# A Case Study on Introducing E-learning into Seafarers' Education

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**Abstract:** This paper considers beginning steps in introducing e-learning into seafarers' education, as additional mode of acquiring knowledge at the Faculty of Maritime Studies which is a part of the University of Montenegro. Related activities are the result of the enthusiasm of few professors and they are partly supported by a small, initial project of bilateral scientific and technological cooperation between Austria and Montenegro. The paper is conceived in a way that it considers following issues: (a) a brief discussion of some current shortages in maritime education and training in general; (b) possibilities of getting advantages through introducing e-learning into this respectable field of education; (c) some advantages and disadvantages of Moodle which has been used as a technological platform for introducing e-learning in the analyzed case; (d) results of the surveys conducted among involved students, teachers, and professionals in the field of employing new media techniques into the knowledge transfer, and (e) some conclusion remarks regarding possibilities of optimal combining maritime and virtual education.

**Key words:** seafarers' education, e-learning, surveys' analysis.

## Introduction

The education and training of seafarers should represent very responsible posts, and consequently appreciated ones. However, it is evident that in the world, at the level of national legislation, there are large differences in the interpretation of the STCW (Standards of Training, Certification and Watchkeeping) Convention and its realization through teaching programs at MET (Maritime Education and Training) institutions [3]. This causes the issuance of a large number of certificates, which do not correspond to objectively sufficient knowledge, skills and competencies of future seamen, that is, of those who may in the perspective educate the next generations of seafarers. This is, of course, a serious problem that could be overcome only by serious top-down approach and far greater investment in education and training (i.e. wages and mobility of teach-

ers/trainers; simulators and other supporting equipment; literature; providing training onboard ships, or so called *underway* training, etc). It is necessary to engage and motivate competent teachers in the field of theoretical teaching (education) of seafarers (people with academic titles and corresponding references) as well as experienced (active) captains and officers in the field of practical teaching (training) to establish active cooperation with referential METs in EU and worldwide, and also with successful shipping companies that should provide students with the appropriate training. All mentioned above is far beyond the scope of this paper in which the authors can only focus on one small segment related to the improvement of education of (future) seafarers based on the implementation of e-learning. So, the following chapters contain the discussion about the motives for the introduction of blended learning at the

Faculty of Maritime Studies (FMS), University of Montenegro, and the potential benefits that primarily students (active and future sailors), then teachers, and consequently, the MET at which such kind of education is realized, might have.

## Motives For Implementing E-Learning

The main motive for the introduction of e-learning in the case examined in the paper were numerous seafarers' demands to enable them to have an alternative possibility of upgrading the education that goes beyond the limits of the Bologna Declaration, which has been applied at the FMS since 2006 year. Namely, the strict requirements for attendance of lectures and exercises and limited number of terms for the exams are absolutely inappropriate to the needs of active sailors, who are for a few months, half a year, or longer onboard ships but would like to, or are pressured to improve their knowledge in order to preserve their jobs and/or get career advancement. Another motive was quite natural attempt of a few professors to do something about modernizing traditional ways of teaching through the introduction of new technological solutions. What also has contributed is the fact that the FMS indirectly participated in the Tempus project: "Enhancing the quality of distance learning at Western Balkan higher education institutions" (http://www.dlweb.kg.ac.rs), since it is a part of the University of Montenegro as one of the formal partners on this project. Though, this was a big project, based on which the FMS got the possibility of using the University server by means of which Moodle system was 'set up' and a few teachers had the opportunity to attend short training courses being dedicated to e-learning several times. In addition, the FMS and the Academy for New Media in the Transfer of Knowledge – ANMKT (University of Graz), have successfully implemented a project of bilateral cooperation: "Developing an e-learning module for the educational needs" (2011-2012) and they are currently working on preparations for the realization of the second, follow-up one: "Distant learning implementation at the Faculty of Maritime Studies (University of Montenegro) as an additional mode of education" (2013-2014). Colleagues from Graz transferred very useful practical skills on the use of Moodle in the effective implementation of e-learning to the teachers and system engineers of FMS through several trainings. The results of polls conducted among students during the past (2011-2012) and this academic year (2012-2013), which are depicted and analyzed in the separate parts of this article, speak in favor of success of this collaboration.

## Advantages and Disadvantages of the Used Platform

In the implementation of e-learning at the FMS as an additional type of education the Moodle platform (1.9.4.) has been used [1;4;5;6;11]. The Web portal to access the on-line courses is available on the location: http://fzp.moodle.ac.me. Moodle is an open source course management system, also known as a learning management system or a virtual learning environment. It can be relatively easily used by teachers for creating online dynamic web sites for students. It is very sound tool to manage and promote learning. Some institutions use it as the platform to conduct fully online courses while some use it simply to augment "face-to-face" courses, i.e. as blended learning, what is in fact the case of the FMS as a MET institution. In other words, Moodle is used to support and combine "face-to-face" interaction with e-learning, mobile learning and other forms of learning. According to enabling mobile learning there were some plans at the FMS for implementing Windows 7 Phone application [9] that can be viewed as a proxy for Moodle sites, simplifying and adapting user interface for mobile devices. But this currently remains only on the level of the potential future solution.

Within the following parts of the paper some advantages and disadvantages of a Moodle (1.9.4) will be listed. It is indisputable that the number of benefits is larger, but after dealing with some limitations of the used version of Moodle, in this particular case, we started work on the "raising" of the new (experimental) server with more advanced Moodle (2.3) version. However, since a lot of information on Moodle can be found on the website: https://moodle.org, so much attention will not be given to them, but to some of our personal observations and experiences related to the use of Moodle (1.9.4).

Since the currently released version of Moodle is 2.4 it has to be explained why at the FMS there is still a rather old version of the platform in use. When Moodle was installed at the FMS release 1.6 was the current version. This version was regularly updated until version 1.9.4. Since the program surface of Moodle rather changed with the release of Moodle 2.x FMS decided to stick to the older version. Mainly this is due to two reasons: 1) Teachers and students are used to the look and feel of the 1.9.x versions and it seemed problematical for them to grow accustomed to a new surface especially at an early stage of working with the platform; and/or 2) The installation of Moodle 2.x demands an enhanced technical environment which is not totally available at the FMS at the moment.

### Advantages of Moodle (1.9.4.)

From the standpoint of teachers (educators) the advantages of Moodle (in comparison of not using a course management system) are numerous. First of all using electronic boards, forums and/or mail teachers can very elegantly direct students to the sites which contain meticulously prepared materials (textual, audio and video recordings) including links to the relevant Web sites, educational games, tests for self-evaluation and others. In the considered case, students are mostly sailors, who spend most of the time of the year on the ship (i.e. at the sea or in the ports located all around the world). While students use on-line educational materials available and mostly are self-taught (here we are talking about students at the postgraduate level), teachers may do the research work, or e.g. work on projects. Thus, they improve their own competence and enhance the reputation and quality of the MET institution at which they are employed. So, the benefits are undeniable manifold. From the standpoint of students, especially seafarers among them, the availability of materials and the opportunity to learn while they are on board is of up most importance. That enables them to work, learn and gain achievements in the career, in parallel. In acquiring new knowledge they can be guided by their own living and working paces because they are in a "classroom without walls" and not in a traditional one with, abstractly saying, „multiple walls".

In using Moodle (1.9.4) platform, the possibilities of students' self-testing and playing educational games (of course, with the automatic generation of the results in both cases) are of particular importance and worth. When it comes to educational games, we used a special software package Hot Potatoes (which includes options: JCloze, JQuiz, JCross, JMatch, and JMix). More about this package can be found on the Web location: http://hotpot.uvic.ca. At the first sight, one might conclude that the last is a trivial tool, but it is in fact a very useful didactic approach, which encourages students to achieve a better result by continuously playing the game and consequently to learn more. What some of the involved students have concluded in the affirmative sense according to this (for them new) aspect of the knowledge acquisition, readers can find out from the section in which the analysis of students' surveys are given.

### Disadvantages of Moodle (1.9.4)

When the disadvantages of using Moodle, specifically of version 1.9.4., are on the board, we should say that our experience in working with mathematical expressions, lessons, wikis and the setting up of an online survey for students were not completely satisfying in the sense that we have encountered (in fact as the end users) some obstacles in the implementation of some of our ideas. That actually encouraged us to start thinking more intensively about the rapid transition to Moodle 2.3 version. What some of the involved students have noticed as shortcomings (not only for the Moodle as a platform, but in general for the whole concept of blended learning) readers also can find out in the section where the results of students' surveys are analyzed.

## REALIZATION OF THE SURVEYS

In order to obtain a feedback on the realized program of e-learning for students of the specialist studies at the FMS we conducted several surveys. One survey was conducted among professors at the FMS and experts in developing new IT-supported didactic methods from the ANMKT. The other one was realized among students (seafarers), i.e. users of this new IT tools enriched type of education, in two different time intervals, i.e. in the academic years 2011-2012 and 2012-2013.

## Survey Conducted Among the Teachers and the Experts – Based on the Ahp Approach

The survey conducted among the teachers at the FMS and the experts from the ANMKT is based on the Saaty AHP (Analytical Hierarchy Process) method [12-18] and this approach has actually enabled us to rank some features of e-learning, which are in the framework of this study identified as important. But certainly we are not limited by them in the sense that we underline the need for further, more extensive and detail research in this area.

Namely, the idea of certain e-learning features (eFs) ranking is associated with AHP with respect to the estimates of the respondents (here professors at the FMS and professionals from ANMKT). In general, ranking is a procedure, where the most significant e-learning feature is given the highest rank and the last significant feature is given the lowest rank while the other considered features are somewhere in between these two upper and down rank boundary values. Here, the respondents were asked to compare each pair of the criteria sets eF1-eF6 (Table 1) according to the Saaty scale by using grades: 1-same importance; 3-weakly more importance, 5-moderately more importance, 7-strongly more importance, and 9-absolutely more importance of the first than the second considered criterion; or, by the corresponding reciprocity values depending on the mutual importance of the compared elements composing the certain pair(s).

**TABLE 1. Considered e-learning features**

| eFs | Features |
|---|---|
| eF$_1$ | Stability and speed of the Internet connection (what is not always the case at the sea) |
| eF$_2$ | Availability on-line of all necessary materials for preparing the exam in a subject |
| eF$_3$ | The existence of the tests for self evaluation of the acquired knowledge |
| eF$_4$ | Conducting regular students' surveys |
| eF$_5$ | Possibility of regular communication with teachers via forum, chat and/or e-mail |
| eF$_6$ | Possibility of making tests and final exam on-line |

The example of the Saaty matrix created by one of the respondents (experts) for the purpose of the conducted case study and then used in determining the rank of criteria is given below:

$$\begin{bmatrix} eFs & eF_1 & eF_2 & eF_3 & eF_4 & eF_5 & eF_6 \\ eF_1 & 1 & 1 & 1 & 1 & 1 & 3 \\ eF_2 & 1 & 1 & 1 & 3 & 3 & 5 \\ 1eF_3 & 1 & 1 & 1 & 3 & 3 & 5 \\ eF_4 & 1 & 1/3 & 1/3 & 1 & 1/3 & 3 \\ eF_5 & 1 & 1/3 & 1/3 & 3 & 1 & 5 \\ eF_6 & 1/3 & 1/5 & 1/5 & 1/3 & 1/5 & 1 \end{bmatrix}.$$

Although, for the purpose of this research work, twenty competent persons were asked to create the Saaty matrixes, only ten of these matrixes have been taken into further consideration since they were consistent. By the normalized eigenvector values calculus [19;20], the ranks of the considered criteria eF1-eF6 (per each respondent) have been calculated (Table 2), along with the values of the largest eigenvalue $\lambda_{max}$, and the ratio of consistency index CR, while the random index RI is equal to 1.24 in all cases, since the number of criteria is constant and equal to six, in this case. It is obvious that all $\lambda_{max}$ values, for each considered matrix, are less than 0.01, which is to be fulfilled in order to provide a satisfying degree of the Saaty matrix consistency (Table 3). For these calculus, the appropriate Mathematica (5.1) programs have been used [2].

**TABLE 2. The ranks of the considered eFs assigned by each of the ten competitive respondents**

| eFs/Rs | R$_1$ | R$_2$ | R$_3$ | R$_4$ | R$_5$ | R$_6$ | R$_7$ | R$_8$ | R$_9$ | R$_{10}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| eF$_1$ | 2 | 1 | 1 | 1 | 2 | 1 | 3 | 1 | 2 | 1 |
| eF$_2$ | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 2 | 1 | 2 |
| eF$_3$ | 1 | 2 | 1 | 2 | 3 | 3 | 4 | 3 | 3 | 2 |
| eF$_4$ | 4 | 5 | 3 | 5 | 5 | 5 | 5 | 4 | 4 | 3 |
| eF$_5$ | 3 | 3 | 1 | 3 | 1 | 4 | 2 | 2 | 2 | 4 |
| eF$_6$ | 5 | 4 | 2 | 4 | 4 | 2 | 6 | 5 | 5 | 5 |

The results presented in Tables 2 and 3 have been realized in Mathematica (5.1) program, and the following pseudo-code is given in Table 4 [2].

TABLE 3. THE LARGEST EIGENVALUE AND RELATIVE CONSISTENCY INDEX FOR EACH MATRIX ESTIMATED BY THE RESPONDENTS

| Rs | $R_1$ | $R_2$ | $R_3$ | $R_4$ | $R_5$ | $R_6$ | $R_7$ | $R_8$ | $R_9$ | $R_{10}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| $\lambda_{max}$ | 6.36016 | 6.60484 | 6.03873 | 6.56456 | 6.53663 | 6.53540 | 6.54947 | 6.54948 | 6.05530 | 6.56732 |
| CR | 0.05809 | 0.09755 | 0.00625 | 0.09106 | 0.08655 | 0.08862 | 0.08862 | 0.08866 | 0.09766 | 0.09150 |

TABLE 4. MATHEMATICA PROGRAM PSEUDO-CODE FOR DETERMINING eFs RANK PER EACH RESPONDER [2]

```
Pseudo-code 1: Off[General::spell1]
(*n=Input["Number of criteria is (n):"];*)
(*A=Table[0,{n},{n}];
For [i=1,i≤n,i++,
For [j=1,j≤n,j++,
A[[i,j]]=Input["Input Saaty matrix A ["<>ToString[i]<> ","<>ToString[i]<> "]:"];
If [A[[i,j]]==$ Canceled ∨ A[[i,j]]==Null, Abort[]]]];*)
n=6;
A={{1,5,9,3,5,5},{1/5,1,7,3,3,3},{1/9,1/7,1,1/5,1/5,1/3},
{1/3,1/3,5,1,3,3},{1/5,1/3,5,1/3,1,3},{1/5,1/3,3,1/3,1/3,1}};
wn=Table[0,{n}]; wp=Table[0,{n}];
For[i=1;ws=0, i≤n,i++,wn[[i]]= ∏ A[[i, j]] ;wp[[i]]=wn[[i]]^(1/n);ws=ws+wp[[i]]]
                                j=1
w=Table[0,{n},{1}];
For[i=1;i≤n,i++,wn[[i,1]]=wp[[i]]/ws]
V=A·w; l=V/w;
    1  n
λ=—— ∑ l[[i,1]];
    n i=1
CI=( λ−n)/(n−1);
RI={0,0,0.58,0.9,1.12,1.24,1.32,1.41,1.45};
CR=CI/RI[[n]];
Print ["λ=",N[λ]];
Print ["CI= ", N[CI]];
Print ["RI= ", N[RI]];
Print ["CR= ", N[CR]]; If CR≤0.1,
Print ["Saaty's matrix is consistant"],
```

The main point is to determine the overall rank of in the paper considered features of e-learning (Fe1-Fe6) on the basis of the individual ranks establish by Saaty matrix, i.e. given by each of the experts individually. For this purpose it is necessary to determine the weight coefficients for each of the considered eF criteria and the process of their determination follows.

The idea of evaluating above mentioned weight coefficients is associated with the sum of ranks of each criterion $c_q$, with respect to the estimates of respondents (1):

$$c_q = \sum_{r=1}^{10} c_{qr}, q = \overline{1,6}. \qquad (1)$$

Where,

$c_q$ - is the sum of ranks of each criterion (eF), while q is the number of considered features (here 6), and r is number of experts, or respondents (here 10); and,

$c_q$ - is rank of the q-th criterion estimated by the r-th respondent. Now, the average weight coefficient for each criteria (q = 1,6) can be calculated by the following formulae (2):

$$w_q = \left[ \frac{c_q}{\sum\limits_{q=1}^{6} c_q} \right]^{-1}. \qquad (2)$$

Finally, the normalized average weight coefficients are to be calculated for each concerned criterion (3):

$$\overline{w}_q = \frac{w_q}{\sum\limits_{q=1}^{6} w_q}. \qquad (3)$$

The overall ranking of $eF_1$-$eF_6$ criteria according to their significance, carried out by ten respondents, is demonstrated in Table 5.

TABLE 5. THE FINAL RANK OF THE $eF_1$-$eF_6$ CRITERIA FORMED ON THE BASIS OF THE RESPONDENTS' QUESTIONNAIRES

| eFs | Features | $\overline{w}_q$ | Rank |
|---|---|---|---|
| $eF_1$ | Stability and speed of the Internet connection (what is not always the case at the sea) | 0.244808 | 2 |
| $eF_2$ | Availability on-line of all necessary materials for preparing the exam in a subject | 0.282471 | 1 |
| $eF_3$ | The existence of the tests for self evaluation of the acquired knowledge | 0.153005 | 3 |
| $eF_4$ | Conducting regular students' surveys | 0.085398 | 6 |
| $eF_5$ | Possibility of regular communication with teachers via forum, chat and/or e-mail | 0.146885 | 4 |
| $eF_6$ | Possibility of making tests and final exam on-line | 0.087432 | 5 |

In order to examine the level of consistency of the respondents' estimates, the concordance coefficient W is to be calculated by (4):

$$W = 12S/r^2q(q^2−1). \qquad (4)$$

Where,

$$S = \sum_{q=1}^{6}\left(c_q − \sum_{q=1}^{6} c_q\right)^2$$ - is analogue to the variance of the ranks;

r – is the number of the respondents (10); and,

q – is the number of the considered eF criteria (6).

Now, the smallest value of W, i.e. $W_{min}$ is to be calculated by the formulae (5):

$$W_{min} = \chi^2_{\alpha,v} / r(q-1). \qquad (5)$$

Where, $\chi^2_{\alpha,v}$ - is critical chi-square statistics, found in the table [7] by assuming the degree of freedom $v = 6 - 1 = 5$, and the significant level $\alpha = 0.010$. Here, it is . By taking into account the previous assumptions $W_{min} = 0.3018$, while $W = 0.476571$. Since the condition $W_{min} \leq W$ has been satisfied, it implies that the estimates of the respondents are consistent, what means the previously obtained rang of criteria eF1-eF6 (Table 4) is the valid one. The previous calculi have been realized by Mathematica (5.1) program and the associated pseudo-code is given in Table 6 [2].

TABLE 6. Mathematica program pseudo-code for testing the consistency of the respondents' estimates [2]

Quantified results of the survey among the experts in the field of e-learning could be qualified as follows:

```
Pseudo-code 2: Off[General::spell1]
n=Input["Number of criteria is(n):"];
m=Input["Number of respondents is (m):"];
Cm=Table[0,{n},{m}];
For [i=1,i≤n,i++,
For [j=1,j≤n,j++,
Cm[[i,j]]=Input["Input rank for the criterion "<>ToString[i]<> "and respondent"<>ToString[j]<>"]:"];
If [Cm[[i,j]]==$Canceled ∨ Cm[[i,j]]==Null,Abort[]]]];(*)
c=Table[0,{n}];
For[i=1;cs=0, i≤n,i++,c[[i]]= Σ(j=1 to m) Cm[[i,j]];cs=cs+c[[i]]]/n
S = Σ(i=1 to n) (c[[i]] − cs)² ;
W = 12S / (m²n(n²−1)) ;
χ² = Wm(n−1) ;
χ²(α,v) =Input["Input the critical chi-square, from the statistical table: "];
W(min) = χ²(α,v) / (m(n−1)) ;
Print["S= ",S];
Print["W= ",W];
Print[" χ² = ", χ²];
Print["", W(min) ];
If[ W(min) ≤W, Print["The estimates of the respondents are consistent."],
Print["The estimates of the respondents are not consistent"].
```

- The experts involved in this research assigned numerically by the largest marks and gave consequently the greatest importance in the qualitative sense, to the availability of educational materials (which implies their appropriateness and quality).

- In the second place, the experts positioned stability of Internet connection, which is understandable, since in the paper very specific application of e-learning related primarily to the needs of seafarers has been considered. Namely, it is often not possible to establish Internet connection on the vast sea, or it is usually unstable. Another reason for the second highest rating of this parameter might be that the experts might consider a stable Internet connection as a fundamental basis for the establishment of e-learning offers.

- Experts put on the third position the availability of tests for students' (here seafarers') self-evaluation, which is also a very important segment of e-learning, which indirectly should involve the existence of smart educational games, as well.

- The fourth position is reserved here to the possibilities for the students to communicate with teachers via forum, chat, e-mail, etc, which is of course very important segment of e-learning, but it is sometimes difficult to achieve this due to the previously mentioned problems with Internet connection and its stability at the sea (and sometimes in the ports). On the other side, teachers are usually too busy, and they are practically sometimes physically prevented to devote more time for communication with students.

- On the last positions are technical possibilities of doing exams on-line, and conducting regular on-line (or classical) surveys among the students, related to their degree of satisfaction with offered e-learning services, respectively. This is understandable, since the Internet as an open communication channel is not perfect for testing students on-line. In addition, surveys conducted among students are very important, but in comparison with the previously considered components of e-learning are for sure slightly less important. However, this does not mean at all that they should be ignored.

- This survey reflexes profoundly very subtle nuances in mutual positions of the analyzed e-learning features, and it remains us to associate them to the high degree of expertise and sensitivity of the interviewed experts in this field.

**Survey Conducted Among Students**

The survey was implemented among the students at the FMS and it was done on a larger sample than the previous one. It is considerably simpler in terms of the content and results analysis, but not less revealing. Respondents were students from the different FMS departments and with different experiences according to their employment and the length of the navigation service. The survey was conducted in two rounds, i.e. in two different time sections: during the academic years 2011-2012 and 2012-2013.

Some of the results are presented in Table 7. Thus, the table shows the percentage of surveyed students who had opted for the offered advantages and disadvantages of e-learning. Distinctly the highest percentage of students opted for "the possibility of learning from home and working place", while for the disadvantages of e-learning the highest percentage of students opted for "lack of direct contact with teachers" (2011-2012) and "inability to interrupt the class, put a question, and get the answer immediately when there is some ambiguity in knowledge transfer" (2012-2013).

TABLE 7. THE RESULTS OF THE STUDENTS' SURVEYS
(CONDUCTED IN 2011-2012 AND 2012-2013 ACADEMIC YEARS)

| | Academic year: | 2011-2012 | 2012-2013 |
|---|---|---|---|
| No. | **Advantages of e-learning** | „Yes" answers | „Yes" answers |
| 1. | The possibility of learning from home and working place (during the breaks) | 60.78 % | 91.38 % |
| 2. | Reducing the traveling costs and time saving | 25.49 % | 79.31 % |
| 3. | Easier access to the instructional materials | 27.45 % | 74.14 % |
| 4. | Possibility of self knowledge evaluation through on-line tests | 13.73 % | 79.31 % |
| 5. | Ability to communicate via the net with teachers and other candidates | 15.69 % | 63.79 % |
| 6. | More effective learning | 13.73 % | 65.52 % |
| No. | **Disadvantages of e-learning** | „Yes" answers | „Yes" answers |
| 1. | Lack of direct contact with teachers | 45.10 % | 53.45 % |
| 2. | Inability to "interrupt" the class, put a question, and get the answer immediately when there is some ambiguity in knowledge transfer | 43.14 % | 60.34 % |
| 3. | A nonstandard form of learning that requires a strong will, self-discipline, and high level of concentration | 13.73 % | 31.03 % |
| 4. | Some colloquiums are taken on-line, which is sometimes stressful, due to limited time, and present fear if the technique will/will not function properly | 11.76 % | 29.31 % |
| | Number of students involved into the survey: | 51 | 58 |

When it comes to the results of surveys conducted among students, some inconsistencies have to be noticed, as for example a quite large discrepancies in some results obtained in (2011-2012) and (2012-2013).

The largest differences are observed when it comes to e-learning advantages regarding the possibilities of students' self-evaluation of acquired knowledge, and more effective learning that allows e-learning. This discrepancy inspired us to think about it, and led to the conclusion that the results obtained in (2012-2013) should be taken, however, as more reliable. The question is why? – The e-learning facilities that are offered to students this year are far more extensive and of higher quality than those of the previous year. Additionally, some of interviewed students were using e-learning services at the FMS for two years continuously, and therefore they should be treated as more competent to judge what is important to them due e-learning and to what extent. Though, if we focus on the assessment of the students in the "second round" (2012-2013), then we should make the following conclusions:

- Due to the benefits of e-learning, the opportunity to learn from home or from work or at leisure time was identified as the greatest advantage. This is not really remarkable because learning anytime and anyhow is an – meanwhile well known – essential benefit of e-learning.

- The second position in terms of the students surveyed is shared by the reduction of commuting costs and the possibility of self-evaluation (either through on-line tests and different educational games). Again, reducing travelling costs and saving time is a rather obvious advantage of e-learning. More interesting is the fact that the availability of self-evaluation is very important for almost 80% of the students. This rating shows that students are very well aware of additional educational possibilities that come along with e-learning and that students are willing to use these possibilities for their own learning purposes. Moreover evaluations of the use of the Moodle courses show that self evaluations are very popular among the students especially immediately before exams.

- The third place belongs to the greater availability of educational materials than in the case of traditional teaching. This good rating is probably owed to the fact that the polled students are seafarers with a lot of travel activities who do not have the chance to spend much time in the classroom.

- In the fourth position is placed the possibility of learning more effective, which could mean that it is still in some ways easier to the students to learn if they have a teacher "in front of them", i.e. physically

present (even this conclusion should be treated as hypothetical one).

- The last place among the advantages of e-learning belongs to the ability to communicate (regularly) with teachers. How can this be explained? - Teachers are often not able to meet the requirements of the students (all their questions sent by e-mail, e.g.) and to be available though the chat and/or forum sessions. Therefore, the most likely students agreed that this possibility is not (unfortunately) of essential importance to them. This should of course be considered and corrected in the perspective.

- Due to the disadvantages of e-learning, students have cited the inability to directly ask the teacher what they do not understand in the learning materials as the greatest shortcoming. Thus, this greatly complicates their understanding and learning processes. Anyway, the rating is consistent with the rather poor rating of the ability to communicate with teacher as an advantage.

- In the second place, students positioned the lack of physical presence of the teacher, which is directly linked to the previous and therefore quite logical. And this can be explained as indeed the biggest and the most profound dilemma concerning traditional vice-versa e-learning.

- The necessity of students' strong will, concentration and learning self-discipline is placed in the third position. This should be fortunately interpreted in the way that most of the students fulfilled these very important preconditions of successful e-learning.

- The fourth place among the disadvantages of e-learning, students have associated to the stress caused by taking some colloquiums and tests on-line. This is logical, since most of the students are familiar with PCs and doing the tests on-line, in the technical sense, is not a big problem for them.

Within the additional survey conducted at the end of the semester of 2012-2013 the students should respond affirmatively/negatively to these three questions [10]:

- E-learning has a future in the sense that it will be increasingly used? (Answer "Yes": 100%);
- E-learning will lose its importance in the coming years? (Answer "No": 100%); and,
- Do you (personally) prefer e-learning than traditional lecture "face-to-face"? (Answer "Yes": 76%).

In the brackets next to these questions are given the percentages of surveyed students (58 of them) who responded affirmatively/negatively (depending on question). There is no doubt, according to the results of this short survey conducted among the students at the FMS, that the future learning channels shall be based on novel technical and didactical e-learning solutions.

## CONCLUSIONS

By comparing some observations from the first part of the paper to those of the following sections, it could be concluded that it is about building *a new roof on the old and damaged walls*. And what does it really matter? – A vain job, or however something else? - We believe, it is still something else. All this effort over the introduction and development of e-learning at the FMS should be one more in a series of incentives toward improving the educational process at the MET institutions in terms of recommendations which are generally given in the introduction. Thus, the need for greater investment in seafarers' higher education in terms of personnel and infrastructure is indisputable. Additionally, the networking is very important, not just for networking, but a real one is essential, based on professional cooperation and reciprocity on the EU level and among the referential MET institutions, exchanges of teachers and students for the sake of mutual enrichment of knowledge, the launch and implementation of joint projects, etc. All of this is to be done to the extent that is feasible and before it becomes too late. Also, it is necessary to establish a connection with the maritime industry, e.g. shipping companies interested in providing practical training onboard ships. The national legislation has to be modernized in the sphere of higher education in terms of recognition and proper interpretation and implementation of the STCW Convention requirements and in terms of faster deployment of virtual learning as a supplement to the traditional education and training of the seafarers. Within this context we should not lose the sight of the fact that STCW Convention itself calls for a proper education as the foundation of successful training and acquiring competences [8]. In order to confirm this observation the quotations from the STCW Manila Amendments, Chapter II, Section B-II / 1, Paragraph 14 are given: "Scope of knowledge is implicit in the concept of competence. This

includes relevant knowledge, theory, principles and cognitive skills which, to varying degrees, underpin all levels of competence. It also encompasses proficiency in what to do, how and when to do it, and why it should be done. Properly applied, this will help to ensure that a candidate can: work competently in different ships and across a range of circumstances; anticipate, prepare for and deal with contingencies; and adapt to new and changing requirements." Additionally, of importance within the context of this paper is that the newest STCW Code amendments concern and not only concern, but strongly recommend - the introduction of modern training methodology including distance learning and web-based learning in seafarers' knowledge acquiring and upgrading.

*Authorship statement*

*Author(s) confirms that the above named article is an original work, did not previously published or is currently under consideration for any other publication.*

*Conflicts of interest*

*We declare that we have no conflicts of interest.*

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