University of South-Eastern Norway (USN)

CHESSCON

CONTAINER TERMINAL SIMULATION AS A DIGITAL SUPPLEMENT OF TEACHING LOGISTICIANS

akquinet

Automation and digitalisation in logistic processes nowadays increase the complexity of logistic systems (supply nets, terminals and warehouses) and lead to linked systems of high density and leads to highly interdepended systems. Today, sizing terminals, starting up as well as optimization of operational processes require intense technical assistance.

Terminal simulation and emulation technologies are used to understand the functionalities and processes of a container terminal. Analytics and visualisation of the interaction of these complex processes on a terminal is the main goal. In the field of economics business games are already used in education to show the complexity of the processes.

Initial situation

Students participating in the bachelor programme Shipping and Logistics at the University of South-Eastern Norway (USN) were familiarized with capacity calculations of container terminals during the introductory course "Ports and Terminals Management". Operational planning was performed as traditional, mathematic calculations.

The students' understanding of the problem was generally below expectations mainly caused by three factors:

- the students' general mathematical understanding (no specific mathematical skills were required to attend the course),
- size of the course, and
- the timeframe of the course.

The comprehension of terminal operations' great importance within the supply chain is focusing on efficiency, costs and environment and would enhance the students' ability to actively contribute to container terminal planning and operations after the accomplishment of their degree.

Container terminal simulation as a digital supplement

The digital technology as a potential for changes in teaching and education has been on the notice board for a long time. Technology is increasingly interacting with larger proportions of the existing and coming generation(s). The development of skills necessary to understand gaming theory, calculations and the managing of social media were assumed to be largely developed outside the educational systems. However, these skills made students competent participants in activities involving these digital tools. USN's previous experience using simulation software in class could (…) verify that obtained skills from "gaming" increased the students ability to learn.

It also indicates that this hands-on experience, though virtual, increased substantially the student's ability of comprehending.

Therefore, the course "Port Operations and Logistics" was developed and lectured in 3rd. year in the "Shipping and Logistics" seminar. With respect to the usage of CHESSCON Simulation software, "Port Operations and Logistics" is a course focusing on the physical operations within a container terminal. Focusing on ship to shore operations, internal port operations, and choice of transport modes related to hinterland transportation, identification of cost drivers, pricing of port operations and the identification of key performance indicators (KPI).

As a prerequisite knowledge, the students had to pass the courses "Ports and Terminals Management" and "Physical Distributions and Logistics Management".

The learning objectives are mainly port operations with a focus on container terminals, port costs, port pricing, key performance indicators and modelling port operations using simulation software and document flow related to export and import of cargo. Students should demonstrate their skills, being able to:

- plan and optimize port operations,
- understand, determine and calculate charges/rates (taxes, duties, fees, and dues, etc.) that apply during port operations ▪ identify environmental threats and challenges, plan and calculate countermeasures to satisfy requirements in accordance with regulations and society
- determine transport modes with respect to hinterland infrastructure and accessibility based on destination

- describe which implications lead to the choice of the most suitable transport mode for the ports
- be able to plan and execute port operations aiming at optimization with respect to time, price, area, equipment, environment and simulate and explain
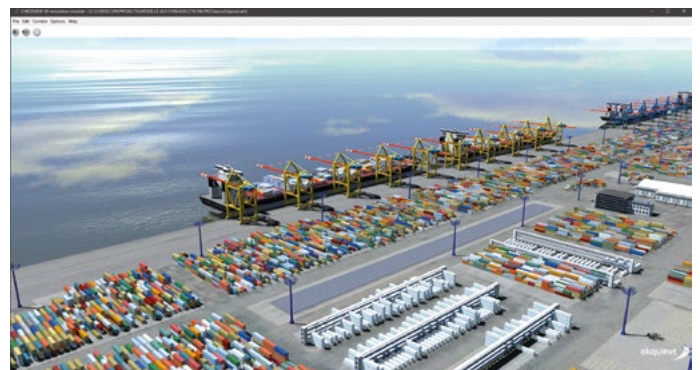
After accomplishing the course the general competence obtained should make the students able to:
- Obtain deep insight in the various port operations from the moment a container, until it is transhipped
- Demonstrate an understanding and establish key performance indicators from the point of view of
  ▸ Port administration
    - Port terminal operator, and
   - Ship-/liner operator.

This course will be tutored as a combination of

- Traditional lecturing (combination of oral presentations, using blackboard, PowerPoint presentations and/or overhead presentations), guest lecturers from industry.

- Sessions will be structured with bidirectional communication and the student is invited to engage in discussions and experience/sharing during sessions)
- Computer labs will be used regularly to learn how to utilize different software to model and simulate logistic areas related to procurement

The student is required to read relevant literature, participate in lectures and group work, and to deliver mandatory assignments. Mandatory computer lab exercises will be carried out during the semester. The home examination is mandatory for all students. It consists of a group assignment to be submitted as a PDF document, whilst the final project also shall be presented in a plenum class session.

Achievement learning goal
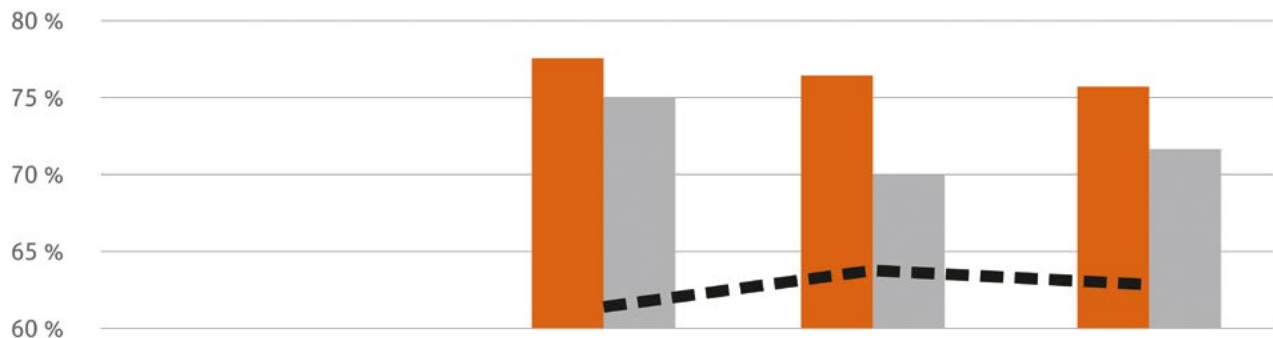
	Female	Male	Total
% Learning achievment this course	77,27 %	76,14 %	76,36 %
Average grade this course	75,00 %	70,00 %	71,67 %
Average grade logistics courses	61,43 %	63,59 %	62,91 %

Results of using container terminal simulation within the course

To ensure that the effect indicated with the use of simulation software we decided to compare the % of achievement of learning goals claimed by the respondent with the final grading on the course and the average grading on other logistic subjects within their bachelor program.

The result of our survey confirms that the results from % achievement learning goal is closely corresponding the average grade in this subject. The grades in this subject is also on average 1 grad higher than the other subjects in their bachelor program.

T. Lundestad, CEO Port of Borg:

"The student report provided an excellent contribution to the design process of our stacking area".

From left: Anders Bakken Hekland (student), Tore Lundestad (CEO Port of Borg) and Haakon Skinnerud (student)

USN Universitetet i Søraust-Noreg

CHESSCON

For further information please contact:

akquinet

akquinet port consulting GmbH
Barkhausenstrasse 2
27568 Bremerhaven
Germany

Holger Schuett, Managing Director, Prof. Dr.-Ing.
holger.schuett@akquinet.de
+49 40 88 173 - 4387

CHESSCON

21.01-AKQ

www.CHESSCON.com