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# Exploring the effectiveness of online learning tools and technologies while teaching Maritime English to future ship engineers

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**Abstract.** Maritime English proficiency is crucial for future ship engineers to effectively communicate, operate, and ensure safety in the globalised marine industry. The study is devoted to analysing the integration of language and technical skills, highlighting their symbiotic relationship in the educational context. This paper explores the development of modern approaches to teaching Maritime English, emphasising continuous assessment and adapting teaching strategies. The assessment and evaluation methods were used to measure language proficiency, demonstrating the importance of ongoing assessment to monitor progress and adapt teaching strategies. Additionally, this article examines the influence of e-learning and digital resources, shedding light on advancements, challenges, and opportunities in Maritime English education. The importance of cross-cultural communication training is discussed, emphasising its role in preparing future ship engineers for an international working environment on a ship. Case studies, best practices, and lessons conducted at Kherson State Maritime Academy (KSMA), Ukraine, are shared to provide practical insights for teachers. The implications of international language proficiency regulations in the maritime industry are also addressed. By analysing the impact of these pedagogical approaches on ship engineers' safety and crisis management capabilities, this article highlights the tangible benefits of effective Maritime English education. For mobile learning app developers, the study suggests integrating features that promote collaborative learning, interactive assessments, and personalised feedback to optimise learning experiences. Overall, integrating online learning tools and technologies (e.g. Moodle LMS) presents a promising avenue for advancing Maritime English education and preparing future ship engineers for the challenges of the marine industry today.

**Keywords:** Moodle, maritime professionals, Maritime English, e-learning

## 1. Introduction

Maritime English proficiency is essential for future ship engineers as it directly impacts their ability to communicate, operate, and ensure the safety of ships in a globalised marine industry. Seafarers must know how to use nautical terminology (e.g. ship components, engine room equipment, safety-related terms); maritime communication (standard communication procedures and radio communication); technical English (phrases related to ship systems, machinery, and equipment); safety protocols (safety-related vocabulary); legal terminology (SOLAS, STCW, LSA Code); documentation (logbooks, cargo manifests, and reporting forms); cross-cultural communication; emergency procedures; environmental awareness (MARPOL – Marine

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Pollution); multimodal communication [16]. Ship engineers must interact with crew members from various nationalities and communicate with the crew, port authorities, and other personnel.

Good Maritime English skills reduce the risk of misunderstandings, improve teamwork and coordination, and facilitate effective problem-solving. Therefore, it is important for marine engineers to constantly improve their language skills to ensure the safety, efficiency, and success of their operations in the globalised maritime industry.

Teaching Maritime English is closely related to Moodle and other modes of teaching language due to the specialised nature of the language and the need for practical, accessible, and interactive educational platforms. Future marine engineers must possess sufficient English language competence to solve professional and personal issues while performing their official duties. Teaching Maritime English using Moodle and other modes of language instruction enhances accessibility, interactivity, flexibility, and customisation, thereby optimising the learning experience for future ship engineers and promoting proficiency in the specialised language skills required for success in their future work. Maritime English education faces several contemporary challenges that necessitate innovative approaches and solutions [16] (e.g. martial law in Ukraine).

Thus, the research problem encompasses integrating technology, including online learning tools and multimedia resources, into Maritime English education.

### 1.1. Analysis of recent research

Reviewing existing literature on online learning tools, technologies, and their effectiveness in language education, we identified gaps in the current research to justify the importance of our study. Many scientists nowadays study the problem of teaching Maritime English to find and develop modern and effective approaches to teaching. Mustaeva, Qurbanova and Saydivalieva [8] explored technology development and listed the stages of learning transport terms in English based on modern technologies. Ni, Wang and Li [9] reviewed regulations, current status, effects and reduction strategies of emissions for marine diesel engines. Their materials are usually used while teaching Maritime English to future ship engineers [9]. The role of information and communication technologies (ICT) in lifelong learning and professional development was explored during several Ukrainian workshops. Various ideas and experiences on using ICT were provided (e.g. interactive simulations, machine-based learning, computer-supported education) [10–12]. Latygina et al. [7] proved mobile applications can be attractive and highly effective in foreign language learning. M-learning can also be interconnected by utilising Moodle LMS to deliver educational content and activities to learners via mobile devices.

The study's objective is to analyse effective methods of Maritime English teaching using modern online learning tools and technologies under present conditions.

## 2. Methodology

Assessment and evaluation methods were explored during the research to measure the language proficiency of future ship engineers, emphasising the importance of continuous assessment to monitor progress and adapt teaching strategies accordingly.

Mini language and grammar tests were designed to collect quantitative data from students before and after the experiment. It was done to gather quantitative data on the perceived effectiveness of online tools in improving language skills. We analysed the content of online materials used in Maritime English programs to evaluate their alignment with industry needs and language proficiency goals. We tried to identify all possible obstacles to a successful strategy.

After experimenting, we compared the results of students who worked with online tools (in experimental groups) with those of control ones in language learning.

## 3. Results

### 3.1. Moodle LMS online course

As a result of our research, we should create an online course for future ship engineers to study maritime English. Modern Maritime English teachers face many challenges nowadays, and low digital competence is one of them. New tools and instruments for e-learning appear every day. Moodle also releases updates from time to time, so teachers need to be up to date and know how to use it and how to use it most effectively. An online course about Moodle use for English teachers was created. Maritime English teachers (approximately 60 people) have already passed.

Using new tools and features of the experimental Moodle Maritime English course was created. The summary of the online course on Moodle LMS is given in figure 1. The course has modules (according to the program of the speciality). Each module is focused primarily on the organisation of interaction between the teacher and students. With the help of the course, the teacher can choose any of the modules, place them on the website, edit, update, and use them to inform, teach, and evaluate students. The course allows the teacher to monitor student's activity and contains a user-friendly electronic grade journal. Conveniently, the modules for the following topics can be hidden until the students complete the tasks from the previous topics. Only after activity completion does the system make them visible to students.

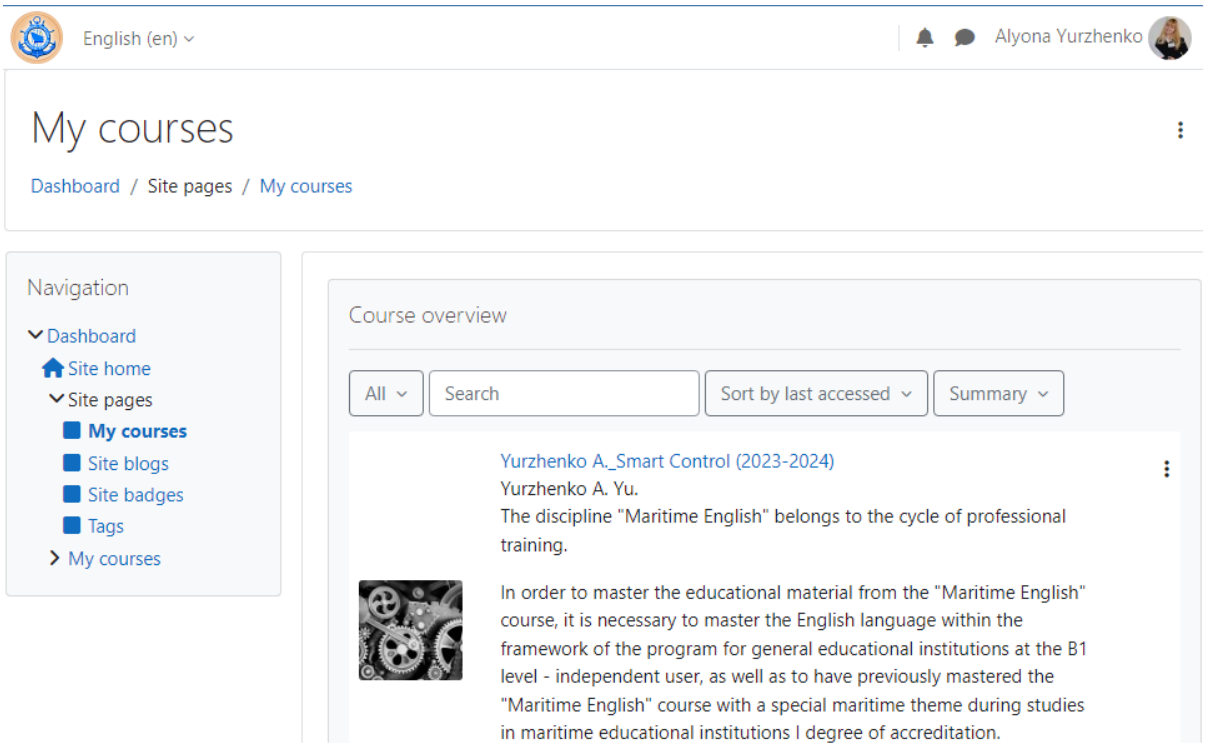


**Figure 1:** "Maritime English" course summary.

The teacher's cooperation with students takes place with the help of two types of tasks: "Activities" and "Resources". The first group – "Activities" – allows the creation of tasks for evaluation. These objects provide opportunities for communicating with students, performing tasks that involve uploading files with work results, placing elements for joint work ("Wiki"), etc.

A "Resource" in the Moodle system is a group of objects allowing teachers to add content to a course. For example, these can be web pages, text pages, captions, links to files, web pages ("URL"), a directory with files ("Folder"), or text pages in book format ("Book").

The teacher chooses which of these objects to include in the course based on the goals and tasks of the academic discipline.

The course contains four modules, each finished with obligatory activities.

#### *3.1.1. Quiz*

It is an interactive assessment tool that allows teachers to create and administer various tests to students within the Moodle LMS. The system supports various questions, including multiple-choice, true/false, short answer, essay, matching, and more. This allows teachers to design quizzes assessing different cognitive skill levels [1].

A "Question Bank" should be created to create a test. First, all test questions from the academic discipline are entered into the system, which will then be used while creating the test. All questions should be divided into three levels. The first level – easy questions, answering correctly, the student will receive 2 points. The second level is a question of medium difficulty; the student can get up to 5 points for an answer—and the third level is difficult questions – 7 points. The "Test" module allows the teacher to quickly check the results of many students at once, as their answers are checked automatically and immediately entered in the gradebook. Therefore, the primary expenditure of the teacher's time is not related to checking works but to developing questions, filling them in the "Question Bank" and setting up the test. In contrast, each question can be checked using the preview function.

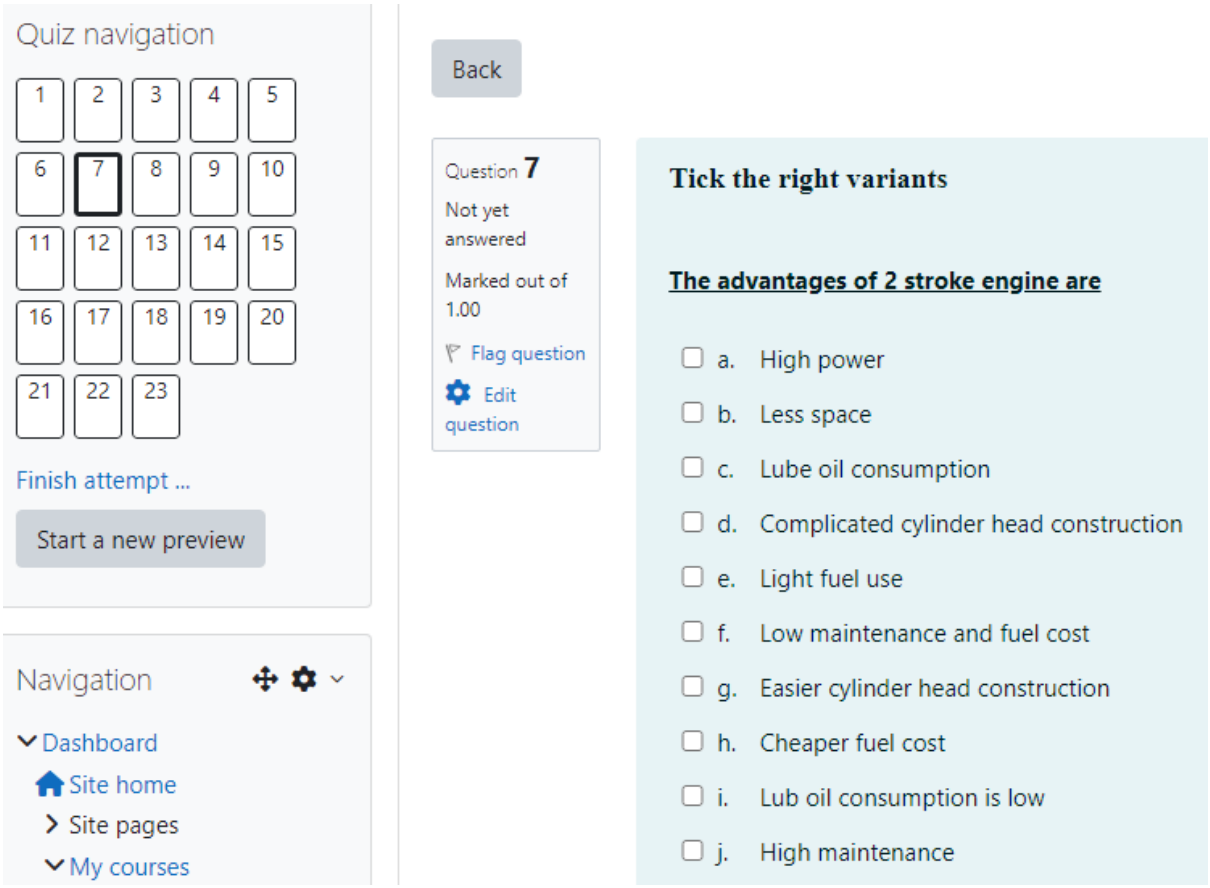


**Figure 2:** Quiz devoted to diesel engine construction on Moodle LMS.

When adding a new test to the Moodle system, there are several things to consider that may affect test performance. For example, setting the "time selection" function optionally allows a teacher to take the test in a specific time interval and over a certain amount of time. "Estimation" allows a teacher to set a minimum passing score for the student. At the same time, it should be borne in mind that, unlike other modules, the maximum score in the "test" is assigned directly during the creation of no questions to him. At each attempt, the system can automatically generate a set of questions from the database test questions, shuffling the order of questions and answer options (which reduces the risk of students copying answers).

Students can take the test several times, and each attempt is automatically scored. The test can show correct answers or just a score.

The teacher can view the test results, each student's start and end times, and the points received for each question.

Detailed statistics are also available with information on the percentage of correct answers for each of the test questions – this allows a teacher to analyse the group's answers and identify problematic questions that may be worth returning to for consolidation.

#### *3.1.2. Chat*

It is a real-time communication tool that enables users within a Moodle course to engage in text-based discussions. It allows participants, such as students and teacher(s), to have synchronous conversations within a course environment. System users can exchange text messages available to all or individual participants. By discussing the different questions, the student can get quick feedback from his teacher and be pointed to the topic he needs to repeat.

Saving chat sessions allows for convenient retrieval and reference of past conversations. Notable benefits of this feature include the straightforwardness and user-friendly nature of the tool.

#### *3.1.3. Forum*

Moodle is a communication and collaboration tool that allows course participants to engage in asynchronous discussions and share ideas, questions, and information. Forums are a fundamental feature in Moodle and can serve various educational purposes. With the help of settings, a teacher can organise different levels of access to each forum's functions and perform message evaluation.

Forums come in various formats, including open discussions, social interaction platforms, and platforms for evaluating course content. When properly designed, a forum can be a valuable and engaging tool for learning. It is particularly crucial to allow students to share their own experiences, express their opinions, and conduct research on relevant websites related to the discussion topic.

To ensure the forum's effectiveness, well-crafted discussion questions that encourage thoughtful responses rather than simple yes/no answers or repetitive responses are essential. Additionally, regularly changing the questions on the forum prevents answers from being readily available on the Internet, maintaining the integrity and uniqueness of the discussion within the forum.

#### *3.1.4. Assignment*

It is a feature that allows teachers to create, distribute, collect, and grade assignments or projects of their students within a course. Assignments in Moodle provide a structured way for students to submit their work (any digital content (files), such as text documents, spreadsheets, images, audio, and video files) and for teachers to evaluate and provide feedback [2]. The example of Assignment is given in figure 4.

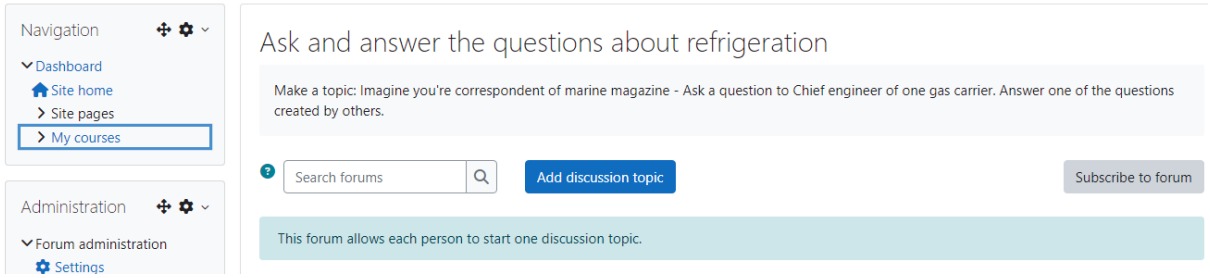


**Figure 3:** Forum on Moodle LMS.

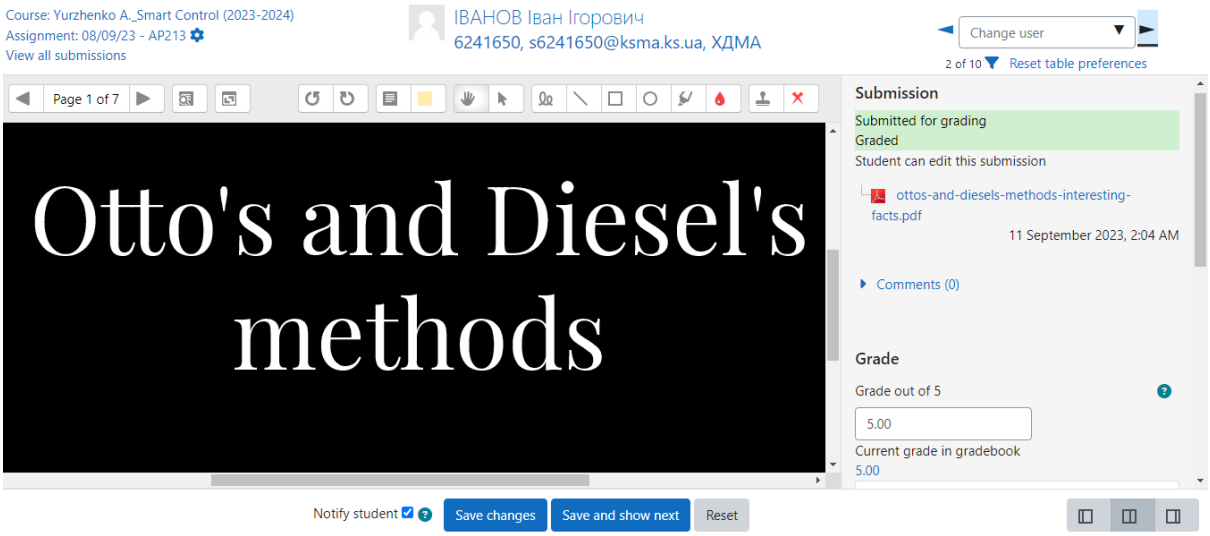


**Figure 4:** Student's submission of Assignment.

The task can also remind students what they need to do "offline", for example, some creative work that cannot have a digital appearance.

Teachers can grade student's works (the final grade will be recorded in the grade journal), comment on them, and send them back. In such a way, students receive feedback, which is so essential while e-learning [3].

It is convenient for working with small groups of students, but when a teacher needs to check the results of the work of 50-100 students, it is better to use the "Test" module.

There may be some restrictions on the task: according to the deadline (sent by a specific date), by the number of possible retransmissions, and by blocking the sending of a response after the expiration of the execution period.

#### *3.1.5. SCORM*

SCORM (Sharable Content Object Reference Model) is a set of technical standards and specifications used in e-learning and instructional design. It is a framework that allows e-learning content to be created, packaged, and delivered in a consistent and interoperable manner across different LMSs.

SCORMs are used in Maritime English courses to add gamification elements, game-based activities, etc. Every teacher has an account on the external www.learningapps.org website, where, with the help of templates, he or she adds his/or her own Maritime English content and then transfers it to Moodle. Such activities include videos, simulations, interactive quizzes, maps, etc. Moodle's flexibility in course design combined with SCORM's ability to package and deliver content allows teachers to

create customised learning paths tailored to ship engineering cadets' specific needs and proficiency levels.

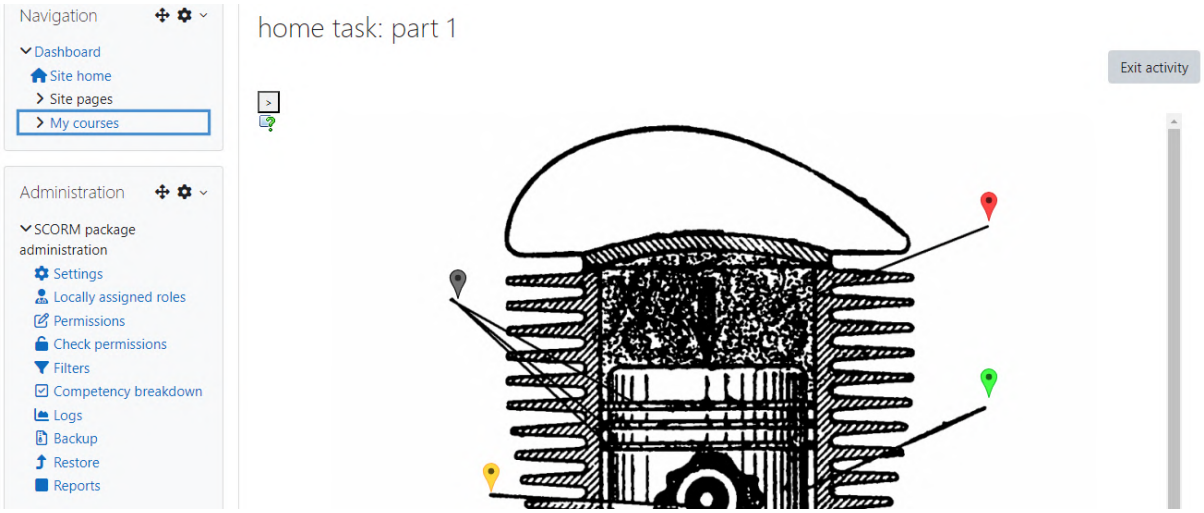


**Figure 5:** Label engine's parts SCORM.

### *3.1.6. Glossary*

It stands for e-Vocabulary, which has specialised terms related to studying a specific subject and is created by students. They can add new lexical units, images / videos / animations / charts, and links, explain their definition, give examples / synonyms / antonyms, and provide glossary links in the text, etc. The availability of a glossary explaining key terms used in the training course is necessary for extracurricular conditions of independent work.

Expanding the vocabulary enhances student's ability to express ideas and communicate effectively [5]. An example of a Glossary is given in figure 6.

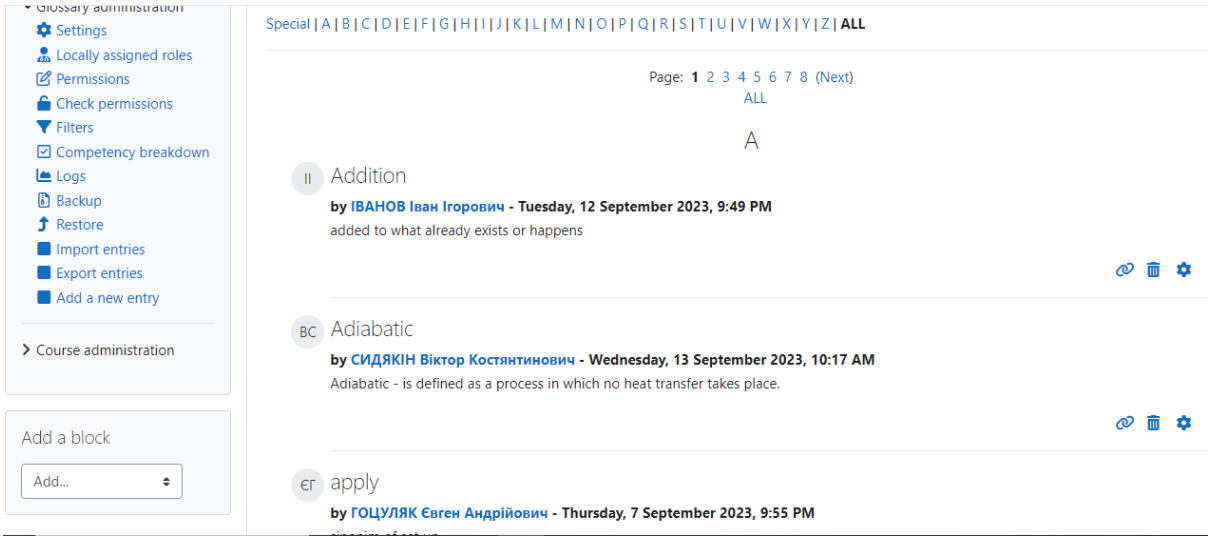


**Figure 6:** Moodle's Glossary example.

Many more Moodle activities are used in Maritime English e-learning. Among them are URLs, Lessons, Surveys, Pages, H5P, Choices, and others.

### *3.1.7. Wiki*

Contemporary distance learning systems are crucial because they can obtain a wide range of electronic resources for informative content and enhance the educational process's management capabilities. Among the tools used, Wiki technology is precious as it is integrated into the educational system and customised to serve as an educational resource.

Wiki is an advanced technological solution designed to enhance the socialisation of the online space and facilitate collaborative knowledge sharing. It serves as a platform for users to jointly develop and cultivate a wide range of information and resources. Like blogs and web journals, Wiki allows for creating web-based documents. However, its distinctive feature lies in the ability for any user to expand, edit, and comment on the content based on their respective privileges [14]. The example of Wiki is given in figure 7.

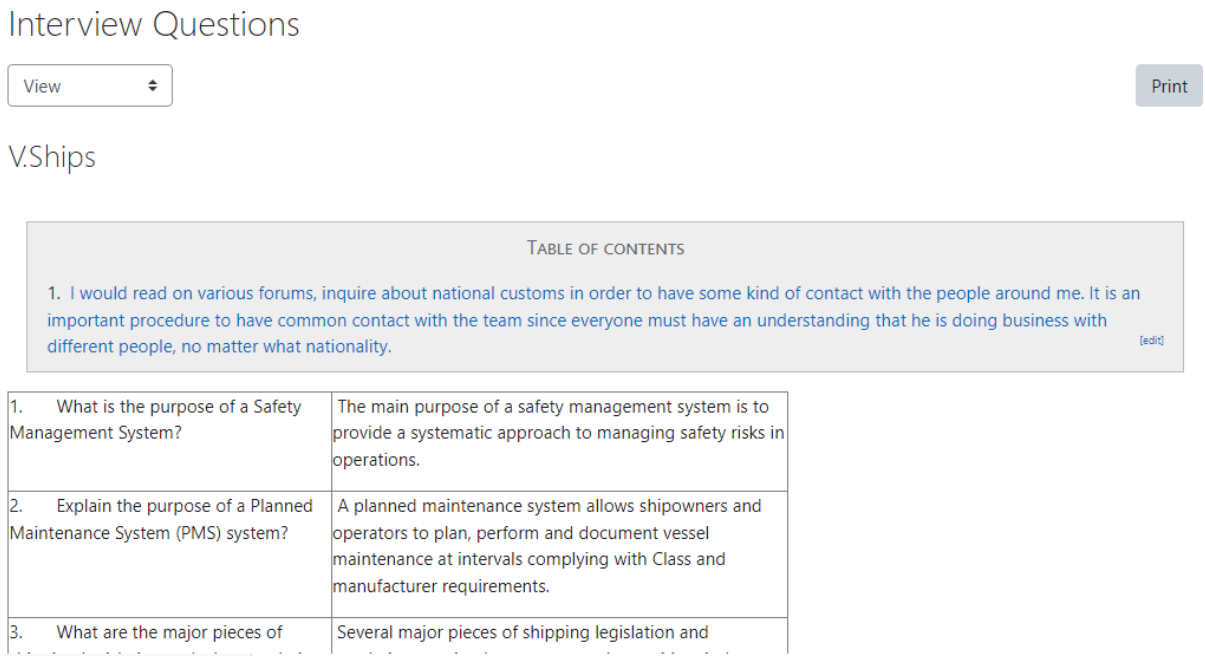


**Figure 7:** Moodle's Wiki example.

Figure 7 shows the Interview Questions table where the teacher has created the table with questions from V.Ships crewing company. The cadets' task was to complete the second column with personal answers. In case cadets see each other's mistakes, they have the opportunity to correct them. Moodle also allows the teacher to see the history of answers. If someone corrects mistakes inappropriately, the teacher can choose the old version of Wiki. History is handy for checking who did the task, when, and how often. An example of Wiki's history is given in figure 8.

Incorporating Wiki technology greatly enhances the possibilities within the realm of education. Wiki introduces various pedagogical methods to the learning process, including cooperative learning, discussions, role-playing, games, situational analysis, and the project method. Additionally, Wiki fosters creative thinking among participants in the educational journey. The primary idea behind Wiki technologies in remote teaching is facilitating collaborative engagement amongst students by allowing them to create, edit, and work on their electronic materials and projects.

### *3.1.8. BigBlueButton*

This web conferencing module is integrated into Moodle. It allows users to share audio, video, chats, and slides, use the board, collaborate, attend sessions and partici-

V.Ships

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| ● ○ | 44 | АК КАЦАЛАП Андрій Олександрович | 7:03 PM | 9 November 2023 |
| ○ ○ | 43 | АС СКРИЦЬКИЙ Антон Сергійович | 4:17 PM | 7 November 2023 |
| ○ ○ | 42 | АС СКРИЦЬКИЙ Антон Сергійович | 3:33 PM | 7 November 2023 |
| ○ ○ | 41 | ЄГ ГРИГОР'ЄВ Єгор Дмитрович | 11:47 AM | 7 November 2023 |

**Figure 8:** Wiki's history example.

pate in surveys. In addition, sessions can be recorded and archived. BigBlueButton has several advantages: it is easy to use and fully integrated into Moodle. In addition, records are easily accessible [4, 15]. The example of BigBlueButton is given in figure 9.

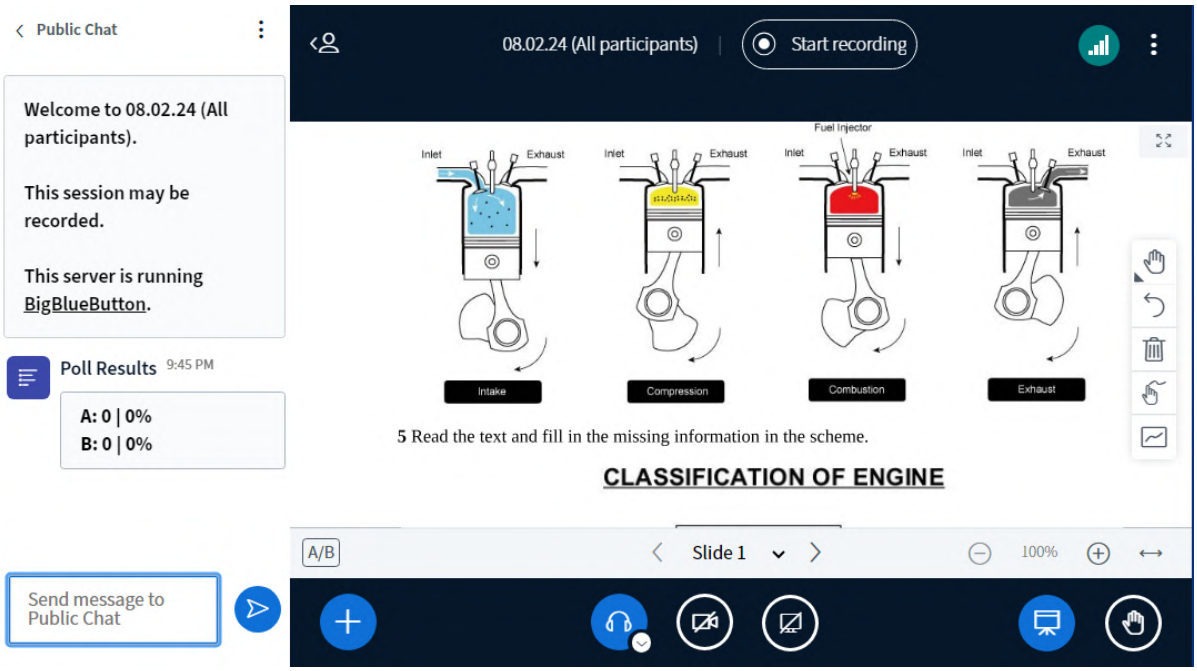


**Figure 9:** Moodle's BigBlueButton example.

The shipping industry is global, necessitating effective communication in English as the common language. Online learning resources facilitate the enhancement of language abilities and offer students ample opportunities to practice communication skills in a realistic setting. By utilising virtual classrooms and video conferencing, students can engage in dialogues, presentations, and group activities that replicate real-world scenarios they may encounter in their prospective careers.

Moreover, online learning tools eliminate geographical constraints, thus improving access to high-quality maritime English education. This is particularly advantageous for individuals residing in remote areas or those unable to attend traditional face-

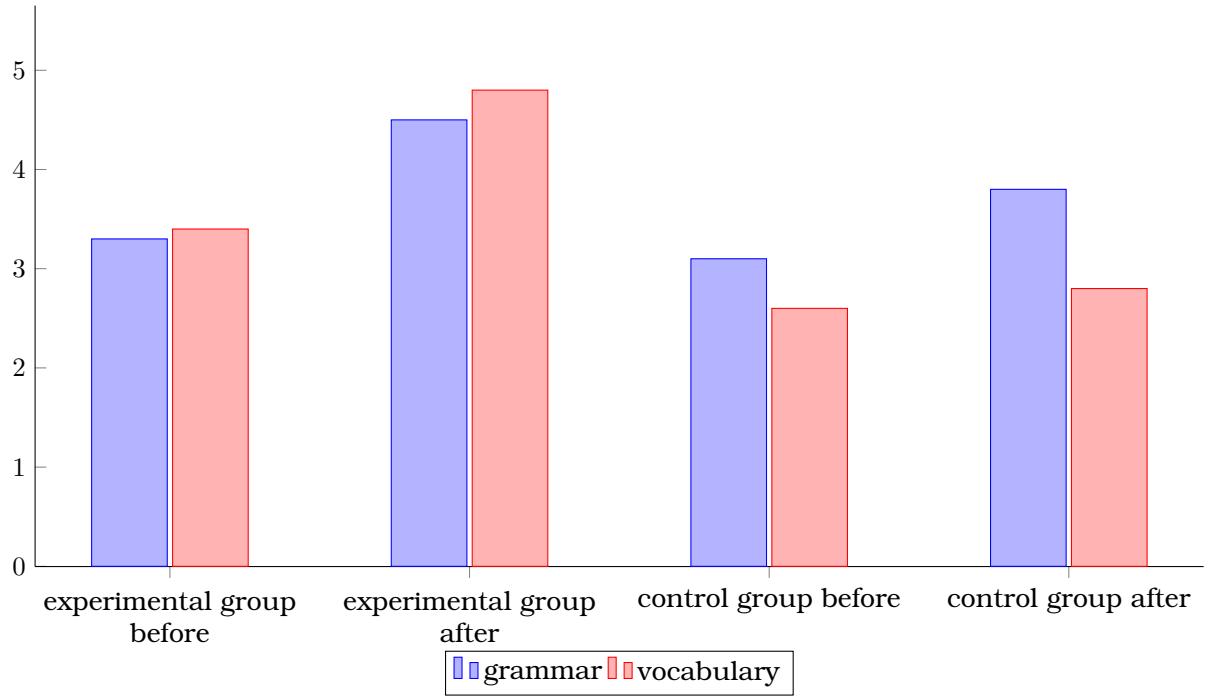


**Figure 10:** Comparison table.

to-face classes. Online platforms ensure that all students can acquire the essential language skills necessary for professional advancement regardless of location or time limitations.

### 3.2. Compare the results

Testing was conducted again after the experiment (where different groups used different tools (online and paper tasks). According to the previous and last test results, a conclusion was drawn favouring using online tools in teaching maritime English. The experimental group students could work independently, in pairs, or in groups and repeat the material by doing different homework online or taking mini-tests every week. At the same time, students in the control group had the opportunity to repeat only from paper media and take a test at the end of the module.

Figure 10 shows us the results before and after the experiment. As we can see from the results at the beginning of the experiment, the quality of students' knowledge in different groups was approximately the same (both grammar and vocabulary). However, after using online tools, the quality of knowledge in the experimental group increased significantly, which indicates the effectiveness of using these tools and the frequency of repeating and performing various tasks. The experimental group improved their skills in grammar from 3.3% to 4.5% and in vocabulary from 3.4% to 4.8%.

## 4. Discussion

The Survey on Moodle LMS is a tool that allows teachers to create online surveys or questionnaires for students to complete. The "Maritime English" course's last activity is a Survey to collect participant feedback and data. Teachers created this survey to gather information on course content, teaching methods, and other aspects of the learning experience.

The results we have received can help teachers and course designers improve course content, teaching methods, and the overall learning experience.

The use of Moodle LMS underscores its efficacy in offering extensive opportunities to study academic disciplines, mainly Maritime English. Through segmenting course materials into didactic units, teachers can become more creative, shaping fragments of online courses in a myriad of ways, including the presentation of information through various visual aids (images, videos, animations, charts, etc.) and employing strategies of active professional education.

LMS facilitates the adoption of a wide array of self-guided learning methods by students, ranging from direct dialogues to interactive discussions about problems and issues. It also encourages the submission of creative works such as projects. Furthermore, students benefit from unrestricted internet access, granted by instructors by providing external links to information resources (e.g., the MARPOL website). This access encourages the independent pursuit of knowledge from primary sources, motivating the cultivation of a personal connection with the subject matter being studied [6, 13].

The availability of e-learning is a pivotal aspect, fostering a student-centred approach that accommodates each learner. This approach thrives on the adaptability and flexibility of content delivery, ensuring that students can progress at their own pace while comprehending theoretical and practical subject matter. So, the transition of the educational process to Moodle LMS has been instrumental in upholding a comprehensive educational experience and delivering high-quality educational services to KSMA.

Undoubtedly, a great advantage is the ability to choose the time devoted to learning and the pace of acquiring knowledge in accordance with the individual needs of the student. The student decides when and where he studies. E-learning allows students to minimise fear or shyness. It provides an opportunity to ask questions by email, chat, or discussion forums. In addition to the many other benefits of using e-learning, an important aspect is the ever-increasing amount of learning materials available to students.

The biggest drawback of this system is the need for more direct contact between the student, teacher, and other course participants. Another problem is the need for more motivation and self-discipline, which are essential in distance learning. A blended approach that combines online resources and personalised instructor support can ensure a well-rounded and comprehensive education for future ship engineers.

## 5. Conclusions

Online learning tools and technologies can help teach Maritime English to future ship engineers. They offer flexibility, accessibility, and interactive learning experiences.

Integrating online learning tools and technologies in teaching Maritime English to future ship engineers presents a promising avenue for advancing language education. By harnessing the power of technology, educators can create an immersive and interactive learning environment that equips students with the necessary language skills for their professional success in the maritime industry.

The practical pedagogical approaches explored in this article underscore the significance of Maritime English proficiency in preparing future ship engineers for the challenges and demands of the globalised marine industry. As the maritime world becomes increasingly interconnected and dependent on effective communication, teachers must adapt and innovate to continue preparing ship engineers for the evolving demands of their profession.

Implementing a Moodle-based online course for Maritime English education at Kherson State Maritime Academy demonstrated the practical application of modern e-learning tools in enhancing language learning experiences for ship engineering cadets.

From interactive quizzes and forums to collaborative wikis and virtual classrooms, the course offered diverse activities and resources to engage learners and promote active participation. The hypothesis was proved that using e-learning and digital resources positively impacts Maritime English education by addressing advancements, challenges, and opportunities in the field. The prospects of further research can be seen in the analysis of Moodle LMS use while distance learning Maritime English during dual degree programs.

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**Declaration on generative AI:** The authors declare that they have not used AI tools in the writing of this article.

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