Voloshynov S., Yurzhenko A.

Kherson State Maritime Academy

The use of digital technologies while formation of professional competencies of future seafarers by means of LMS MOODLE

In the conditions of accelerated development of informatization of society and higher education system, an important condition is the use of digital technologies in teaching practice, which contributes to the expansion of innovative technologies. The introduction of digital technologies in the educational process of higher maritime educational establishments allows to increase the efficiency of training through the visualization of theoretical material, the formation of interest in consolidating knowledge in practice, which is an important component of forming key competencies of future seafarers.

The urgent task today is the search for new, development and active use of innovative elements in the teaching of humanities, mathematics and science cycles, not only for full-time but also part-time and distance learning of future seafarers through the use of new digital technologies (Redevelopment of educational spaces, Adaptive technologies, Critical reflective learning, Deep and Micro learning, Maker space, Personalized learning, Collaborative learning, Improving the culture of innovation, Big data, etc.). It is with the help of innovative methods, MOODLE and its new module for videoconference as adaptive elements were implemented into the training of future seafarers at the Kherson State Maritime Academy (KSMA), which in turn allows graduates of this higher education institution to be highly qualified professionals and competitive in the global maritime labor market.

Nowadays, the problem of application of digital technologies, tools in higher education is devoted to many theoretical and experimental works of scientific researchers. Among the works devoted to the theoretical and practical training of future seafarers with the help of innovative technologies, we should highlight the works of the following scientists: Sherman M., Chernikova V. [1], Lvov M.S. [2], Sokolov S., Saveleva M., Mitrofanova A., Kolesnichenko S., Logunov N. [3], Chen S. [4] etc.

Sherman M. and Chernikova V. studied English communicative competence of future seafarers with the help of digital technologies and highlighted that English for professional purpose is not just a discipline for future seafarers, but is gradually becoming a means of professional communication. They say it is also a component of professional training together with special subjects. In particular, according to the outlined scientists, the leading features of professional training of future ship navigators are the uneven educational process (which is due to the duration of maritime practice), professional orientation of the content, the growing role of independent work where digital technologies can help. Multimedia simulators (simulators) play an important role in the training of specialists in the marine industry by means of digital technologies, with the help of which you can easily practice your skills and abilities on how to act in a given situation [5], [6]. The process of formation of professional navigation competence of future ship navigators by means of simulation technologies of mixed reality was investigated by Popova H. and Lvov M. Noting the effectiveness of this method, provided that it is carried out on the basis of the model of professional navigational competence formation, based on the pedagogical conditions of formation of the studied phenomenon, namely: the development of professional thinking of future ship navigators; introduction of the "Virtual Reality Vessel of the

KSMA" into the system of professional training of future ship navigators; development of digital competence of teachers [2].

Sokolov S., Saveleva M., Mitrofanova A., Kolesnichenko S. and Logunov N. highlight that digital distance education technologies are a relevant issue today. They provide individual digital educational trajectories and an individual profile of students' competencies using the Data Mining methods and LMS MOODLE [3]. The use of augmented and virtual reality technologies (AR and VR) in the educational process was investigated by Yisi Liu, Zirui Lan, Jian Cui, Gopala Krishnan,Olga Sourina, Dimitrios Konovessis, Hock Eng Ang, Wolfgang Mueller-Wittig [7], Bauk S., Kopp M., Avramović Z. [8] and others. Scientists Yisi Liu, Zirui Lan, Jian Cui, Gopala Krishnan,Olga Sourina, Dimitrios Konovessis, Hock Eng Ang, Wolfgang Mueller-Wittig proposed and implemented an Electroencephalogram (EEG)-based psychophysiological evaluation system to be used in maritime virtual simulators for monitoring, training and assessing the seafarers. Their system included an EEG processing part, visualization part, and an evaluation part [7].

Bauk S., Kopp M. and Avramović Z. created a brief discussion of some current shortages in maritime education and training in general. They described possibilities of getting advantages through introducing e-learning into this respectable field of education and listed some advantages and disadvantages of MOODLE which has been used as a technological platform for introducing e-learning in the analyzed case [8].

Nevertheless we haven't found the works devoted to the formation of professional competences of seafarers with the help of LMS MOODLE together with module for videoconference.

The instruments LMS MOODLE provides

LMS MOODLE as an element of seafarers training while distance learning, has possibility to include e-courses where every tutor leads his own online training course. Each course was created according to IMO Model courses and international convention on Standards of Training, Certification and Watchkeeping of Seafarers (STCW) [9]. To contain all the competencies provided by IMO Model courses and STCW LMS MOODLE has Competency framework. The use of it implemented in KSMA on LMS MOODLE is aimed to increase the effectiveness of the learning process management and to implement a competency approach in the process of forming professional competencies [6].
E-courses of LMS MOODLE also use some elements of innovative technologies. An example of them is AR. Some elements of the courses are connected with the help of links to various videos, presentation, web materials etc.

Gamification is also innovative technology which LMS MOODLE allows to implement. Examples of gamification elements are badges, leaderboards, loops of progress and progress bars, missions and levels, boss fights, Easter eggs, gamified activities (crosswords, wordsearch, matching games, quizzes etc.). Example of course rules in the form of infografics is shown in the figure below.

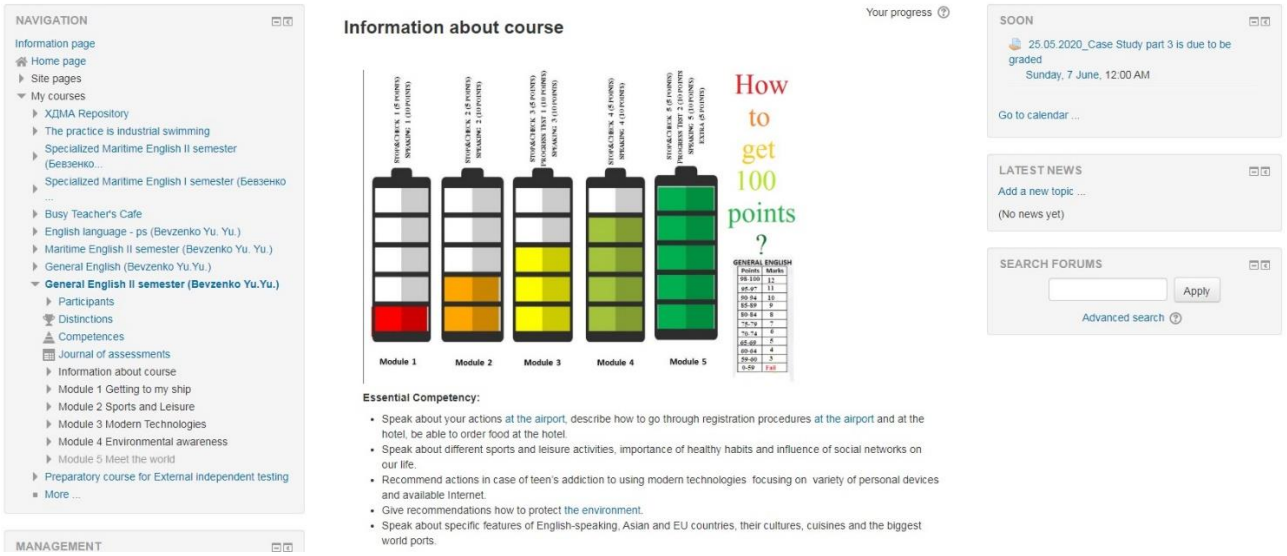

Fig. 1 Rules of "General English" e-course for future ship engineers.

Example of progress bars as elements of gamification on LMS MOODLE is shown in the figure 2.

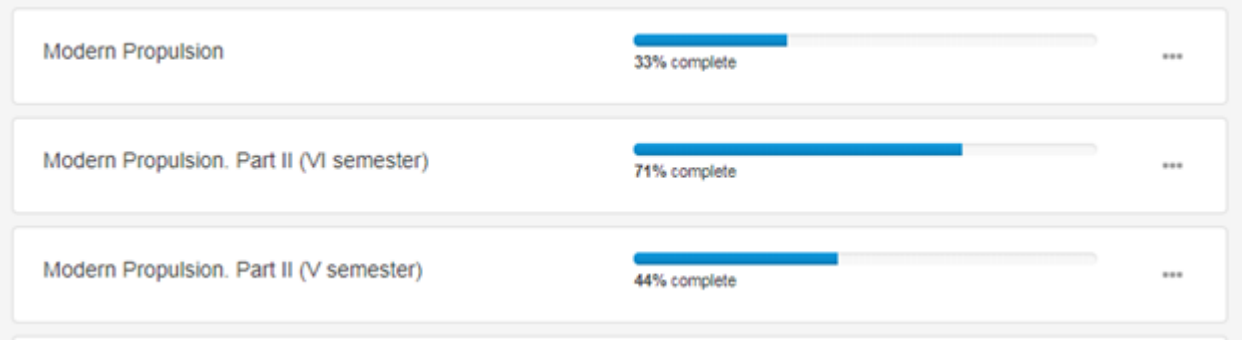

Fig. 2 LMS MOODLE Progress bars.

Mobile-learning (m-learning) is also realized with the help of LMS MOODLE because this platform has free mobile application with the help of which it's easy and comfortable to do the tasks of e-courses (Figure 3). M-learning is considered as comfortable form of distance education because helps students to use LMS MOODLE anywhere and anytime which is important for seafarers on shipboard practice. MOODLE Mobile application can be used even offline. While online zone all the results of ready tasks will be transported into gradebook of e-course [10].

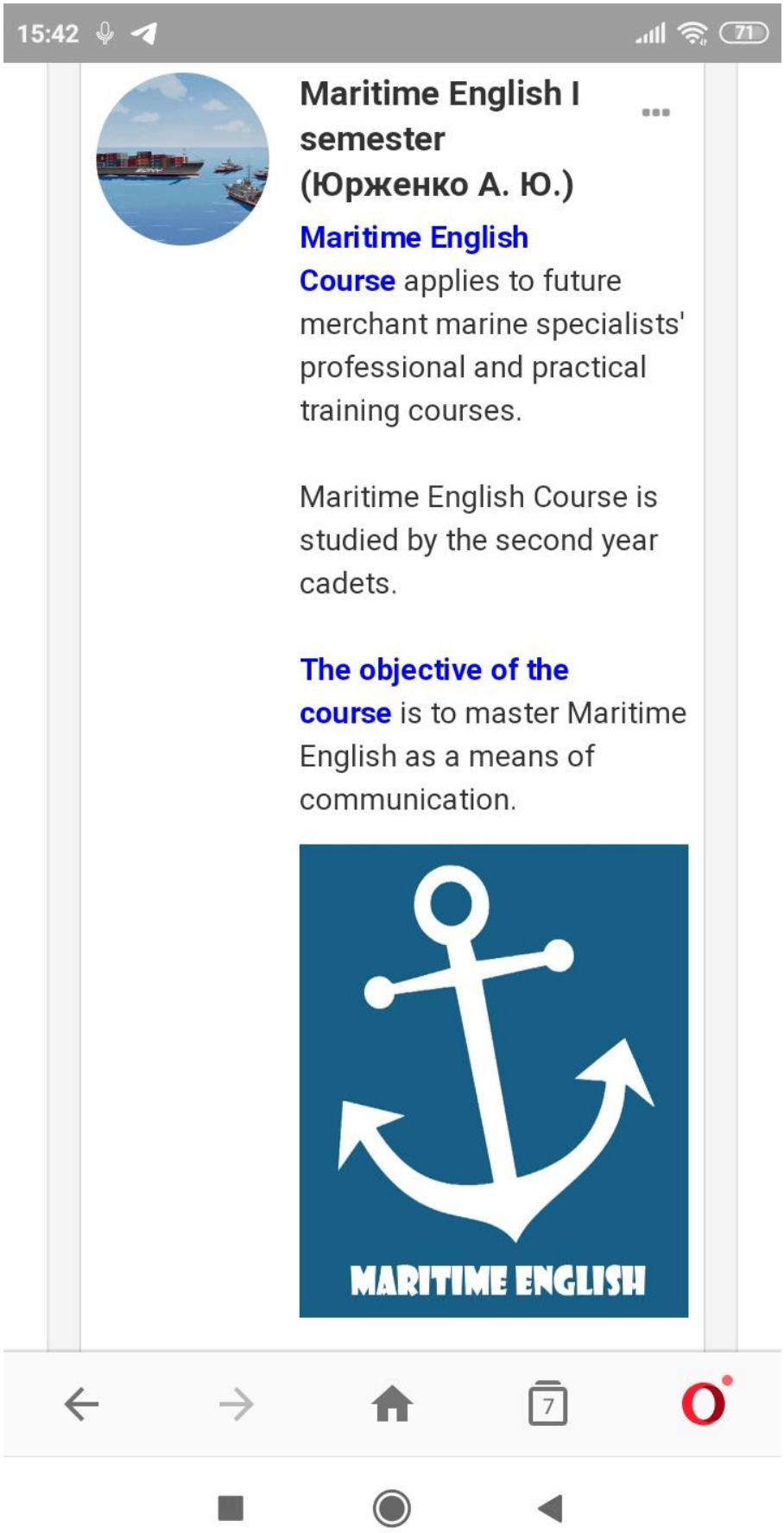

Fig. 3 The example of Maritime English I semester e-course of Yurzhenko A. with its abstract on mobile phone's application (Opera).

LMS MOODLE also provides adaptive technologies and helps to create individual trajectory for each student.

It is implemented with the help of settling the system of activities. Bank of questions with level categories helps to organize the training according to every student mental capabilities. Moreover, LMS MOODLE helps to form critical thinking of students with the help of different resources: Assignment, HotPot activities, Book etc. With the help of these resources Case study can be organized. Adaptive testing can be organized with the help of “Lesson” resource – it delivers and checks the material in a flexible way [11]. Depending on the student's choice of answer and how the teacher develops the lesson, students may progress to the next page, be taken back to a previous page or redirected down a different path entirely. LMS MOODLE redevelops the educational space – tutor stops being the center of studying process. Learning becomes student-centered one. Every course has map of topics at the beginning – student knows what he’s going to study next. The news of course is reflected in special forum where students can check nearest events. Forums are also used for study – tutor can organize different activities there (e.g. create your dialogues/questions; answer the questions; continue the thought etc.) [12]. There is also a forum to help students with technical questions – how to orient in course. According to the program topics are organized with the help of resources LMS MOODLE provide: Assignment, BigBlueButtonBN, Chat, Choice, Database, External tool, Forum, Glossary, HotPot, Lesson, Quiz, SCORM package, Survey, Wiki, Workshop, Book, File, Folder, IMS content package, Label, Page, RecordingsBN, URL.

There is also a calendar which reflects the time and dates of activities with deadlines. One of the most important resources on LMS MOODLE is easy-to-use Gradebook. It can be settled according to tutor’s course needs. Course total is a flexible formula which can be changed and automatically calculated.

AR in LMS MOODLE

LMS MOODLE is one of the platforms where different elements can be integrated. One of such elements is AR objects. KSMA uses free application which is named Layar. The example of Layar image is shown in figure 4. Students scan the image with the help of their phones’ scanners and watch the video with different tasks/instructions.

Fig. 4 Example of AR image which is present in the Student's books and e-course

The use of AR helps to visualize studying process, it increases content understanding, provides long-term memory retention, improves physical task performance, students collaboration and motivation [13].

The use of Recosha - vodeoconference module of LMS MOODLE on BigBlueButton platform

The means of digital technologies are divided on the basis of interaction and on the basis of the use of direct digital technologies. Synchronous and asynchronous are defined on the basis of interaction: synchronous are video conferences, and asynchronous include online mode (webinars, e-learning materials, etc.). Based on usage, video clips, audio clips, virtual objects, animation graphics, etc. are distinguished. To create and implement them, you need a gadget and proper application.

The staff of the Kherson State Maritime Academy has accumulated considerable experience in the use of videoconferences in the educational process, as the specifics of training specialists in sea and river transport requires mobility and flexibility of the educational process. This is primarily due to the fact that the practical training of future maritime professionals takes place on existing ships of the merchant fleet, so often the student must acquire knowledge through electronic resources.

In the current situation of the distance learning needs, such teaching methods have gained opportunities for widespread use and thus have become the most widely used in the educational process. Thus, synchronous and asynchronous multimedia technologies began to be actively used in the educational process. The combination of these two types has created opportunities for full-fledged work and implementation of the tasks of humanities and philology, competence in which should be measured not only by the ability to solve certain problems and write texts, but also to form conversational competence.

The introduction of synchronous multimedia technologies, namely the use of video conferencing, provides an opportunity to practice such competencies as socio-personal competencies, interpersonal skills and abilities, ability to criticize and self-criticism, interaction (teamwork), instrumental skills, including oral communication in native and foreign language (Maritime English and English for special purpose); system of competence (ability to apply knowledge in practice, to adapt to new situations, to generate new ideas).

Of course, distance learning using a variety of digital technologies and modern online services encourages future employees of sea and river transport to more effectively learn new material and continuous self-improvement in their spare time. Evidence of this is that after virtual communication, they easily perform the most difficult tasks, and if you have any questions, you can always seek advice from the tutor via messenger. Students with the help of Recosha (videoconference module on BigBlueButton platform) have the opportunity to simultaneously see the teacher, groupmates, assignments on the course and observe the example of searching for data on LMS MOODLE, as well as be not just a passive listener but also an active participant in the online meeting, study while discussions, offer alternative ways to solve professional problems.

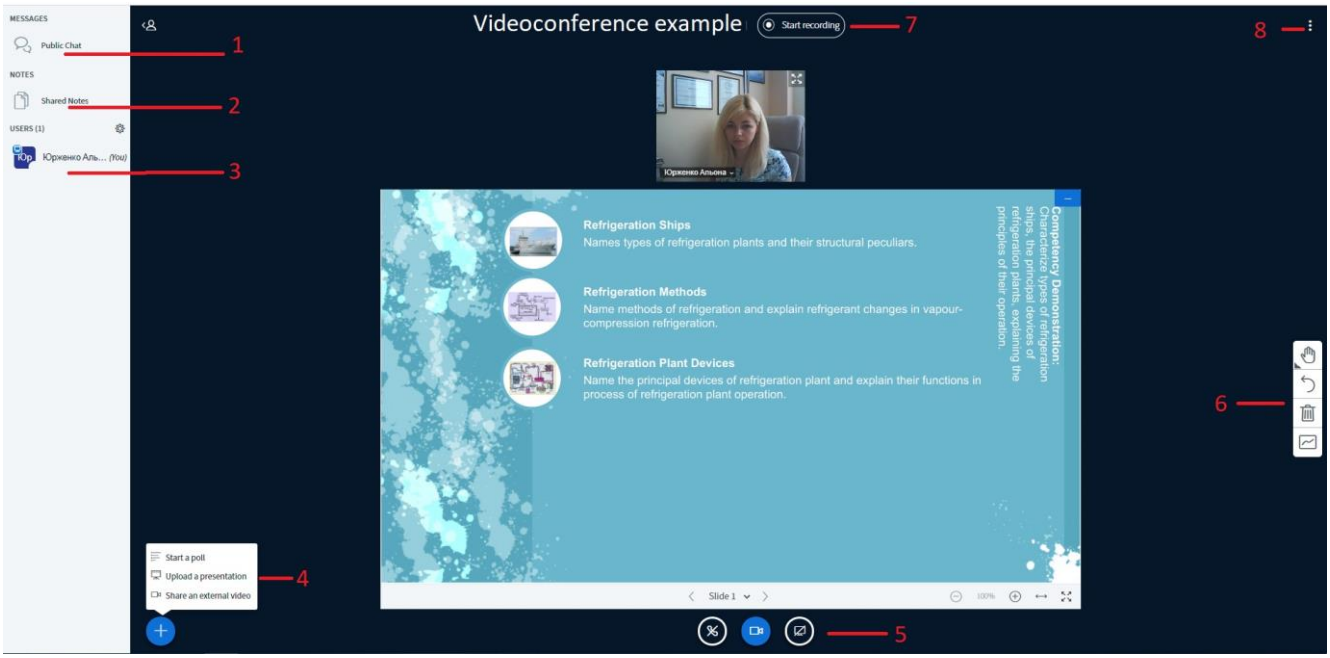

Fig. 6 Recosha videoconference on BigBlueButton platform example, where 1 - chat; 2 - notes; 3 - list of users with MOODLE logins; 4 - possibility to start a poll, upload PPP, share a video; 5 - possibility to switch on/off microfone/camera/screen; 6 - possibility to use text/line/pencil tools etc.; 7 - recording; 8 - other settings.

Thus, the use of digital technologies (LMS MOODLE and its videoconference module) in the educational process is justified, as it creates conditions for the effective development of educational material and the formation of necessary professional competencies of future seafarers. In addition, the combination of different types and forms of activity makes the learning process more effective, as for a student with "clip" thinking, the constant change of activities gives a high quality result in terms of learning material. This is due to a number of factors: the acquisition of knowledge occurs due to the own trajectory of educational activities of each individual student; a new criterion of objective evaluation of the work performed is formed; the opportunity for independent overcoming of difficulties in the studied material is created; interdisciplinary links are actively introduced. The prospects for further research

include a detailed study of VR and AR as additional tools of LMS MOODLE in training of future maritime professionals.

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