expertise? Will they be available to assist instructors with preparing the course?

What criteria will be used for assessment?
Instructors need to determine the way to assess the knowledge acquired by the learners. Having answers to the following questions will be helpful:

- How exactly trainees will be graded after the completion of the course? What kind of tests will be graded, or will the effectiveness of the course be measured by the practical skills and competences the trainee acquires after completing the course?
- If the instructor plans to assign grades to trainees, what will be the passing grade, and will a learner be able to pass a failed test again to improve their result?

7.2 Design

In the design phase, trainees will be taught that the focus is on learning objectives, content, subject matter analysis, exercise, lesson planning, assessment instruments used and media selection. The goal of this stage is to create the structure of the course.
The following issues are to be taken into account by the course designer/course design team when designing the course:

Focus on learning transfer
By focusing on transferring participants' learning to job performance, the training must ultimately lead to better job performance. Otherwise, no matter how entertaining or enlightening, the training will fail.

Which learning environment is appropriate?

For developing skills, the learning environment has to be activity oriented, enabling the learner not only to gain knowledge, but also to develop certain skills.

For IWT this means that the learning environment has to rely on the environment on board inland vessels. Yet, it is not necessary for competency based education to carry out lessons in the exact environment the learner is confronted with on board. On the contrary, in many situations it is much more efficient to use standardised simulation environments, so that the learners are confronted with a standardised, safe situation, which is still close to reality and activity-oriented. This aspect also raises the question of the available resources in general.

Available resources

In practice, this means either testing with activity-oriented learning stations, suitable simulators or training vessels, with whatever equipment is available. This also includes suitable e-learning systems or modules that help to develop certain skills, as well as films, videos and other forms of media presentation.

On the other hand, appropriate rooms and technical equipment are also necessary in order to be able to present elaborated presentations or role-plays in a pleasant learning atmosphere.

Even if numerous activity-oriented learning environments or situations are available, it must be checked in each individual case whether they are suitable to impart the desired competence. If this is not the case, it is necessary to plan which changes are to be made or to develop and introduce new learning environments.

In individual cases, this can be a considerable effort for the course designer. For example, if there is an existing interactive learning video and it represents a certain way of acting in such a way that the desired competence is conveyed, the following questions help to meet the desired requirements: is the language and vocabulary in the video appropriate? Is it owned or rented by the trainer? If the desired requirements are not met: can a suitable learning video be produced at all or in what amount of time and what are the costs involved? Consequently, a large number of detailed questions have to be answered and appropriate decisions have to be made.

Impact on the organisation

We must not forget the effects on the organisation. The design and development phases determine the course's expected benefits and costs to the organisation. The careful planner keeps costs proportionate to benefit. Often, however, the financial means of the school authorities are very limited, so that the implementation of goal-oriented ideas for the organisation of a course is either restricted or not feasible at all.

Scheduling a course design

The following notes must be observed with regard to the scheduling of a course design: Course design begins with the broad planning or macro-level planning, moves forward to mid-level planning for units or modules and ends with detailed lesson or learning plans at the micro-level. For example, in the design phase, a course designer may feel that the use of a training station for mooring a vessel with different types of bollards offers the best overview for the learners. In the development phase, the course designer/design team will select or create a particular station.

During the design stage, the instructor needs to accomplish three main goals:

1. Decide on the format of the course.

At this stage, the course developer has to decide how to best impart the knowledge to the target audience. They have to decide upon what teaching methods and aids to be used in order to prepare a manual, trainees will be able to study at their own pace, whether to create an electronic course on a computer, or resort to blended learning, the type and the number of tests to be used, which references to include, etc. This decision should be made based on the preliminary analysis of the target audience and its characteristics, preferences, and habits.

2. Develop the education strategy.

The education strategy is comprised of lectures, discussions, tasks, tests, projects, and supplementary materials meant to help the trainees better understand the course material. All of these are important to be developed as:

- Trainees will know what topics will be covered in a particular section of the course and the instructors can motivate them by explaining the advantages of possessing the knowledge and skills that will be imparted to them during the education process. At this stage, it is beneficial to tell the trainees about the objectives of the course, as it will help them understand the global structure of the course, and also how they would be able to apply the obtained knowledge after completing the course.
- The course will be concise and unnecessary details can be avoided. Examples should be included to help learners understand the material better.
- It is vital to enable the trainees to practice what they are being taught. The amount of practice a learner gets while taking the course and after completing it directly corresponds to how quickly and well he or she obtains the requisite skills.

3. Evaluate results

During the Analysis stage, the instructor needs to define the results the trainees have to achieve for the course to be considered a success. Depending on the specific objectives of the course, it is important to decide on the correct way to determine whether the trainees have reached the required performance. It is important to choose a way of rating the trainees that clearly shows whether they have acquired the necessary knowledge, and if the obtained skills and competences meet the requirements set for the course.

Designing a training course is like mapping out a road trip or creating a journey. A training design is basically an outline of all the ”what, where, who, when and how” details of the training for use by coordinators, curriculum developers, and trainers. There are five primary components of a training design:

1. Learning Outcomes: What will participants be able to do as a result of completing the training?
2. Training Materials: What materials need to be developed and what will the materials include?
3. Trainers and Content Experts: Who will facilitate the training and act as content experts to review materials?
4. Training Methods: What methods will be used so that participants meet the learning objectives and learn the content most effectively?
5. Logistics: Where and when will the training take place? Who will be invited and how will they be notified? Will a per diem be paid to participants? Etc.

In ideal cases, a needs assessment provides information about these five components. Optimally, the results of a needs assessment inform these five training design components. For example, if we know the gap between what a target audience knows and what it needs to know, we can write learning outcome statements that precisely meet their job-related needs (see CESNI). Needs assessment will also help determine who will be needed as content experts for the training, and whether a course should be one, three, or five days long.

Course Design Process

Course design refers to the planning and structuring of a course to achieve specific instructional objectives. The course design process includes the following activities:

- Identifying appropriate objectives
- Choosing content that's consistent with the objectives
- Selecting ways to achieve the objectives
- Assessing participant learning in relation to the objectives

As part of the design process, instructors should also consider (see picture):

- Their own teaching style, their personality and teaching competencies
- The learning styles of the trainees, their personality and competencies already gained
- The chosen Learning Environment and the role of the course in the overall training effort

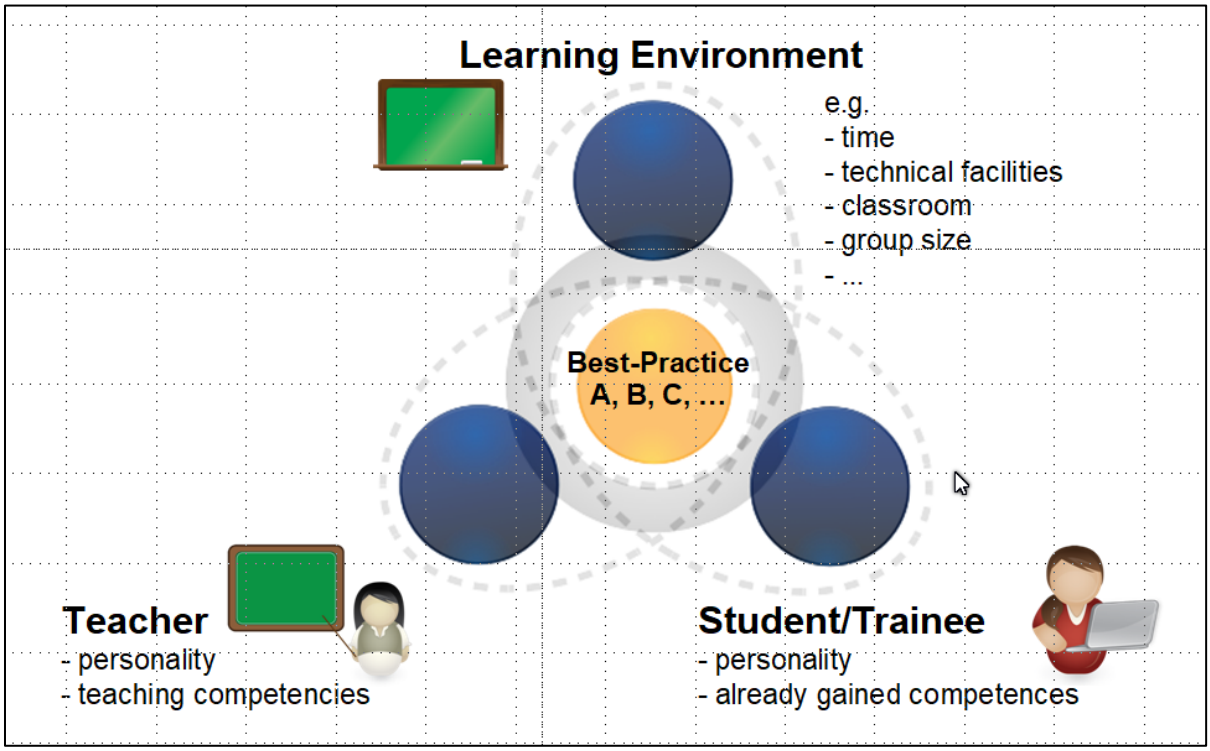


Figure 17: Online learning environment model

The designing process can be divided into three steps [Hamza 2012]:

1. Before training begins

Most design decisions must be made before the first lesson of the course. These decisions relate to these basic areas:

- The content to include
- The teaching methods to use
- The time allocated for each of the objectives
- The tools for assessing trainees learning

2. During the training session

As we conduct the training, we will learn more about the trainees and their needs. This information may require adjustments in the course design. For example, after working with the group, we may decide to:

- Change the time allocation for a particular topic
- Change the type of activity associated with a particular topic, for instance, from an individual to a group activity or vice versa

3. At the conclusion of the session

The information we gather at the conclusion of a training session will help us assess the effectiveness of the current training and help improve future training sessions. To evaluate the course, appropriate evaluation tools and own perceptions should be used.

Going into further detail of course design, the following checklist and questions are used as guidance. It is helpful to complete the following training worksheet to help you designing your training.

- General theme or topic: In general, what knowledge and skill areas will be the focus of the training?
- Goals and objectives: What do we want participants to learn during the training? (What will they leave knowing more about or what new skills will they have acquired?)
- Essential questions: What central questions do we want trainees answering as the training unfolds?
- Summary of trainee activities: How will trainees accomplish curriculum objectives and answer the questions in numbers 2 and 3 above? (e.g. small group discussions and projects, lectures, role-playing.)
- Resources: What resources might the trainer use to help trainees accomplish curriculum objectives? (e.g. current research, guest speakers, discussions, encouragement)
- Assessment activities: How will we determine if trainees
    - have reached curriculum objectives identified in number 2 above; and
    - can answer the questions in number 3.
- Evaluation of the training and the training process: How will we evaluate the quality and usefulness of the training as well as its implementation?

Learning Outcomes

Learning objectives are central when designing a training course. They must reflect the needs-assessment results and work in harmony with training methods and design. A learning outcome is a statement of what a learner is expected to know, understand, or be

able to do as a result of a learning process. There are several ways of developing appropriate learning outcomes/objectives. Beginning a learning objective with a strong verb can help guide the development of training because it focuses attention on what participants are supposed to be able to DO after they complete training. [Hamza 2012]
The following are just a few examples of standard verbs used to start a learning outcome or objective statement:

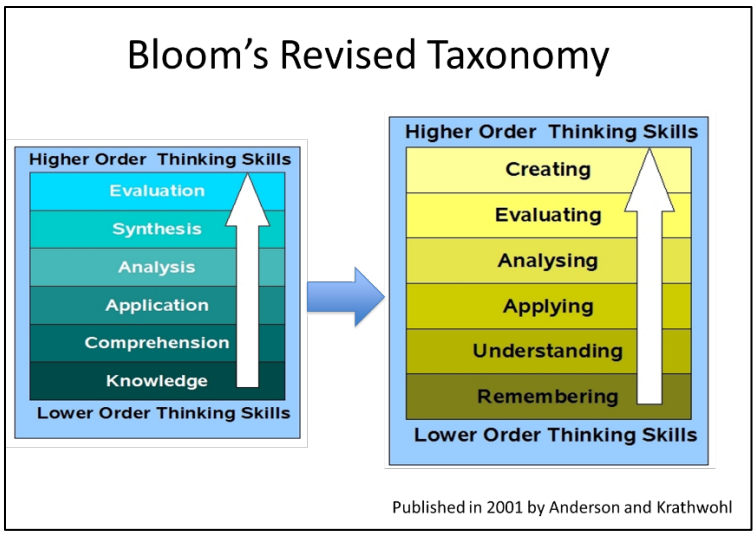


Figure 18: Bloom's revised taxonomy (Medved, 2010)

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

Figure 19: Bloom action verbs (Anderson, 2001)

There are specific reasons why objectives should be well thought through and clearly stated from the outset and before any design activities take place. These are:

- Identifying outcomes is an effective way to review curriculum and content. This leads to a more balanced and well-sequenced curriculum.
- It helps design appropriate assessment and evaluation tools that accurately reflect the curriculum.
- By reviewing the needs assessment, trainers know what participants know and need, and the learning outcomes help inform everyone as to what new materials or skills they are intended to learn.
- Trainers are able to evaluate the effectiveness of their teaching. Have the outcomes been achieved?

- An instructional shift from teaching to learning is facilitated. The focus is on the learner rather than the trainer.
- Participants will know exactly what they are expected to learn, thus avoiding ambiguity.
- If you build participant learning assessments into the training, participants will know exactly how their learning will be assessed.

Trainees begin to take more responsibility for their own learning when they know what they are expected to do and what standard they are expected to achieve.

At the stage of writing learning outcomes and objectives, the following questions need to be considered:

- What information or content do we want trainees to learn from the training?
- What do we want them to do with that information?
- What skills or competencies do we want them to gain, develop, expand, or improve?
- What kind of higher-level thinking do we want them to engage in?
- How do we expect participants to demonstrate what they have learned and how well they have learned it?
- At the very minimum, what should participants know and be able to do when they finish the training?
- How do we think they will be able to use the information and skills that they develop?
- If someone asks the participants what they learned from your training, how would we like them to answer?

There are four major steps to any training design process:

STEP 1:
It is much better to sketch out the whole curriculum before going into the specifics. Think about the big picture:

- What is the major aim of the training?
- What is it trying to achieve?

WRITE a goal or aim statement. This should be a broad, general statement, such as: participants will be able to understand the importance of disaster risk-reduction alongside preparedness and response.

STEP 2:
CONSIDER the overall scope of training.
Specify the major topics or sections of the training by brain-storming (with others) and making a list. What sort of things do we want the participants to learn?

At this level, the outcome statements will be quite broad referring to such areas that cover the whole subject. For example: participants who successfully complete the training are expected to be able to:

1. Establish a common understanding of the principles on which the basics of vessel operation and command are based.
2. Develop a better understanding of inland waterway vessel action, response and assessment as an integral part of on-board work.

3. Illustrate the role of the different actors in an on-board situation and the importance of coordination between them.
4. Introduce and discuss the knowledge and practice/competencies already introduced on board an inland waterway vessel.
5. Build a network among the trainees by sharing the experience, existing know-how and team-building.

STEP 3:
The next step is to IDENTIFY specifics. Brainstorm and create a list. This is where we will write clear, precise statements detailing what the participants will actually be doing.

- What specific, detailed knowledge, information, or skills do we expect participants to learn from the training?
- What cross cutting issues need to be included and which ones to be prioritised (gender, environment, etc.)?

For example: It is anticipated that participants who successfully complete the training will be able to:

1. Acquire the conceptual basis to understand the complexity of vessel operation and management.
2. Develop a better ability to engage and relate to experts from different disciplines in a professional situation.
3. Have an improved ability to use tools and mechanisms to analyse risks, work tasks and capacities and acquire basic knowledge in risk identification and assessment.

STEP 4:
THINK about how trainees can demonstrate their learning, i.e., exactly what they should be able to do. Brainstorm and generate a list of ideas for how trainees can demonstrate what, how much, and how well they have learned.

7.3 Develop

When good content is matched with an appropriate design, even the most complex documents become appealing, credible, and easy to read. In fact, studies have shown that using the right design elements can have a positive impact on how well readers understand the material. Curriculum and material development usually include the following:

Background and descriptive information

1. Basis of the curricula (why it was developed)
2. Target audience
3. Other relevant information explaining the material and supporting its use in a different setting
4. Resources supporting the content, (e.g. citations, web links, prototype materials, tools, and guidelines)
5. Copyright and contact information

Directions on how to use the curricula

1. Guidance on using adult learning principles
2. Specific tips to improve learning
3. Outcome and competency statements

4. Suggestions on adapting the curricula and supporting materials for a different target audience or for a different context

Course planning forms and checklists

1. Materials, equipment, and facility specifications
2. Unit or module overviews with key messages
3. Scope and sequence guidelines, (e.g. sample course outline or agenda with timeframe)

Guidance on tailoring each particular workshop

1. Topic-specific materials and questions to help trainers gather needs assessment data that helps determine what participants want or need to learn; and what skills they wish or need to develop.
2. Materials may include:

- Questionnaires or discussion questions for gathering information from potential participants and/or their supervisors before the training
- Questionnaires to be collected at the beginning of a training session
- Suggested questions that trainers can ask at the beginning of the training
- Exercises that help participants think about their own learning objectives
- Pre-tests or activities to determine what participants already know, or what they want to learn

3. Suggestions for revising the training so it better addresses the needs of the group
4. Optional sessions, when relevant

Specific, measurable, and realistic learning objectives

1. Learning objectives explaining what participants should know or be able to do as a result of the training or learning activity.
2. Objectives should be specific. They should state specific knowledge, attitudes, or skills that a participant should be able to demonstrate.
3. Objectives should be measurable. It should be possible by observation, testing, problem-solving exercises, or some other means of evaluation to determine whether participants have achieved the anticipated learning objective.
4. Objectives should be achievable and realistic. Learning objectives describe expectations of knowledge, attitude, or behaviour change that are realistic given the instruction conditions (e.g. training time and size of the group).

Clear and complete course content

1. Course outline including content, learning activities, directions, and timeframes
2. Easily understandable presentation notes with support materials for each session (e.g. PowerPoint, overheads, participant worksheets, and handouts)
3. Include important teaching points for the trainer to introduce, discuss, or address
4. Active learning exercises (e.g. role-plays, group discussions, case studies, brainstorming, and skills practice) providing opportunities for participants to clarify, question, apply, and consolidate new knowledge
5. Participant handouts and other course material easily understood by participants
6. Accurate and appropriate technical content
7. Ordered content with information moving from basic to specialised, and from simple to complex
8. Suggestions for presenting the material
9. Participant opportunities for building on what they've previously learned

Integrated evaluation plan / tools

1. Methodology and tools for assessing participants' learning and progress, (i.e. evaluation)
2. Evaluation instrument(s) should measure:

• Process - to get immediate feedback about the workshop experience, (e.g. content usefulness and quality; trainer/facilitator's helpfulness and applicable experience; adequacy of the handouts or other materials, facilities, workshop registration/preparation, etc.)

• Outcome - to measure participants' immediate changes in knowledge, attitude, or behaviour based upon exposure to the training session or course, (e.g., pre- and post-training questionnaires or tests, open-ended questions, interviews, exercises)

• Impact - to measure longer-term training outcomes (e.g. guidelines for conducting follow-up interviews, site-visit procedures, and suggestions of markers for measuring longer-term outcomes)

3. Evaluation questions linked to specific learning objectives.
4. Participants' suggestions on improving future workshops of this type
5. Trainer/facilitator self-evaluation form
6. Observer form for giving feedback to trainer/facilitator.

Once we have developed a course document's basic content, the publication development process generally proceeds in two stages:

7. The draft stage—all design team members have input on all aspects of the project: Planning, Content Development, Draft Layout and a Preliminary Review.
8. The final stage—the final layout incorporates the final text and images; the materials are sent to the printer: Final Lay-out, Final Review, Printing, and After Printing

If the design phase of training is like creating a blueprint for a house, the development phase is the actual hammer-and-nails construction. We know what we want to build and how we want to build it. Now we must take the right materials and build a solid structure. Just as with a house, we should consider how occupants will use and navigate through the training structure.

Developing training involves writing materials, creating learning exercises, and working with content experts and trainers. It is the most time-consuming phase of training; draft materials may go through multiple revisions, involving several people, before they are ready for training use.

As we progress through this development phase, we need to make sure the training materials and exercises match the learning outcomes we identified in the design phase, which are based on the needs assessment. All subsequent training phases should reflect these outcomes.

One major aspect is the fact that, due to heterogeneous groups of learners in IWT, no course can be generally structured and carried out.

Yet, there are certain aspects to take into consideration when developing new competency based IWT courses.

- define the goal to be reached
- analyse the group and find out about their individual needs
- organise an activity oriented learning environment
- safe situations
- comparable tasks
- cooperation with partners □ standards in the EU

Here are a few considerations the instructor should keep in mind during development:

- Spice the course up with media content. Anything from illustrations to videos to graphs and tables will make the course look better and help the learners to acquire information on the visual level. Interactive tasks will make the course more engaging and give the learners some hands-on practice related to the topics being learned.
- Introduce new topics only after the learners have had a chance to grasp the basics and understand all underlying concepts.
- Do not disregard the data collected during the Analysis stage, and always keep in mind the main objectives the course aims to achieve.

In order to ensure that the course meets the required standards, a number of learners need to complete the finished sections of the course. Their feedback is recorded and changes are made to the course based on this. The corrected sections are then returned to the learners for another pass.
It is also important to measure the time it takes the learners to complete the course and see how it measures up to the goals set before the course. If the average completion time is significantly longer than planned, the instructor should consider revising individual pages and/or sections, or even removing pages containing non-essential information outright.
Having finished developing the course, it is a good idea to once again submit it for review to higher-ups/clients for additional feedback.

7.4 Implement

During the implementation stage, the materials created during development are introduced to the target audience and the learning process starts. The instructor reflects on the continuous modification of the program to make sure maximum efficiency and positive results are obtained. Here the instructor strives to redesign, update, and edit the course in order to ensure that it can be delivered effectively.

The course implementation can take different forms:

1. Trainees acquire knowledge autonomously by taking an electronic course and trying to understand the material with no outside help.
2. Knowledge transfer is facilitated by an instructor or a group of instructors using the developed materials as a basis for teaching. They deliver the information to learners and make sure that the main concepts of the course are well understood.
3. Learners study a part of the course autonomously, while the rest is explained by an instructor, who also controls the acquisition and retention of knowledge

The instructors developing a course should consistently analyse, redesign and enhance the course to ensure competency-based delivery. Meticulous monitoring is a must. Proper evaluation of the lesson, course or programme, with necessary and timely revisions, is done in this phase. When instructors and trainees actively contribute during the implementation process, instantaneous modifications can be made to the course or lesson, thus making the programme more effective and successful.

7.5 Evaluate

The last stage of the ADDIE method is Evaluation. This is the stage in which the instructor must subject the course to meticulous final testing regarding the what, how, why, when of the things that were accomplished (or not accomplished). There is an initial evaluation that happens during the development stage and a summative evaluation that occurs at the end of the programme. The main goal of the evaluation stage is to determine if the course objectives have been met, and to establish what will be required moving forward in order to further the efficiency and success rate of the programme.

Evaluation is done throughout the implementation phase with the aid of the instructor and the trainees. After the implementation of a course or programme is over, a summative evaluation is done for instructional improvement. Throughout the evaluation phase, the designer should ascertain whether problems relevant to the training programme are solved, and whether the desired objectives are met.

Evaluation is an essential step of the whole ADDIE method as it aims to answer the following questions:

1. Was the course effective? (i.e. improved learning, increased motivation, competence/skill acquired etc.)
2. Was learning and instruction fun and engaging?
3. Did the instructor understand the objectives of the course?
4. Were the teaching materials relevant to the course's objectives?
5. Were there enough practical exercises?
6. Did the tests check the knowledge that is relevant to the course's goals?
7. Did the instructor receive enough feedback from trainees?

Conclusion

In conclusion, the development of a competency-based IWT course involves numerous factors to be taken into consideration. The underlying aspects influencing those numerous factors are predominantly the individual needs of the people involved, trainers as well as trainees. Since the trainees' needs especially, depending on their individual prior skills and knowledge, influence the aims in competency-based education to a great extent, it must be assumed that no competency-based course can be adopted without taking into account the individuals involved. Moreover, the local conditions, financial situation etc. of the training institute are also relevant for planning competency-based courses. Yet those factors usually do not change so frequently. Therefore it is necessary to check whether these factors still fit the situation presumed when planning the course. They need not change for every single course unless required to meet the people's needs.

References

1. Tracey, W.R. (1985). *Human Resources Management and Development Handbook*. American Management Association, New York
2. Biech, E. (2005). *Training for Dummies*. Wiley Publishing, New Jersey
3. Fink, L. Dee (2003). *Creating Significant Learning Experiences*. Jossey-Bass, San Fransisco
4. Bloom, Benjamin S. & Krathwohl David R. (1956). *Taxonomy of educational objectives: The classification of educational goals, by a committee of college and university examiners. Handbook 1: Cognitive domain*, New York, Longmans.
5. Robinson K. Sir. *Bringing on the Learning Revolution,* [On-line] available: www://sirkenrobinson.com/skr/ (accessed September 28 2010)
6. Atherton, J. S. (2010) *Learning and Teaching; Bloom's taxonomy* [On-line] UK: Available:http://www.learningandteaching.info/learning/bloomtax.htm Accessed: 28 September 2010
7. Fisher, D. & Muirhead, P. (2005) *Practical Teaching Skills for Maritime Instructors* Second Edition Malmo: WMU Publications
8. Swinton, Lyndsay. (December 2004) "Honey & Mumford Learning Style Questionnaire. [On-line] available: Mftrou.com. < http://www.mftrou.com/honey-mumford.html (accessed Sept 29 2010)
9. SAS Flight Academy (2003) SAS BRM Bridge Resource Management Trainers workbook, 9th Edition Sweden, SAS Flight Academy
10. Billington, Dorothy D. (1996) *Seven Characteristics of Highly Effective Adult Learning Programs*, New Horizons for Learning, [On-line] available: http://www.newhorizons.org/lifelong/workplace/billington.htm (accessed 28 September 2010)
11. Cross, S.J. & Muirhead, P.M. (1998) "*Simulator instructor training – the pedagogical needs of the post STCW 95 era*". In J.B. Hooper, A. Redfer, & N.A.J. Witt (Eds.) Tenth International Navigation Simulators Lecturers' Conference (INSLC). Malmo: International Maritime Lecturers Association (IMLA)
12. Committee on Developments in the Science of Learning with additional material from the Committee on Learning and Research and Educational Practice, National Research Council. (2000) *How People Learn: Brain, Mind, Experience, and School*: Expanded Edition , Washington D.C.: National Academies Press.
13. Achor, S. The happiness advantage: research linking happiness to success, (on-line) available www.TED.com (accessed Dec 2011)
14. Grow, Gerald O. (1991/1996). "Teaching Learners to be Self-Directed."*Adult Education Quarterly, 41* (3), 125-149. Expanded version available online at: http://www.longleaf.net/ggrow.(accessed Oct 10, 2012)
15. http://www.umsl.edu/~henschkej/henschke/the_new_update_on_adult_learning_theory_mirriam.pdf (accessed Oct 10,2012)
16. Fulantelli, G. Oprea L (2011) *SLOOP2DESC Project – Sharing Learning Objectives in an Open Perspective to Develop European Skills and Competences*, Europlus Publishing, Galati, Romania (accessed http://www.adam-europe.eu/prj/5936/prj/Sloop2desc_book.pdf (Oct 17, 2012)
17. IMO Model Course 6.09 Training course for instructors (2001): International Maritime Organization London SE1 7SR
18. Achor, S. The happiness advantage: research linking happiness to success, (on-line) available www.TED.com (accessed Dec 2011)

19. Directive 2008/106/EC (2008) "*The minimum level of training of seafarers*" Official Journal of the European Union
20. STCW Convention International Convention on Standards of training Certification and Watch-keeping for Seafarers, 1978, as amended including the Final Act of the 2010 Conference of Parties to the International Convention on Standards of Training, Certification and Watch-keeping for Seafarers, 1978, and resolutions 1 and 3 to 19 of the Conference. Third consolidated edition 2011: International Maritime Organization London SE1 7SR
21. IMO Model Course 6.10 Train the Simulator Trainer and Assessor 2012 Edition: International Maritime Organization London SE1 7SR
22. Validation of Model Training Courses Model Course-Train the Simulator Trainer and Assessor Draft Model course STW 43/3/4, Sub-committee on Standards of Training and Watch-keeping: accessed May 2013 on-line http://www.scribd.com
23. Branch, R. M. (2009). Instructional design: The ADDIE approach (Vol. 722). Springer Science & Business Media.
24. Ed Forest: The ADDIE Model: Instructional Design, Educational Technology
25. [ASTD 2008]American Society for Training and Development (ASTD): Instructional Design and Implementation. Train-the-Trainer: Volume 2. American Society for Training and Development, 2008.
26. [PLATINA 2016] Consolidated tables of STCIN competences. Deliverable No D3.13. Strasbourg: Central Commission for the Navigation of the Rhine.
27. [EU Directive 2018]Directive of the European Parliament and of the Council on the recognition of professional qualifications in inland navigation and repealing Council Directive 96/50/EC and Council Directive 91/672/EEC.
28. [CMINET 2015] Course Manual for Inland Navigation Education and Training, 2015.
29. [Hamza 2012] Hamza, Mo: Developing Training Material Guide. Swedish Civil Contingencies Agency (MSB), December 2012.
30. [Medved 2010] Medvev, Michele B.: Designing Competency Based Training with Bloom's Taxonomy. *https://mbmtraining.files.wordpress.com/2010/12/blooms.ppt,* 20.02.2018, 23:14 Uhr. [Anderson 2001] Anderson, L. W. and Krathwohl, D. R: A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon, 2001.
31. [Nikolov 2014] Nikolov, R. ; E. Shoikova, E. and Kovatcheva, E.: COMPETENCE BASED FRAMEWORK FOR CURRICULUM DEVELOPMENT. State University of Library Studies and Information Technologies. TEMPUS project. PICTET: EQF-based professional ICT training for Russia and Kazakhstan, Sofia 2014.

http://www.ifsma.org/tempannounce/aga33/GlobalMET.pdf
accessed Nov 2017
https://www.ijlter.org/index.php/ijlter/article/viewFile/837/pdf
accessed Nov 2017
https://www.utu.fi/en/units/cms/projects/mariepro/Documents/Survey%20report%20on%20syllabus%20differences%20between%20MET%202016.pdf
accessed Nov 2017
http://iamu-edu.org/wp-content/uploads/2014/06/29-Seafarer-Training-Does-the-System-Defeat-Competence.pdf
accessed Nov 2017

http://iamu-edu.org/wp-content/uploads/2014/07/Challenges-and-Opportunities-in-Maritime-Education-and-Competence-Development-a-comparative-analysis-of-lessons-learnt.pdf
accessed Nov 2017
http://ceur-ws.org/Vol-1614/paper_25.pdf
accessed Nov 2017
https://training.gov.au/TrainingComponentFiles/NTIS/TDM01_1.pdf
accessed Nov 2017
https://www.researchgate.net/profile/Gholam_Reza_Emad/publication/235279251_Contradictions_in_the_practices_of_training_for_and_assessment_of_competency_A_case_study_from_the_maritime_domain/links/56de691a08aeb8b66f94b182.pdf
accessed Nov 2017
http://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/meetingdocument/wcms_164412.pdf
accessed Nov 2017
http://blog.competencycore.com/2013/04/competencyframework.html
accessed Nov 2017
https://www.researchgate.net/profile/Jason_Frank/publication/45387549_The_role_of_assessment_in_competency-based_medical_education/links/09e41506449a82d2a3000000.pdf
accessed Nov 2017
http://tll.mit.edu/help/types-assessment-and-evaluation
accessed Nov 2017
http://www.itlal.org/?q=node/93
accessed Nov 2017
https://www.researchgate.net/profile/Jason_Frank/publication/45387543_Competency-based_medical_education_Theory_to_practice/links/0912f5029a4ec8b894000000/Competency-based-medical-education-Theory-to-practice.pdf
accessed Nov 2017
https://assessmenttrainer.nl/waar-word-je-op-beoordeeld/#WAKKER method
Accessed Nov 2017
https://karvi.fi/app/uploads/2014/09/OPH_0499.pdf
Accessed Dec 2017
http://www.oecd.org/edu/school/46927511.pdf
Accessed Dec 2017
http://www.unesco.org/fileadmin/MULTIMEDIA/HQ/ED/pdf/me-report.pdf
Accessed Dec 2017
http://www.ciep.fr/sites/default/files/migration/en/bibliography/docs/bibliography-schools-evaluation.pdf
Accessed Dec 2017
http://www.oecd.org/edu/school/synergies-for-better-learning.htm
Accessed Dec 2017
https://elearninginfographics.com/the-addie-model-infographic/
Accessed Feb 2018
https://www.elearninglearning.com/addie/reference/
Accessed Feb 2018

Annnex 1 Format Course manual

1 GENERAL INFORMATION

1.1 Introduction

The purpose of this course manual is to assist education and training institutes in integrating competence tables in their curricula.

Its intention is neither to present instructors with a rigid “teaching package” which they are expected to ''follow blindly", nor to substitute the instructor's presence by audio-visual or “programmed" material. As in all training, the knowledge, skills and dedication of instructors are the key components in the transfer of knowledge and skills to those being trained through the training course material.

The training systems and cultural backgrounds of learners vary considerably from country to country. For this reason the course material has been designed to identify the basic entry requirements and trainee target group in universally applicable terms, and to specify clearly the technical content and required levels of knowledge and skill.

1.2 Course objective

The general course objective.

1.3 Entry level

The required entry level of the participants.

1.4 Pass criteria

Description of the passing criteria

1.5 Required qualifications of teachers, examiners, instructors and operators

An overview of the required qualifications of the instructors, assessors and examiners.

1.6 Course maintenance

Who is responsible for the maintenance of the course? It should be clear who keeps the course (contents) up-to-date.

2 INSTRUCTOR MANUAL

2.1 Lesson plan

The lesson plan or Instructor Guide (IG) specifies activities and an overview of the materials to be used during the course. The IG includes subjects and specific learning objectives. The Instructor Guide is attached to the course manual and can be filled in by the institute.

2.2 Background material

An overview of materials to be used – such as course books, e-learning modules, presentations and/or hand-outs – is also attached to this manual, together with where they are to be found (as hardcopy and/or digital versions).

Location and name of books, presentations and/or hand-outs:

- ……. can be found at……..
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2.3 Practical Activities

Generally speaking, practical activities involve: (Simulator) exercises

Practical exercises on board a (training) vessel or in an IWT ship-handling simulator can be undertaken in order to give the learners the opportunity to deepen and enhance their theoretical knowledge. This practical training links the theoretical content of the lessons to their practical use.

Case studies

Theoretical subjects are elaborated autonomously by the learners in case studies. The candidate should deepen their knowledge in defined theoretical subjects by elaborating on a variety of facts and figures on this topic and then presenting the results in front of the class.

Group discussions, interactive learning

Possible solutions to theoretical and practical subjects can be discussed within (a subsection of) the learning group. Different opinions on a defined subject are exchanged and discussed by the participants, broadening individuals' views of the problem and highlighting possible solutions and their respective advantages and disadvantages. Such discussions should where necessary be monitored and steered (stimulated or consolidated) to ensure that every student actively participates.

Teamwork

Assignments can be either individual or team assignments, depending on the objective. An individual assignment should stimulate and show up an individual's competences. In a teamwork assignment the participants will be exposed to a wide range of experiences: from quick synergy-based problem-solving to experiences relating to such aspects as interpersonal difficulties in a team setting. Depending on the purpose of the assignment the team should be defined in advance, with the assignment and any work process rules being communicated to the team in a clear and formal manner.

Specify in attachment 3 such Practical Activities as:
- Simulator exercises
- Practical (real life) exercises such as:
  - Case studies
  - Discussions
  - Teamwork

The description contains at least the following items:
  - Specific objectives of the Practical Activities
  - Relation to theory
  - Clear instructions for the instructor/operator for performing the Practical Activities

2.4 Classroom facilities and educational tools

For the course the following educational tools should be used: Classroom facilities such as

- Blackboard or whiteboard
- Overhead projector or beamer
- Computers

Educational tools

- Books
- Print-outs
- E-reader
- E-learning modules

Laboratory equipment and facilities such as

- Bollards, anchor windlass, lashing windlass
- Ship models
- Ropes, wires, chains
- Mast showing day and night signals
- Personal Safety/Protection Equipment
- Charts
- Compasses, such as magnetic and gyro
- Inland Navigation Handbooks

Simulators such as

- Bridge simulator, designed for inland navigation
- Inland ECDIS simulator
- VHF simulator

Other, such as

- (Training) vessel
- Personal Safety and Protection Equipment

Specify in attachment 4 the educational tools to be used during the course and how they will be used.

2.5 Examination & Assessment

In general it is a good idea to apply a common and uniform evaluation/assessment concept.

Evaluation effectiveness depends on the accuracy of the description of what is to be evaluated. There are two distinct aims of a course's evaluation:

- Student evaluation/assessment

The aim of this evaluation/assessment is to find out whether learning has taken place. It enables the instructor to ascertain whether the student has acquired the required skills and knowledge needed at a given point in a course or in working towards a qualification.

- Evaluation of the instructor and the course itself

The aim of this evaluation is to determine – from a student point of view – whether the instructor has done a good job and how the organization of the course was seen, thereby gaining valuable input for the improvement/optimization of a course program and its implementation.

Guiding principles:

Evaluation and assessment should be conducted in accordance with Column 3 - Methods for demonstrating competence - and Column 4 - Criteria for evaluating competence of the Platina Competence Tables. Instructors should refer to this table when designing the assessment.

The instructor or course organizer is responsible for the use of appropriate methods and evaluation tools. If necessary, appropriate evaluation tools may need to be developed. The methods and tools should be based on the course objective, the content covered and the qualifications to be achieved.

Initial / diagnostic assessment

This should take place before the student commences a course to ensure he has the appropriate entry level. Diagnostic assessment is an evaluation of a student's skills, knowledge, strengths and areas needing further development. This can be carried out in an individual or group setting through relevant tests.

Formative/Summative assessment

Formative assessment

An integral part of the teaching/learning process is "continuous" assessment. This provides information on the student's progress and may also be used to encourage and motivate him.

The purpose of formative assessment is:

- to provide feedback to learners;
- to motivate learners;
- to diagnose learners' strengths and weaknesses;
- to help learners develop self-awareness.

Summative assessment

Such assessment is designed to measure student achievement against defined objectives and targets. It may take the form of an exam or an assignment and takes place at the end of a course. Its purpose is to assign a student a grade (pass or fail).

Theoretical/practical assessments

For theoretical examinations the following exemplary options are available:

- Multiple-choice tests: Multiple-choice items can be used to assess both simple knowledge and complex concepts. Since multiple-choice questions can be answered quickly, a student's command of many topics can be assessed in the exam. In addition, answers can be easily and reliably evaluated.
- True-false tests: As guessing will produce the correct answer half of the time, true- false tests are less reliable than other types of exams. However, they are appropriate for occasional use. Therefore, a combination of multiple-choice and true-false questions is suggested for an exam.
- Some of the true-false questions could have an added "explain" column in which learners write one or two sentences justifying their response.

When examining practical work, a performance test is a method of measuring (judging and assessing) proficiency. Performance tests require learners to demonstrate proficiency in executing a series of steps in a reasonable amount of time, following instructions and reacting to simulated situations. Performance tests can be used individually or in groups. Exact criteria have to be specified to be used for grading results and the problem has to be stated in such a way that learners know exactly what they are supposed to do. A performance test should always mirror a real-life situation.

Scoring:

The assessment is to judge whether the participants have acquired the necessary skills, in terms of achieving sufficient specified learning objectives, to perform the tasks required by the qualification. They should be tested against predetermined criteria rather than against the performance of other examinees or the norm for the group as a whole.

The pass mark should be set at the score which proves that sufficient skills and knowledge have been demonstrated in each subject. It is essential to have documentation attesting a consistent standard with regards to marking.

To achieve uniformity in marking between examiners in different centres and to facilitate the review of papers, the following guidelines should be used:

1. When several learners sit the same examination, papers – except when consisting solely of multiple-choice questions – should be marked question by question, i.e. question 1 of paper 1 should be marked for all applicants before proceeding to question 2, etc. This provides for more uniform marking.
2. All questions should be marked even if it becomes apparent that the candidate will not achieve the pass mark.

Evaluation/Assessment of the instructor/the course

Instructor / course evaluation is conducted at the end of a course. There are two possible ways of doing this:

- Usually the student will provide feedback on the course and instructor using a standardized questionnaire. Questions will relate to the content, implementation / organization and personal benefit of the course for the student.
- It is also possible to statistically compare the performance of all comparable courses, putting course data in relation to average values. This can be classified and optimized in terms of positive/negative impact on the optimization of a course offering extremely good or bad feedback. Moreover, this also allows a comparison of different training providers, insofar as they are prepared to raise this level of transparency.

Evaluation can also be required for quality assurance purposes. In such a case, the purpose will be:

- to provide feedback to Instructors on student learning;
- to evaluate a module's strengths and weaknesses;
- to improve teaching.

Specify in attachment 5 the assessment and/or examination process and items used, such as:

- Method of assessment in terms of written examination, assignments, presentations, oral examination, simulator-based assessment, etc.
- Documents used
- Organization of exams and assessments
- Teaching tools used in the assessment/examination
- Responsibility
- Rules and regulations

3 REGULATIONS AND CERTIFICATION

In the case of an official certificate being issued by a (inter-) national body, this chapter can be filled in by the institute.

3.1 Official course name

Course name and course code used by ..... (For instance for registration and administration purposes.)

▪

3.2 Official course name as used by the accreditation authority

Name and code of the course and name and code of..... as used by the accreditation authority.

Name of the accreditation authority
▪

Name and code of the course (used by the authority)
▪

Name and code of ..... (used by the authority)
▪

3.3 Official text and stamp for the Service Record Book (or other)

(If applicable) The official text and stamp that should be used for course registration in the Service Record Book (or other).

▪

3.4 Course certificate

Attached: a copy and below the link to the location of the certificate as approved or recognized by the authority.

Location course certificates:

- ……..

3.5 Official course manual/guideline reference

Reference can be made to official course manual/guidelines from authorities/institutes such as: ……
When elements of the course manual are used, these should be specified.

Model course/guideline reference:

3.6 List of qualified teachers, examiners and operators

A list of teachers, examiners and operators who are qualified by …….. to hold this course for ……

- List of qualified instructors is available from the responsible manager.