

Challenges in the Maritime Higher Education from the perspective of implementing the online teaching and evaluation activities

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Abstract

The unpredictable emergence of the pandemic coronavirus situation has forced the maritime higher education to change the approach to teaching by implementing the online learning and teaching environment. The main actors of education, teachers and students, as well as the decision makers in the education system were faced with a challenge of unprecedented scale. Even if this transition from the classical education system to the online one took place suddenly "overnight", maritime higher education already used certain specific education methods of the virtual environment, due to the particularity of the naval industry on internationalization, standardization, and continuous specialization. In order to evaluate the adaptation of the maritime higher education to the specificity of online education, between May and June 2020, within the Naval Academy a cross-sectional evaluation study was conducted. This period was overlapped with activities of teaching / evaluation online. The study presents the analyses the teaching activities carried out online, by assessing the students and teachers degree of perception on how to conduct them, in terms of advantages, limitations and difficulties and by considering feedback of student - teacher two-way relationship. The identified conclusions by the statistical processing of the collected data through anonymous online questionnaires, could be generalized and applied to improve the e-learning process within maritime higher education institutions.

Keywords: Online education, teaching activities, cross-sectional evaluation, the maritime higher education

1. Introduction

The unpredictable occurrence of the coronavirus pandemic situation has forced maritime higher education institutions to change their approach to teaching through the implementation of online and distance learning. Thus, all the actors of higher education: teachers, students, as well as the decision-makers, were faced with a challenge of a magnitude that has never been met before.

Although this transition from the classical education system online was suddenly realized, however, at that moment, maritime higher education was no stranger to online and distance education, due to the specific requirements of the maritime industry for lifelong learning and continuous training imposed by the internationalization, specialization, and standardization. (Stanciu, 2014)

Consequently, during the conference of the parties to the STCW Convention, held in Manila in 2010, the maritime industry has accepted the implementation of online education for the continuous training of workers, in order to be able to provide accessible training to all without time and location restrictions (www.imo.org).

Following the online education trend imposed by the STCW Convention, the maritime universities have offered to the students the online education and distance e-learning, in parallel with classical education. One such university is the "Mircea cel Bătrân" Naval Academy (MBNA) in Constanța, which is a higher education institution in Romania, aims to provide education at the academic level, for the personal development of the students, with an emphasis both on the professional insertion of students and to meet the need for the competence of beneficiaries and the economic environment in the maritime and naval area (www.anmb.ro).

In this context, the article presents the case study developed in MBNA, between May and June 2020, having the aim to evaluate the adaptation of maritime higher education to the specificity of

online education. The specific objectives consist of the analyses of the teaching and evaluation activities carried out online, by assessing the students and teachers degree of perception on how to conduct them, in terms of advantages, limitations, and difficulties and by considering the feedback of student-teacher two-way relationship.

The specific objectives consist of the analysis of the teaching and the evaluation activities carried out online. The teaching activities were analysed from the point of view of the respondents' degree of perception on how to conduct them, in terms of advantages, limitations, and difficulties and by considering the feedback of student-teacher two-way relationship. The analysis of the evaluation activities consisted of the identification of the most appropriate online assessment methods from the two groups of respondents' perspectives.

2. Characteristics of the statistical processing of collected data

The study was conducted on a sample of 327 respondents, students and teachers, as follows: 300 students, out of a total of 1793 and 27 teachers, out of a total of 58.

For data collection was used the technique of electronic opinion survey sounding through anonymous online questionnaires. The sample of the study population was representative for the target group, with an error margin of +/- 5%, for a confidence level of 95% (Pomohaci, 2008).

For data analysis it was received theoretical advantages of the ANOVA variance statistical analysis, as well as, the t-test.

The simple ANOVA technique was used because it allows the evaluation of the null hypothesis between the averages of two or more data series, with the restriction that they be components of the same independent variable, such as, for example, the evaluation of the teaching activities in the virtual education environment (Cardinal, 2006)..

In general, the studied aspects contain an independent variable with several components, as faster fulfilment of teaching tasks, facilitation of learning, acquisition of new digital skills and, implicitly, those groups of subjects: students and teachers, and a single dependent variable, for example, the quality of teaching.

Using the simple ANOVA, the dispersion of the two components of the dependent variable is analysed, as follows: the dispersion inside each formed group that reflects the deviations due to the different components of the independent variable and the dispersion between the averages of the groups and the main average. Both components reflect the dispersion due to random selection of the sample (Cardinal, 2006).

The Bonferroni multiple comparison method was used, which involves a sequence of t-tests in which the significance threshold is divided by the number of comparisons. The F- test was used to determine whether the dispersions of the two groups could be considered equal, taking into account the dispersing of data in the two groups. To collect data that provides a perspective on the nuances and opinions of the participants, Likert scale was used. For the statistical analysis, averages on a Likert scale from 1 to 4 were used (1 - don't know; 2 - don't agree; 3 - neutral; 4 - agree).

3. Perception of teaching and assessment online activities

It is well known that any form of education has its advantages and disadvantages, as well as the fact that each actor actively involved (professors and students) generates different opinions on these education forms. Accordingly, the study aims to evaluate the teaching and assessment activities in the virtual education space using questionnaires focused on issues aimed to identify the advantages, opportunities, limitations and difficulties that online teaching offers.

The statistical analysis of some positive aspects of respondents' perception of online education (Table 11) was performed on the two groups of respondents.

Respondents' answers reveals, according to the average values, that both categories of respondents have a neutral position in relation to the positive aspects considered advantages in the online questionnaire. It is also noted that teacher respondents have an attitude of rejecting the supposed benefits mentioned in the questionnaire. Regarding the fact that online education helps to accomplish teaching tasks faster, teachers disagree with this statement (average of 2.593), compared to the opinion of the students from the second and fourth year of study who have a neutral position with tendencies towards agreement (average of 3.241 – 4th year of study, respectively average of 3.262 – 2nd year of study). Similarly, the situation regarding the usefulness of digital skills acquired in the analysed period for subsequent activities is presented: teachers disagree on the trend towards neutral on this statement (average of 2,556), while most students have a neutral position (averages around of 3).

The answers of both categories of respondents regarding the fact that the period of interruption of classical courses and transition to the online and distance education allows teachers and students to focus on the essential, qualitative, skills and competencies, reveals that the opinions of respondents are neutral to this statement (overall average of 3.064). However, the detailed analysis by categories of respondents shows that teachers' perception is around an average of 3.630, which means that most of them agree with, which is in discrepancy with the perception of students, who have a neutral position towards this statement.

Regarding the impact on the teaching activities by the online education sudden transition, both categories of respondents consider that the teaching activities have been greatly affected (average of 2.770).

Online education advantages	Average	Standard deviation	Students N = 300				Professors P N=27	F	Significant differences *
			Year I N =86	Year II N =61	Year III N =40	Year IV N=112			
Quick achievement of teaching tasks	3.083	0.861	2.930	3.262	3.3025	3.241	2.593	4.728	II > P IV > P
Facilitates student learning	3.172	0.816	3.058	3.082	3.3200	3.304	3.148	1.356	No
Acquiring Digital Skills	3.178	0.862	3.360	3.213	3.3050	3.214	2.556	5.010	I > P IV > P II > P
Focusing on essential, qualitative, capacities, and competences	3.064	0.911	2.930	3.180	2.2975	3.000	3.630	3.665	P > I P > III P > IV
Moving teaching activities online has not affected their quality in any way	2.770	0.904	2.651	2.725	2.2836	2.893	2.556	1.380	No

* Significant differences identified using the Bonferroni t test.

Table 11. Online education benefits respondents' perception

Given the unforeseen transition from classical to online education, the study also aimed at an analysis of the degree of perception among students about how to carry out activities in the virtual education environment. After statistical data processing, according to the data presented in Table 10 it can be ascertained that teaching activity was properly managed during the transition to online

education (average statistical responses obtained is around 3 - neutral), meaning the students have not encountered major difficulties.

Beyond advantages, the online activity has limits and difficulties, both in the teacher-student relationship, and in the development of teaching activities, due to an important side of the classical teaching activity cannot be done virtually.

Regarding the identification of possible limitations arising from changing the way teaching activities are carried out, both type respondents were interviewed about relevant issues for this purpose.

From the statistical data presented in Table 13, as a result of the suspension of teaching activities, the following conclusions on these activities are found:

- course activities: professors consider that these activities have been affected, while students have a neutral position on this statement;
- seminars and laboratories: both categories of respondents agree that these activities have been affected;
- the necessary support provided by teachers: both categories of respondents agree that in the online education environment this activity took place like in the classical one;
- the lack of human contact can be compensated by well-designed remote activities: both categories of respondents have a neutral position towards this statement, which can be explained by the fact that the short period of online activities did not allow the design of these kinds of activities;
- limiting the interaction between teachers and students, as well as the feedback between these categories were not negatively influenced by the transition to online education;
- limiting the efficient structuring of the discipline content taught online: both categories of respondents consider that do not exist differences in the structure and content of the disciplines taught in the educational online environment versus the classical education system.

Students' perception	Average	Standard deviation	Students N = 300				F	Significant differences *
			Year I N=86	Year II N=61	Year III N=40	Year IV N=12		
I am content with the online teaching-learning process related to the study program	3.224	0.855	3.217	3.311	3.125	3.125	0.592	No
I hope to be used in the classical teaching some of the digital tools and resources from online	3.274	0.908	3.227	3.361	3.375	3.227	0.787	No
I can learn the same in both education systems	2.987	0.952	2.970	3.000	3.050	2.970	0.125	No
All tasks are very clear to for entirely followed online disciplines	3.097	0.931	3.111	3.148	2.950	3.111	0.610	No
I know how I will be evaluated to all online disciplines	3.304	0.918	3.273	3.361	3.375	3.273	0.349	No
For me, is easy to implement online education	3.294	0.837	3.116	3.262	3.150	3.438	2.831	No

* Significant differences identified using the Bonferroni t test.

Table 12. Online education students' perception

The identification of possible difficulties in carrying out online teaching activities was made in the study by using questionnaires common to both respondents, as well as specific to each group of respondents. The answers to the specific questions of the professors are presented in Table 14.

Following the statistical analysis of the results obtained, it can be observed the increasing the professors workload compared to classical education, especially due to the preparation of educational materials specific to teaching activities in the virtual environment and time spent for student assessment. This is due to the need for teachers to transpose the content and questionnaires they had from classic format into digital format.

However, even if there was a sustained volume of work from teachers, the digital resources made can be reused in the future education activities with minimal effort on their part. It remains to be seen whether this perception of teachers will change in the future.

In the study, special attention was paid to the analysis of types of assessment in online education in order to identify the appropriate forms of evaluation that reflect the correct the knowledge assimilated by the students during online education. The evaluation types analysed in the study were the following: online multiple choice test form, online multiple choice test automatically generated, oral examination, written examination and submitted by e-mail, written essay, and essay oral tested.

Limits of online teaching activities	Average	Standard deviation	Students N = 300				Professors P N=27	F	Significant differences *
			Year I N=86	Year II N=61	Year III N=40	Year IV N=112			
Interruption of classical teaching activities negatively influences lectures and course activities	2.945	0.972	3.140	2.803	2.825	2.741	3.667	6.736	P > IV P > II P > III I > IV
Interruption of classical teaching activities negatively affects the seminar/laboratory activities	3.248	0.906	3.337	3.230	3.250	3.152	3.407	0.737	No
Professors can no longer provide the necessary support for an efficient online course	2.926	0.919	3.302	2.803	3.125	2.679	2.741	7.161	I > IV I > P I > II
Human contact can be compensated by online well-designed activities	2.951	0.910	3.047	2.885	2.975	2.982	2.630	1.201	No
Limiting interactions between teachers and students	2.727	0.993	2.953	2.525	3.075	2.438	3.148	7.059	P > IV III > IV I > IV
Limiting the efficient content structure of the discipline taught online	2.767	0.964	2.942	2.770	3.150	2.545	2.556	4.261	III > IV I > IV
Limiting feedback received from students	2.617	0.913	2.605	2.557	2.850	2.545	2.741	1.020	No

Limiting feedback received from professors	2.663	0.920	2.628	2.492	3.025	2.527	3.185	5.150	P > II; P > IV III > II, III > IV
Limiting carrying out teaching tasks in online education	2.828	0.892	2.965	2.689	3.050	2.741	2.741	1.851	No

* Significant differences identified using the Bonferroni t test.

Table 13. Limits of online teaching activities respondents' perception

Difficulties encountered by professors during the online teaching process	Average	Standard deviation
Felling to work with very tight deadlines	2,593	1,010
The workload is higher than in classical education	3,444	0,892
Online education does not help in teaching tasks	2,889	0,698
The time allocated to preparation for student assessment is longer than in classical education	3,444	0,847
Online teaching / assessment tools are familiar	3,407	0,888
Free time is reduced due to the preparation of teaching materials in online	3,444	0,847
Online evaluation of students	3,000	1,144
Adaptation to new teaching / evaluation methods	1,852	0,864

Table 14. Difficulties encountered by professors during the online teaching process

From the answers given by both groups of respondents, illustrated in Figure 22, they appreciate the evaluation types that can be used in the system of online education as follows:

- online multiple choice test automatically generated – are agreed to be used to assess the knowledge assimilated as a result of the followings activities: course (67.66% students and 51.8% teachers), seminar (62.35% students and 59.25% teachers), and laboratory (54.33% of students and 22.22% of professors).
- written essay – both categories of respondents agree with this type of evaluation only for the seminar activities;
- oral examination, written examination and submitted by e-mail, online multiple choice test form ,and essay oral tested - were not appreciated by the respondents as assessment methods usable in online education.

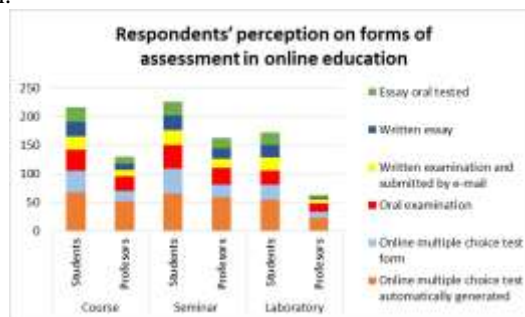


Figure 22 Respondents' perception on forms of assessment in online education

It is noted that online multiple choice test automatically generated and the written essay are the forms of assessment agreed by both groups of respondents to be used in online education. Also, 59.73% of student respondents appreciate the essay report as a very appropriate form of course activities evaluation. They have a similar approach for the evaluation of seminar activities: 43.89% of students consider suitable to use online multiple choice test form and 41.91% of students, the method of written examination.

3. Conclusions

As a result of the analysis of the didactic activities carried out in the virtual education environment, the following conclusions were drawn:

- the course and seminar activities are partially suitable for online education, while the laboratory activities for the specialized disciplines cannot be carried out in the virtual education environment;
- most students have adapted quickly to the new requirements imposed by online education;
- the time allocated and the volume of teaching/learning tasks have increased compared to a classical education for both students and teachers, without being found an increasing the quality of teaching;
- students and teachers consider that the unforeseen transition from classical to online education has affected the way in which teaching activities are carried out, as well as, to a small extent, their quality;
- the students considered that the online teaching activity was properly managed on the occasion of the transition to online education so that no major difficulties were encountered in its implementation;
- human contact absence and mutual feedbacks were offset temporarily by well-designed activities;
- both groups of respondents prefer the online multiple choice test automatically generated and the written essay for the online assessment. There is a subjective approach of the students regarding the evaluation of the course and seminar activities through the written report, which contradicts the majority opinions of teachers.

Although marine higher education was somewhat familiar with online education methods, the results of the study highlighted a few key points. These sensitive aspects are not only specific to maritime higher education, but have a general character applied to the Romanian education system can be remedied by additional teacher training (Botnariuc et al, 2020), both in terms of using specific teaching methods in the online environment and in curriculum development and of teaching materials using state-of-the-art ICT (virtual learning, 3D and augmented reality, etc.) (Vlada et al, 2009; Vlada et al, 2011)

Even if the system will return to face-to-face education, support and educational acquisitions accumulated during this period will contribute to improving the maritime higher education. Also, the experience gained during this period can be capitalized by continuing distance learning for students doing internships on ships.

Even if the system returns to face-to-face education, maritime higher education will not be the same as before the pandemic, and the experience gained during this period will contribute to increasing the quality of education and developing opportunities to train students and train staff who works in the maritime field. One proposal in this sense could be the implementation of distance learning for students doing internships on ships during the academic year. This can be achieved by collaborating between academia and the maritime industry in ensuring optimal conditions for online learning on board ships.

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