ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 11, pp.41491-41499, November, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

THE ESSENTIALITY OF AN INSTRUCTOR IN REGARDS TO SIMULATOR TRAINING

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ARTICLE INFO

Article History:
Received 08th August, 2016
Received in revised form
22nd September, 2016
Accepted 25th October, 2016
Published online 30th November, 2016

Key words:

Seafarer training,
Simulator,
Instructor training,
Technology.

ABSTRACT

The standard protocol regarding traditional seafarers training was based first on theoretical teachings in the classroom, followed by practical training onboard the ship. This teaching method underwent profound changes in the 1980s, due to economical and practical reasons; reduction of crew size, improvement of technology and better access to simulator based training proved to be determining factors that changed the way training was completed. Although training through simulators ashore eliminated the difficulties presented on the ship, the lack of these experiences causes students to not be fully prepared for the real problems that may arise on ship. Instructors play an important role in training because they connect the lessons learned from the simulators with the expected, practical experiences among the ship at sea. This article examines the use of marine simulators in parallel with the role of the simulator instructor. It is necessary for the instructor to obtain proper qualifications through IMO so that when partnered with the simulator, the training will prove to be effective. Only through integration of these measures can effective and efficient training of the seafarer be achieved in line with the training objectives of the STCW Convention.

Citation: Amr Saad Eldin Abd Elhamed Sadek, 2016. "The essentiality of an instructor in regards to simulator training", *International Journal of Current Research*, 8, (11), 41491-41499.

INTRODUCTION

Similarly, to other fields of training in the marine industry, the use of simulation aids in covering multiple factors such as technological, financial and training aspects. Some advantages in using simulators include the following: The advancement of simulation technology has allowed for simplicity in areas that once were difficult to cover. For example, where factors such as time and space were once an issue in determining a convenient training schedule, instructors can plan a training schedule that is more suitable. As easy as it is to plan a schedule, instructors can also manually input the desired environment for the simulator and training experience to match that of the environment as if the seafarers were aboard a ship at sea. Instructors, for instance, can run and speed up a ship on simulator as training requires without worrying about fuel costs or time constraints. Operation of a cost-efficient simulator also allows for the application of different scenarios; this enables easier comparison and study of different situations that could take place at sea. For example, an unrealistic scenario such as moving from the English Channel to Tokyo Port in one day of training allows for processing and analyzation of a situation that depict real life complications in navigation. Simulation also allows for the testing of operation in shallow water, as well as modification of the entering/leaving harbor route plan. Where all these variables can be altered to cause unique experiences for the trainee, multiple types of ships are also available on the simulator to provide trainees the ability to actually feel the difference in ship behavior, such as the difference in medium size general cargo ships compared to VLCCs. Familiarization of equipment fitted onboard ships is also made possible through simulation training. Simulation gives the chance to apply theoretical concepts and demonstrate their practicality, and thereby, help increase the confidence and morale of the trainees. Simulators are becoming increasing apt at representing scenarios abroad a real ship. In fact, the whole onboard system of a ship can be installed as simulator in a purpose built scenario. Other complicated scenarios such as those which would compromise on ship safety are made possible through simulation; these include close quarter situations, excessive turns and high speeds beyond the ship. Unlike experiences that occur on ships, where all situations are new and cannot be repeated exactly, conditions and environment in a simulator can be repeated recurrently to improve the learning outcome.

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Simulator-Based Training: A Historical Perspective

Simulation usage was encouraged in the aviation industry due to high cost of fuel and safety risk involved in real time

training. During World War II, there was a high demand for proficient pilots; however, there were a short supply of training aircrafts. This led to the replacement of real aircraft training with simulator based training. Although the flight simulators were very costly, technological advancements have reduced the manufacturing cost of the simulators, causing them to become more cost efficient. This allowed for the simulation industry to diversify and expand, so that simulation can be used for ship's as well.

Technological advancements and operational requirements brought in multiple simulators in the METICs for the training of seafarers around the 1970s and 80s. These simulators were standalone equipment and in most cases, were manufactured by different companies and installed in METICs at different dates. With Integrated Navigation System (INS) and Integrated Bridge System (IBS) becoming more common in the shipping industry, simulator technology underwent profound changes where all the individual simulators could be mutually integrated, producing an effect of a complete ship model. This allowed for promoting bridge and engine plant teams working together and communicating with VTS station or MRCC ashore on GMDSS simulator in case of emergency. Also, two or more bridge simulators manned by different teams at the same time can simulate ships operating in close proximity. This can give more realistic and interesting scenarios whereby trainees will feel much more involved and responsible and competitive behavior will flourish. Damkjaer (1992), stressed that it was the increasing levels of ship automation that brought new demands on maritime education and training to increasingly use simulators. STCW 78 Convention and 2010 Manila amendments also became outdated, with the main reason being the achievement of paper based qualifications. From then on, trainees were required to go through classroom instruction and then complete a written examination.

The changes implemented demanded new emphasis on competency, as well as the trainee's ability to demonstrate their knowledge. Simulators can be the best source to demonstrate the competency of a seafarer individually, as well as when performing as part of a team working onboard ship. Indeed, there are many reasons for justifying the use of simulation for training. Muirhead (2003), while discussing the simulator training philosophy, said that the inexperienced mariner is likely to make judgement errors early on in any real ship training. The consequences of such errors could be costly and catastrophic. On simulator, a mariner is allowed to make multiple errors, and receive extrinsic feedback to assist and improve performance onboard ships. Rapid repetition of difficult situations allows a review of tactics until a satisfactory conclusion is reached. Some tasks that cannot be experienced or repeatedly practiced at sea, such as emergency procedures, maneuvering in difficult conditions or geographical locations, are readily available only on the simulator. The emergence of computers, integrated electronic navigation systems, monitoring equipment, data collection and presentation, and satellite communication have changed the traditional role of the ship's crew in bridge operations and machinery control. With this, the expectations of ship-owners and operators have changed as well. For example, they are expected to perform faster turn-around-time in ports and function unimpaired with reduced crew onboard. Nevertheless, the challenges involved in cases of accidents, as well as changes in ship size, design and ship speed have placed new demands on the importance for appropriate training and education of the seafarers, so that they may be able to perform with outstanding competence.

Major Features of Simulator-based Training

Simulator-based Training (SBT) has its own unique features and problems as shown below:

Simulators vs. Onboard Training: Simulator-based training is steadily replacing the in-service training of seafarers. The STCW Convention and 2010 Manila amendments also gives weight age to the training conducted using a simulator and hence simulator-based training has started having more value and weight age. Training needs to have validity and reliability. Although RADAR/ARPA and ECDIS simulator training has been made mandatory by the STCW Convention (2010 Manila amendments) in order for the seafarers to obtain their certification, almost all the practical competencies mention simulator-based training as an option to demonstrate the functional competency. In Simulator-based Training (SBT), the simulator provides the physical environment and creates an interface that gives the trainees a feeling of working in the real environment.

Monitoring by the Instructor: An effective simulator contains a comprehensive monitoring system which enables the instructor to observe the trainees from the Instructor Control Station. This monitoring system includes audible microphones which are well positioned on the bridge to observe conversation of all the members of the watch team; this involves the watch officer, navigator, radar observer and helmsman. In addition, cameras on the bridge and monitors at the control station allow for observing the trainees at work at various duty places, e.g., the chart desk and bridge wing repeaters. It is recommended that at the beginning of each training session, the simulator's conditions should be set for the desired exercise design. This will increase and ensure the validity of the training session. Conditions include listing of all the equipment that will be used during the exercise and also the equipment which is not fitted or not available during the session. Conditions also include initial simulator settings, scenarios, weather conditions, traffic conditions and ship's position, course and speed. Standardizing these conditions for subsequent exercises will give reliability of the training being conducted for multiple classes at different times. Realization of the simulators potential depends on the ability of the training program to take into account the special cognitive needs of the trainees and the ability of the instructor to properly provide feedback to the trainees.

Marine Simulators and Manufacturers

There are multiple types of simulators in use for the training and assessment of the seafarers and their use is becoming increasingly popular. Over time, it has become difficult to interpret a clear distinction between their purpose, and the competencies to be learned from them. Even their nomenclature changes with time and origin of production. They can be divided into three classifications with regards to their tasking (function):

- Single Task – trainee can practice and learn a single task, e.g. radar simulator.

- Multi Task – trainee can learn multiple competencies using the same simulator, e.g. them navigation simulator.
- Full Mission – simulator encompasses all possible functions of a simulator, e.g. Full Mission Bridge Simulator (FMBS) (Muirhead, 2003).

And can be divided into two classifications with regards to their Circumstance

- Normal condition
- Causality condition

Suppliers or manufacturers are essential in any discussion regarding simulators; availability, basic training to run the equipment, operational features and maintenance strategy are all governed by the manufacturers and the competition between them.

The STCW Convention Requirements and Simulator-based Training

The STCW Convention addresses the usage of simulators for training of the seafarers under three important headings:

- Training and assessment,
- Use of simulator,
- Minimum standards of competencies.

Training and Assessment

Regulation-I/6-Training and Assessment, demands all parties to ensure that training and assessment of seafarers is in accordance with STCW Convention (Code A) and all instructors and assessors are appropriately qualified and competent to carry out their tasks. Section A-I/6-Training and Assessment (Mandatory) stipulates that if training is being conducted using simulators, employed instructors should have received appropriate guidance in instructional techniques involving the use of simulators, and have gained practical operational experience on the particular type of simulator being used for training. In the case where instructors provide in-service training, they shall do so only when such training does not adversely affect the normal operation of the ship. Dedication of the instructor's time and attention is necessary in this situation. Section B-I/6-Guidance Regarding Training and Assessment - provides guidance on how to comply with the corresponding section A of the Code, and mentions IMO Model Courses for Instructors and for Examination and Certification of Seafarers.

Regulation-I/12-Use of Simulators provides guidelines for the performance standards and other provisions set forth in section A-1/12. Such other requirements as are prescribed in part A of the STCW Code for any certificate concerned shall be complied with in respect of:

- All mandatory simulator based training
- Any assessment of competency required by part A of the STWC Code which is carried out by means of simulator; and
- Any demonstration, by means of a simulator, of continued proficiency required by part A of the STCW Code.

Section A-I/12-Standards Governing the Use of Simulators (Mandatory), Part 2 provides the other provisions whereby training and assessment procedures have been discussed for the simulator trainers and assessors to standardize conduction of simulator training. STCW Convention desires physical and behavioral realism of the simulators appropriate to the training and assessment objectives.

Section B-I/12-Guidance regarding Use of Simulators - STCW Convention gives detailed guidance on how to use the RADAR / ARPA simulator for the training and assessment purposes. (In addition, STCW should provide these guidelines for ECDIS simulator as well).

Performance Standards of Simulators

As there are multiple types of simulators available in the market with varying level of efficiency and control, the STCW Convention mentions the minimum performance standards of simulators especially for Radar/ARPA simulators.

Minimum Standards of Competencies

Chapter II, III and IV of Code A of the STCW Convention lists competencies required of deck, engine room and radio personnel at management and operational levels and indicates the simulator as one of the means to prove competencies of the seafarers. In the list approved simulator training, which should go in parallel with in-service experience and ship training, is mentioned in numerous occasions.

IMO Model Courses

In addition to the STCW Convention, IMO Model Courses are also the major sources which discuss the training and education of the seafarers. With regards to simulator-based training, there are model courses: IMO Model Course 1.07: Radar Navigation, Radar Plotting, and ARPA (operational level) and IMO Model Course 1.08: Radar Navigation, Radar Plotting, and ARPA (management level).These model courses successfully discuss simulator-based training in addition to classroom lectures and discussion. Though not systematically and in details, they discuss some of the aspects of exercise design and running. Basic concepts of familiarization and successive buildup of exercises have been proposed. Situations like open sea and Traffic Separation Scheme (TSS) scenarios for radar operations during the exercise have been discussed. It is desired that the simulator instructor should monitor the exercises continuously. They demand that exercises should follow with debriefing to the trainee where the instructor uses his checkoff list or summary made during the exercise, for exercise overview and group discussion among trainees. These courses are good examples of simulator instructional techniques at the early stage. Conduct of simulation exercise has been discussed in very simplistic manner and an overview has been given of an emerging science of simulator instructional techniques.

In addition to the above, there are other three IMO Model Courses on simulators:

- Model Course 1.22 (edition 2002) Ship Simulation and Bridge Teamwork
- Model Course 2.06 (edition 2002) oil tanker Cargo and Ballast Handling Simulator

- Model Course 2.07 (edition 2002) Engine Room Simulator
- Model Course 6.10 (edition 2012) Train the simulator trainer and assessor
- Model Course 1.27 (edition 2012) operational use of electronic chart display and information system (ECDIS)
- Model Course 1.35 (edition 2007) liquefied petroleum gas (LPG) tanker cargo and ballast handling Simulator
- Model Course 1.36 (edition 2007) liquefied natural gas (LNG) tanker cargo and ballast handling Simulator
- Model Course 1.37 (edition 2007) chemical tanker cargo and ballast handling Simulator Contents of these courses give additional emphasis to the systematic use of simulators for the competency-based training of the seafarers. These courses outline the exercisedesigning, briefing, familiarization of the equipment, monitoring, and finally de-briefing the participants.

Global Use of Simulators

At the time of major revision of STCW 1978 Convention in 1995, only Radar and ARPA simulator based training could be made mandatory for the seafarers. One of the major issues in this regards was the availability of simulator facilities, especially in developing countries. However, the IMO Compendium of Maritime Training Institutes shows that a rising number of METICs have the facility of at least basic types of simulators like GMDSS, Navigation Simulator and Engine Plant Simulator. This implies that after a lapse of a decade from the adoption of STCW Convention, world scenario has totally changed with respect to the availability of marine simulators for training purposes. Hence, any future amendment to the Convention may also consider, with new facts and figures in mind, the issue of mandatory simulator-based training of the seafarers at various levels.

Future of Simulators

From 1950s onwards, after introduction of the Radar simulator, technological advancements in simulation have been continuing at a steady pace, which has had impact on their design and operations. There has been continuing growth in maritime simulation technology which is readily apparent when the specifications of existing and new generation simulators are examined with the objective of comparison. They have developed from simple to sophisticated and much of that development has concentrated on bringing an even greater sense of reality to the seafarers in terms of visual scenario and operational responses. One of the trends in simulator manufacturing is the use of a complete replica of an actual system for simulator training. This gives added validity to the simulation system with provision of training the seafarers for a particular ship system in line with traditional practice of aircraft pilot training. An example is the SHS in Maritime Simulation Centre (MSC), Warnemunde in Germany, where a replica bridge assembly based on the proprietary Ship Control Centre (SCC) has been developed by STN ATLAS for commercial shipping operations (Benedict, 2000).

Visual Effects of Ship Handling Simulator

One of the fidelity issues in simulator training was the visual effects generated in SHS Simulators. Visual effects were far from real in display, lacking in sound system, and movements of objects were also sluggish (Muirhead, 2003). All the efforts put in rest of the bridge equipment and software to ensure fidelity were completely undermined by the visual effects being too artificial. The availability of new display equipment and techniques used have removed this anomaly to maximum possible extent. Now simulation can provide 360 degree panoramic views of ultra-realistic scenarios in both day and night modes with varying visibility and weather conditions.

Assessment on Simulators

Technological advancements have made it possible to use the simulators for assessment of the trainees in a reliable manner. This is the reason the STCW Convention also gives due weightage to assessment using simulators. Various techniques have been developed to increase the validity and reliability of the written examination so that it can be established that the examinee has learned what was intended to be learned. For example, the MASSTER project aimed at harmonizing simulator training within EU. One of the project objectives was to develop and adjust training assessment tools and to validate those through demonstration on simulators. A lot of attention was devoted to systemizing training objectives and scenarios. Looking at the scope of the issues brought forward by the MASSTER project, validity and reliability of such simulator-based training depends upon the instructor and how he conducts the training session to achieve the exercise objectives. As discussed by Butter (2000), use of simulators as training and assessment tools in METICs, for operational level, can have three broad areas:

1. Level of skills,
2. Correct application of the procedures
3. Attitude of the trainee.

Role of Instructor in Training

There is always a particular relationship between an instructor and trainee. Traditionally, a teacher has an overwhelming influence and effect on how the training is conducted. It is the teacher or instructor who is directly in contact with the students or the trainees and who arranges the contingencies of re-enforcement under which they learn. If the teacher fails, the whole establishment of education and training may fail. Skinner (1968) asserted that importance of an instructor is clear in the frequency with which they are blamed when new policies or systems of administration or methods of teaching fail to improve education and training.

The Hidden Curriculum

Whenever we discuss any activity of education and training, it revolves around the curriculum i.e. the planned learning opportunities offered to the learner by the education institution. However, even a well-structured curriculum when implemented will have additional and important elements attached which add to or degrade the value of the training objectives achieved. Planned learning that students were deliberately exposed to by the institution will always have multiple learning experiences which were not planned. Unplanned learning experiences, are a ‘hidden curriculum’. The hidden curriculum can have positive or negative effects on the learning objectives achieved and ultimately, it is the

instructor who will control the direction of the hidden curriculum (Print, 1993).

Development of Attitude

Attitude is the mental state that a learner acquires and it influences the choices of personal actions. These choices can also be termed as tendencies, and these tendencies are responsible for opting for one particular solution out of so many available due to knowledge and experiences. Development of attitudes and shaping the behavior is one of the important elements of any education and training activity and largely depends upon the quality and characteristics of the instructor.

What is an Instructor?

When we discuss an instructor, their role is not limited to simply knowing the subject matter, coming to the classroom, and delivering a lecture for a period of forty minutes. Training demands active and consistent involvement of the instructor at all stages of the learning process. Training does add heavy responsibilities on the shoulders of the trainer/instructor.

Any instructor has to follow a certain curriculum in the training area to have some organized and planned learning activity (Fisher, 2006). Literature gives us three basic types of curriculum:

- What you planned the curriculum to be - the intended curriculum
- What you actually teach - the implemented curriculum
- What your student actually learn - the attained curriculum

It is the instructor who has to follow the curriculum at various stages and ensure that it conforms to minimum requirements of the training objectives. A saying goes that 'if you don't know where you are going, you may not reach there'. Applying this same principle, an instructor has to clearly lay down training objectives so as to achieve them in the stipulated time frame to make the training activity effective and efficient. This means deciding the learning objectives of the whole course, its various subsections and modules. Running of an actual course will comprise of multiple learning activities for the trainees and there are various theories presented by many scholars. All of the approaches towards the learning process are used in parallel and it is the instructor who has to amalgamate these theories into one approach and go ahead with the training activity. Theories which needs to have more emphasis will depend upon the learning objectives, trainees' qualification and time frame available.

Tools for Improvement of Instructor

Improving the Teacher

The basics of teacher training have traditionally been classroom experiences and even today, classroom performance is one of the main measures of competence for teachers. Over time, huge research on the art of teaching has identified or promoted 'pedagogy' i.e. the explicit instruction on how to teach effectively and efficiently. Scientific analysis provides standard materials and practices, and helps in the understanding of human behavior, which is essential in improving solutions to new problems arising with the passage of time. New science of pedagogy classifies the variables the teacher is manipulating as well as their effects. It improves the role of teacher and may open the teaching profession to those who would otherwise not be able to move into that field of work.

Qualifying the Instructor

When one goes through the literature and various qualifying training opportunities available for the instructor, he/she can see a more or less common approach. Great importance is laid on actual delivery of the course and the learning activities. Main areas of concern are preparing the lecture and the delivery. However, even to date, not all METICs may have the capacity to provide for the formal training in these areas to its instructors. Only through experience can an instructor be able to understand, if not all, some of the techniques, attributes and tasks of transmitting knowledge. Realizing the importance of instructors in achieving the aim of quality training of the seafarers, IMO Model Course 6.09 Training Course for Instructors was developed to provide a framework for any training imparted to an instructor of METICs. This course is the first step for having quality simulator instructors. It can easily be realized through its contents that its basic aim is to provide fundamental instructional techniques to a maritime instructor. However, no strong emphasis has been laid for use of simulators and its associated problems.

Technological Effects on Instructional Techniques

Mouton (1984) says that from the traditional concept of a teacher and an instructor, new concepts have evolved in the field of education and training and now the main burden is placed on administration and facilitation. This is particularly true when handling or dealing with the experienced trainees with diverse background as in the maritime field. Now a facilitator or an administrator has to relinquish the idea of being someone who is the main source of knowledge in the class. He will encourage discussion and action by the trainees, direct whole activity towards learning objective and monitor the progress in parallel. Indeed, there were times when instructional techniques meant effective use of training aids and classroom environment. One should imagine how technological developments have affected the training aids availability and how new environmental issues are affecting the behavior and learning process of the trainees in the class.

Black / White Board; Once being the most widely used item, if not the only one, by the instructor, now only finds a hanging place on wall superimposed by some screens or multimedia with data show. Handouts / Reference Books; With less availability of printed material and subject matter, handouts / extracts were common features of an educational institute and an instructor was known by the quality of his/her handouts. Presentation Skills; While an instructor has to present his/her theories and discussion extempore, much emphasis was laid on instructional techniques; how an instructor faces the class and what his/her body language conveys to the trainees. Now comes the stage when instructor has to act as co-worker with the trainees in skill learning classes with less and less formal appearance and bearing. World Wide Web (www); Internet access is increasing and availability of net is common feature in homes, workplaces and training institutes. This has altogether changed the learning environment, and now trainees

are not only affected by what is happening in the class and close social proximity but also all around the globe. Computers: Now we have computers with much more storage capacity and speed of display. Most of the time the trainees are over-burdened with the amount of information or speed of display. Now we need new skills to be imparted to an instructor to be effective and efficient without rendering the trainees fatigued and with loss of interest. Above discussion brought in only some of the many issues which show that new scenarios and issues have emerged. Presently, there is a need to add or remove many items from the curriculum of a standard Instructional Techniques Course.

Is the Instructor Indispensable?

With the vast availability of learning material and development of user friendly software, there is a notion of self-learning or teacher-less education. One major area in the field of education and training is skill-based training. Cotton (1995) discusses skill-based training and highlights three basic components involved in any skill, whether training a surgeon, actor or cook:

- **Psycho Motor Skills:** All types of skill-based training involve some body movement. Part of the skill is movement of some body part and very active skills, like ballet dancing, these movements are highly complex and controlled.
- **Perceptual Skills:** All skills are controlled, practiced, precise and accurate. They require very sophisticated control mechanism which is carried out by the senses. For example, a musician has to listen for subtle changes in tone of speech or in note. All the cues for action and the checks for correct performance need trained perceptual skills.
- **Cognitive Skills:** Every subject, occupation or process has a language which may consist of defined words or symbols. The skilled person has to understand and operate in that language.

Plans, patterns, codes, symbols and technical words are all used within problem solving and operation of a skill. Standard Marine Communication Phrases (SMCP) is one example of a particular professional language. Learning process involves a parallel thinking practice involving emotions, information, logic, hope and creative thoughts that may all pour into this process, ending with confusion of the trainee. This brings in the importance of an instructor who can control the learning process, teaching trainees when to be emotional, confident or sceptical before taking a particular action in real situations. The aspects implied above show that the role of the trainer is still important in any learning environment.

Role and Importance of Simulator Instructors

The simulator instructor's role is not that of a teacher but rather that of a trainer who has to ensure competency transfer to the trainees. A good simulator instructor means a good trainer and thus the simulator instructor has to inculcate in himself/herself all the qualities of a good trainer. Some of the good qualities in an effective trainer, as discussed by Pretty (1995, p.8) are:

1. A warm personality, with an ability to show approval and acceptance of trainees.
2. Social skills: ability to bring the group together and control it without damaging it.
3. A manner of teaching which generates and uses the ideas and skills of participants.
4. An organizing ability, so that resources are booked and logistical arrangements smoothly handled.

Process of Feedback

During simulator-based training, feedback is an important requirement, to make the learning process directed, result-oriented and efficient. There are multiple points a trainer needs to keep in mind while providing feedback to make the process effective:

Table 1. Trainer's Feedback Checklist

• Do you use several ways to offer feedback to learners; written comments, general progress discussions, comments on each performance and action plans?
• Does every learner receive feedback during each session?
• Do you always give feedback immediately?
• Do you always praise the good points before criticizing the bad?
• Do you criticize the performance not the person?
• Do you always give reasons for your feedback?
• Do you check that the learner has understood the feedback by asking open-ended questions?
• Do you concentrate on just a few criticisms at a time?
• Do you create an atmosphere where trainees can give constructive feedback to each other?

(Source: Pretty, 1995, p.11)

Adult Learning Process

Seafarers simulator training involves training adults who have, most of the time, also had experience working onboard ships. Adults have various learning attitudes and this needs to be taken into account by the simulator instructor. Table 4 provides a useful guide for the trainer to regulate and control the training process while handling a class of adults with practical experience in the field of training.

Table 2. Trainer's Checklist – Adult Learning

• Is the atmosphere of your sessions friendly and encouraging?
• Have you made plans to relieve any anxieties your trainees might feel?
• Will your teaching methods allow learners' previous experiences to be acknowledged/used?
• Will learner be 'rewarded' for their contributions?
• Does the work allow participants to measure their own progress?
• Do you make it clear that you are available for additional help if individuals have difficulties?
• Are the first few minutes of your sessions always attention-grabbing?
• Do you build in frequent opportunities for reinforcement and practice?
• Are you avoiding lectures, or at least limiting them to 10-20 minutes?
• Have you built in regular feedback session?

(Source: Pretty, 1995, p.12)

Team of Trainers

During the training session, you are performing many tasks at the same time. Sharing the sessions with a colleague gives you the opportunity to relax and be more effective in the next session.

- One can add up to his/her creativity and experience to deal with any problem.
- By complementing each other, instructors are less likely to overlook some key learning point in debriefing session.

- Changes in style and rhythm between trainers will keep the trainees more concentrated.

Life cycle of a group: Simulator training is carried out in groups who are involved in anexercise together. When a group of people work together, they pass through various stages before forming a functioning team. Handy (1985) characterizes the stages through which the team evolves as forming, storming, norming, and performing. It is at the performing stage that the team is really performing together. The challenge of every group trainer is to help their trainees move through the various phases of group formation until they reach the performing stage.

Elements of Training on Simulators: When we see how the training exercise is actually run on simulator, the whole process of the exercise can be divided into various parts and subparts. As a general guideline, we can distinguish four main stages of any exercise: Briefing, Simulator familiarization, Conducting & Monitoring and Debriefing.

Briefing: The briefing given to the participants has a key role in simulator training and will set the pace of progress. Main points to be covered in briefing include:

Table 3. Briefing - Key Elements

- Participation and motivation.
- Preparation.
- Level of experience.
- Exercise complexity.
- Pre-planning activity.
- Exercise environment.
- Roles, responsibilities.
- Purpose and objectives.
- Use of equipment.
- Intervention.
- Demonstration.
- Repetition and queries.

(Source: Muirhead, 2003)

Table 4. Familiarization - Key Elements

- Main features, equipment and operations
- Limitation of environment
- Acceptance as a 'real ship' of typical behaviour
- The need for adequate familiarization time
- Support of pre reading material
- Use of Part–Task training devices
- Compensatory cues to overcome lack of reality
- Confidence in the transfer of acquired skills

(Source: Muirhead, 2003).

After the briefing session comes the stage of simulator familiarization. All the trainees are to be given a walk round the simulator area while the various fixtures, equipment and their functions are explained to them. This time can be compared with the overlap time a watch keeper should have before handing/taking over the watch, whereby they can explain the situation on watch and newcomer can adjust to the scenario and understand the working. Important points regarding the familiarization process on simulators are given in Table 6 above.

The familiarization stage is followed by the main stage of conducting the exercise on the simulator and making the trainee go through the process of working on simulator as they would have done on a real ship. Here they have to perform and show their basic competence while in parallel learning. During the conduction of the exercise, an important aspect on part of the instructor is monitoring the exercise and performance of the trainees.

Table 5. Key elements regarding how to conduct the exercise and monitoring process

- A balanced interaction between trainee and the exercise
- The use of stimuli and cues
- The role of purposeful intervention in creating a 'real atmosphere'
- Avoidance of excessive intervention
- Avoidance of excessive stress
- Avoidance of 'gaming' atmospheres
- Instructor's role as mentor, moderator, facilitator
- Monitoring-purpose and intent of data collection
- Nature of the observational process
- Planned use of recorded data and information in the debrief

(Source: Muirhead, 2003)

Finally, at the end of the training session, de-brief should be given to the participants. This covers various aspects in details as per the Table 5.8. A well conducted de-brief can itself be a source of learning for the exercise participants. Quality de-brief by the instructor is the show of good instructional techniques by the instructor and will contribute toward the final objective of the effective and efficient training of the seafarers. De-brief is not the end of the learning process, but can start a thought process in the mind of the trainees.

Major points to be kept in mind during the de-briefing are highlighted in Table 8.

Table 6. Debriefing – Key Elements

- Purpose and objectives of the debrief
- Exercise strengths and weaknesses
- Lessons learnt from errors/mistakes
- Use of peer review technique
- Use of supporting exercise data
- Real life examples for improvement
- Avoiding blaming individuals
- No 'lectures' on how to do it
- Use a tactful approach
- Good communication is important

(Source: Muirhead, 2003)

Table 7. Syllabus for Simulator Instructor Course

- STCW and use of simulators.
- Competency-based training.
- Training process.
- The role of instructor.
- Course design.
- Exercise development.
- Pre-briefing techniques.
- Simulator Familiarization.
- Monitoring and recording activity.
- De-briefing techniques/feedback.
- Assessment process.
- The role of assessor.
- Feedback/performance evaluation.
- Validation

(Source: WMU, 2004).

Conclusion

Simulator based training has proved to be highly effective when training seafarers. Over the past decades, simulator technology has advanced so that learning occurs at a highly efficient level. Simulator based training in unison with instruction from an experienced instructor further promotes

learning in this situation. While a simulator provides the flexibility and economic advantages, a skilled instructor provides experience in real life scenarios and trainer feedback. Without one or the other, the competency of the trainee is compromised, and perhaps produces a poor seafarer. Standardization regarding simulator training is provided through STCW Convention, which outlines the expectations of simulator use and instructor training. It is pertinent that the STCW protocol aligns with the concerns of today's technology and expectations of instructors. The author feels that changes in STCW is mandatory. The STCW in Manila 2010 provides all that it can to promote simulator training as an essential tool to train seafarers. A good relation between the instructor and simulator is necessary to produce seafarers who can manage the causality onboard ship. STCW mentions the importance of simulator use; guidelines for proper simulator use are outlined accordingly. Aside from protocol regarding instructor qualifications, the relationship between an instructor and their students is unique in the sense that there are different influences that the instructor can impose on them. Depending on the proficiency level of the instructor and their teaching techniques, these influences can cause drastic effects on whether the trainee becomes successful or lacking in quality knowledge. Where the simulator lacks in personal interaction and guidance, an instructor is much needed for the development of the trainee.

Recommendations

The author feels that simulator-based training should be made mandatory for all occupations related to seafarers to achieve the competency-based training objective of the STCW Convention. A 'successive approach' can be adopted whereby simulators are made mandatory in stages but there is strong need to move farther of 1995 when only the Radar/ARPA simulator training was made mandatory in the Convention. There is a need for an IMO Model Course for Simulator Instructors. This course can act as a benchmark for the qualification of the simulator instructors to appropriately qualify them as per requirements of the Convention. Professional Development Course (PDC) on the subject designed maritime professionals can be taken as basic reference and modified/added to suit worldwide requirements of the simulator instructors. Simulator instructors employed in the METICs for training of the seafarers should undergo some formal training on use of simulation for competency-based training. This training package for simulator instructors will serve the purpose better if it is designed and promulgated through IMO's STCW Convention. Only a qualified simulator instructor can ensure quality training as per the standards laid down in the Convention. In addition to theoretical study, all maritime academies should use the simulator to achieve the practical training before going underway. This will provide assurance that the seafarers have had training in scenarios that may be considered unique or unusual onboard ship. Also, simulators should be updated with latest technology advancements. For example, in simulator they may use virtual reality, which broadens the capabilities of the simulator.

Last but not least, there is need for concerted and dedicated effort to have printed books and material on the subject of the simulator instructor. Now when we have had simulators in use for decades and multiple maritime universities established worldwide, maritime professionals and experts should come forward and document their experiences as simulator instructors. This will be a major contribution and service to our coming generations of the maritime industry.

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