

# Training on Tanker Operations as a Task Based Learning Application

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## ABSTRACT

In 2002 - 2003 DEU – Nautical Science Department has decided to transform its conventional education methodology to the “Problem Based Learning” (PBL) methodology in order to meet the expectations of the rapidly changing maritime industry. In the year of 2005 – 2006, Nautical Science department started to use Task Based Learning (TBL) methodology as the last phase of the active learning, for students at their last year of MET (Maritime Education and Training).

Task-based learning, as a strategy, has similarities with problem-based learning but also has its own unique attributes. Problem-based learning focuses on supplying the learners with problem solving skills. Learners set their own learning objectives on the path of solving the specific problem presented in the scenario. After three years of maritime education, the deck officer candidates get ready to take responsibility of managing certain tasks either alone or as a team member. TBL focuses on accomplishment of the trainees on planned tasks, such as, loading and unloading operations of oil tankers, handling a ship under various situations using different sources like international regulations or other maritime sources.

Most important property of TBL which can be distinguished from the tasks of conventional education is that, TBL has “trainee directed learning” strategies all through the learning process. This study focuses on, how the applications and the practices of the “Task Based Learning” are performed, with predefined tasks in the training of oil cargo and ballast operations in Dokuz Eylul University, School of Maritime Business and Management, Department of Nautical Science.

## Introduction

In the maritime industry, especially latest accidents required new regulations to be developed. Of course human factor and the fatigue is the most searching topics for that reason. In this area researchers are trying to find correct approaches and the solutions using some scientific techniques. As we know the operations at ships must strictly comply with the international and national regulations. To learn these regulations related to the operations has a vital importance to prevent the accidents caused due to lack of knowledge. (Deveci et al.,2006)

Another important point is that excessive and complex knowledge has appeared in accordance with the new regulations and codes. The rapid growth of knowledge, which is called as an "information explosion, fuelled a concern that students were learning less and less about more and more. A reaction to this has been a move towards a core curriculum with options or electives, where students can tackle a range of subjects in more depth according to Harden, R.M. et al., 1996 referring to General Medical Council, 1993; (Harden & Davis, 1995)

Consequently certain new developments in the training process have emerged. Most important of these methods are PBL (Problem Based Learning) and TBL (Task Based Learning).

Since the time of Sophocles almost two and a half millennia ago, it has been recognized that most successful learning is based on experience rather than just on teaching or training. (Race P., 2000) Nowadays the training method basically based on practice following acquisition and experience seems to be the TBL.

Task-based learning (TBL) was first described by Harden at a meeting of the Association for the Study of Medical Education in Bristol in September 1988. The concept of TBL can make learning more related to the work of the healthcare professional. TBL addresses the increasingly important question of relevance in education. (Harden, R.M. et al., 1996)

The task-based learning that began to implement at Dokuz Eylül University School of Maritime Business and Management (DEU SMBM) Department of Nautical Science, is based on true missions to reach the target. The missions that are expected to be done put together to the related learning objectives and international regulations for the maritime education. (Deveci et al., 2006)

In TBL, learning is built round the task such as loading and unloading operations of oil tankers, handling a ship under various situations or preparing voyage planning. Maritime Education is mainly a practice oriented education system. This is the reason that the simulators which are used at maritime education are being renewed continuously and usage ratio of them is increasing rapidly.

“Task-based learning is defined as “the answer to integration and problem-based learning in the education system” by R M Harden et al. (Race P., 2000) In another study of *Harden, R.M. et al. (1996)*, TBL is defined as “What is required is an educational strategy that takes advantage of the rich opportunities and experiences to which a trainee or an officer can be exposed in a real or simulated setting, and yet ensures that the learning objectives are achieved. This is what task-based learning is about.”

Some of the reasons to use TBL education methods in Department of Nautical Science, as pointed out shortly by Race P., are as follows;

- The approach of TBL can help to break down the barriers between separate areas of education and training, and bridge the gaps between discrete learning elements,
- TBL can help to make the curriculum visibly more relevant to professional practice, and can be advocated in terms of both effectiveness and efficiency as a training approach.
- TBL offers the opportunity to express the curriculum in ways where it is relatively straightforward to record and analyze the extent of learners’ achievements
- TBL can provide a flexible framework to underpin collaboration and professional developments of those involved in providing education and training.

TBL, also a very useful approach to integration of the Curriculum and, not least, a time-efficient and cost-effective approach to developing highly relevant skills, attributes and competences for the professions according to the Harden et al. (1996)

Harden R.M. et al. (1996) also suggest that “TBL is not simply the learning that is required to perform the tasks or that which results from doing the task. TBL is not equivalent to “task-oriented learning”, where the teaching program covers the knowledge and skills required to undertake a task. In TBL, tasks are the focus for learning, not the objectives of the student’s learning.

## **Task Based Learning Practices in DEU, SMBM, Nautical Science Department**

Tanker training activities are spread out over four years in Nautical Science Department of SMBM. Problem-based learning method is used in the first three term as shown in Table 1. Real life scenarios are used in PBL as a tool for learning. These scenarios are designed by the academics who have experience in the oil tanker, considering learning objectives which have been developed according to the expectations of maritime industry and the relevant international rules (eg. ISGOTT, MARPOL, Tanker safety). When the PBL scenario is read in the small groups (8-10 trainees), the problems and scenarios make the trainees curious. The trainees themselves determine their learning objectives. These learning objectives are gained in certain learning

environments designed and supplied by the faculty. The tutors and the learning facilities help trainees to gain their learning objectives. At the BPL, responsibilities are shared by the faculty, the tutor and the trainees. Responsibilities on designing the learning environments, their adequacy and suitability are on the faculty. Responsibilities of servicing the learning opportunities are on the tutors. And learning responsibilities on the trainees. Each term consists of 14 modules each of which lasts for two weeks. In Table 1, main learning objectives are given in the fourth column. Some of learning objectives can be spread out through all the other scenarios.

The first term, learning objectives related to the basic tanker safety matters, shore-ship interchange and mooring principles are examined in the scenario of module 12. In the second term, scenario of the module 12 is related to the ship stability and oil pollution matters. The most important module of the tanker training is module 3 of the Term 3. In this term, trainees are supported with basic tanker operation tools which are prepared with Flash animation program at the internet. Leading role of the scenario of the module 3 is M/T Avor. This vessel is built in 2004 and a double hull +1A1 Class crude oil tanker with capacity of 113067 dwt, a width of 44 m, a length over all of 240,437 m. and 7 rows of starboard and port tanks. All stability and ullage manuals of M/T Avor can be reached in SMBM library. And also her stability programs can be used in the Learning Source Centre of SMBM. At this module tanker construction, ISGOTT matters, basic oil cargo operation, calculation of amount of oil cargo, tanker stability charter party contracts and tanker documents are examined by the trainees. How long the modules last is given in the fifth column of the Table 1.

Learning objectives related to the tanker training develop from basic knowledge to the complex skills through out the years. Before task-based learning, all knowledge and skills must be gained by the trainee. At TBL process, trainees need to utilize their prior knowledge and skills to accomplish the tasks.

Task-Based Learning is applied in the fourth term as shown in the Table 1. Seven tasks are mentioned as, Gas measurements, Inert gas plant, Ballast operation, Commence Loading, Completed Loading, Commenced Discharging, Completed Discharging. These tasks are designed in the LCHS (Liquid Cargo Handling Simulator) as a scenario. LCHS of SMBM is developed by Ship Analytic. Four types of tanker models (Oil, Chemical, LPG and LNG) in the six cubicles can be simulated at the LCHS. In Bachelor degree program of SMBM only oil tanker program is performed. Other programs related to the type of tankers are performed through short term courses. At these courses and training, tutor/instructor gives the trainees web-based support using for example [www.tankercilik.com](http://www.tankercilik.com).

**Table 1** : Tanker Training Programs in the Curriculum of the Nautical Science Department of SMBM

<b>Terms</b>	<b>Learning Methods</b>	<b>Learning Tools</b>	<b>Main Learning Objectives Related to the Tanker Training</b>	<b>Duration of Modules</b>
Term I	PBL <sup>1</sup>	12. Scenario	Tanker safety Tanker terminal safety Mooring principles of tanker	2 week (36 hours)
Term II	PBL <sup>1</sup>	12. Scenario	Introduction to the ship stability Oil pollution and prevention (MARPOL)	2 week (36 hours)
Term III	PBL <sup>1</sup>	3. Scenario	Tanker construction ISGOTT Basic oil cargo operation Calculation of amount of oil cargo Tanker stability Charter party contracts Tanker documents	4 week (72 hours)
Term IV	TBL <sup>2</sup>	Tasks	Familiarization of the Model of Oil Tanker 1. Gas measurements 2. Inert gas plant 3. Ballast operation 4. Commence Loading 5. Completed Loading 6. Commenced Discharging 7. Completed Discharging	(56 hours)

PBL<sup>1</sup> : Problem Based Learning


TBL<sup>2</sup> : Task Based Learning

Tutor or instructor must plan the task in the learning environment provided by LCHS. Before the suitable TBL environment the instructor must follow some steps. First, arrange the tasks from the basic to complex. Some tasks can consist of sub tasks. These sub tasks are arranged from the basic to complex. Second, create or choose the scenario considering the aim of the task. Third, try the scenario and be sure satisfying the aim of the task. Fourth, collect the data for planning the TBL.

Before being assigned at the LCHS to the trainees, the tasks must be planned by the instructor. And tutor guide must be prepared considering the data which were gathered before. Tutor guide for the "The Ballasting-deballasting Task" is shown in Table 2. This guide contains the following information.

- how many trainees are charged with the task ?
- how long does the task take for each group ?
- is the presentation required before the task ?
- what kind of learning equipments are needed ?
- which scenario is uploaded ?
- what kind of information can be needed by the trainees for the task?
- what kind of sequential steps are followed for the task ?

**Table 2 : Tutor/Instructor Guide for the Task**

	<b>The Ballasting-deballasting Task.</b>
<b>Trainer</b>	: Selçuk Nas
<b>Place of the Familiarization</b>	: LCHS
<b>Limit of the Trainees</b>	: 12 (Three groups are require for 36 students)
<b>Required Time for Each Group</b>	: 40 minutes.
<b>Required Presentation</b>	: N/A
<b>Required Equipments</b>	: LCHS
<b>LCHS Scenario</b>	: Familiarization 1 <sup>st</sup>
<b>Information to trainees before the task</b>	: Ballast piping diagram, ballast pumps
<b>Steps Number</b>	<b>Sequential Steps of the to Task</b>
<b>1</b>	To obtain group of the trainees
<b>2</b>	To open all cubicle of the LCHS.
<b>3</b>	To choose Suezmax model for all cubicles
<b>4</b>	To load snap of the “ <b>Familiarization 1<sup>st</sup></b> ”
<b>5</b>	To let the trainee follow the page of LCHS in their screens.
<b>6</b>	To explain expectation for the first step of operation (gravity) (With different line and with use two sea chest)
<b>7.</b>	To let the trainee pass the other step of operation (pumping to ballast to sea) (With two pump)
<b>8.</b>	To let the trainee pass the other step of operation (pumping port line to the starboard line) (With two pump)

Every step of the task performed by trainee must be observed and controlled by the instructor. All fault, deficiency and noncompliance with safety matters on oil tanker operation, performed by trainee, must be captured on the instructor console. The instructor warns the trainee to carry out the corrective action. Considering the experience, one instructor can be enough to observe six cubicles. But evaluation of the task performed by the trainee at the six cubicles, at least two instructors must be on duty.

Before evaluation of the trainee, who is charged at the LCHS for the task, evaluation criteria must be determined. Evaluation criteria of TBL are shown Table 3. Evaluation criteria shown at Table 3, are for the “The Ballasting-deballasting Task”. This task consists of three independent sub tasks. Each sub task is evaluated separately. Accomplishment of “The Ballasting-deballasting Task” is affiliated with the accomplishments of the all the sub tasks. Degrees of accomplishment are “acceptable” and “perfect”. If trainee is evaluated as poor, after practicing the task on LCHS, he/she is charged with the same task again until the task is fully accomplished.

**Table 3 : Evaluation of the Trainee in TBL**

EVALUATION OF THE TRAINEE										
Number of the trainees	Name of Trainees	STEPS OF THE SUB TASKS								
		Deballasting Gravity			Deballasting Pumping			Transferring the Ballast		
		Poor	Acceptable	Perfect	Poor	Acceptable	Perfect	Poor	Acceptable	Perfect
1										
2										
3										

## Conclusion

As a consequence, TBL is thought to be one of the most fruitful learning methods in that it meets almost all the requirements of this age and helps to prevent most of the likely accidents at the shipboard operations. In other words, experienced learning, developing correct reflection against the situations, developing of the using theory, motivation in education and training process, and efficient use of the time are some of the highlighted advantages of the TBL system.

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