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Microlearning in Forming the Students' English Competencies with VR Involvement

Olha FEDOROVA[1],
Oleksandr SHUMSKYI[2],
Oksana GOLIKOVA[3],
Iryna KUTSENKO[4],
Nataliia SERDIUK[5],
Oksana ZAHORODNA[6]

[1] Kherson State Maritime Academy, Ukraine, fedorova.olena2406@gmail.com
[2] Ukrainian Engineering Pedagogics Academy, Ukraine, oll123@ukr.net
[3] National Technical University "Kharkiv Polytechnic Institute", Ukraine, golikovantu@gmail.com
[4] Kherson State Maritime Academy, Ukraine, sevilia19771@gmail.com
[5] Hryhorii Skovoroda University in Pereiaslav, Ukraine, serdiuk-n@ukr.net
[6] Vinnytsia National Agrarian University, Ukraine, askania@ukr.net

Abstract: *Every year the problem of higher educational establishments' modernization, introduction of the newest methods and strategies of educational process reorganization, estimation of achievements in the context of information technologies becomes more and more urgent. The situation with the COVID-2019 pandemic has demonstrated the need to involve additional information approaches to teaching within the system of blended learning in higher educational establishments. As a result, the question arises: what mechanisms can be used to make learning effective? The article reveals the concept of "microlearning" as the latest approach in education and identifies its key tools in formation of English-language competencies in university students. The study found that microlearning can be an effective complement to traditional learning, as it extends the learning process beyond the classroom on the basis of information technology, allows consolidating virtually and deepening the knowledge gained during practical classes, and provokes students to daily communication outside the establishment through social network. Moreover, we propose a strategy for implementation of microlearning on the example of the educational process at Kherson State Maritime Academy through interaction of practical classes in the line of communicative-competency approach, virtual and online learning on the principle of rotation.*

Keywords: *Microlearning, learning management system, online learning, computer training module, virtual reality, communicative-competency approach.*

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Introduction

Every year, the field of education is enriched with new information technologies, and, consequently, the question arises what mechanisms to use to make learning effective and the results – maximum.

Over the past decades, the approach to teaching English, maritime English in particular, has centred around the instructor in general, where the latter has played a more dominant role, functioning as the primary source of information. However, with the growth of information technology, this focus has shifted to the student (student-oriented), the recipient of the educational process, who is accustomed to obtain quickly relevant information and knowledge through the online environment.

Involving only the traditional methods and forms of teaching is ineffective, as it has shown disinterestedness and low motivation of students. In addition, in the context of the COVID-19 pandemic, this problem demonstrated a complete ineffectiveness of traditional learning and the inability to assess objectively students' individual learning at home.

Solving this problem requires both introduction of modern information technologies in higher education, and complete instructors' mastery of the latest methods and approaches in computer or online learning.

This will allow us to reach a qualitatively new level of learning, where the instructor builds his/her own strategy, based on different formats of interaction with students.

The *aim* of the study is to reveal the current tools of microlearning in formation of English-language competencies in university students.

Microlearning as the latest trend in education

"Microlearning" / "bite-size learning" is the latest trend in education, which has become in use since 2005 at a conference in Austria and does not have a specific definition, closely related to computer learning (Hug, 2010; Torgerson, 2016). In contrast to the foreign scientific and educational space, in which this approach is already being studied effectively, the domestic one lacks research of both theoretical and applied nature.

Thus, the foreign scientist Hug (2004) interprets "microlearning" as a technique of computer learning, in which a complex learning task is divided into a series of short learning interactions, distributed over time. Torgerson (2016) defines "microlearning" as an approach focused on step-by-step learning in small "portions". In this case, each learning interaction is

subjected to a specific goal that must be achieved (Dillon, 2018; Gutierrez, 2017).

Microlearning is a modern student-centred methodological approach, which is characterized with accessibility and interactivity (Gerasymova et al., 2019; Onishchuk et al., 2020; Sheremet et al., 2019). Its main advantage is the combination of small amounts of educational content together with the flexibility of technology and creativity of the instructor.

Lindner (2007) offers a number of characteristics that consider microlearning as a new educational paradigm:

1) "seamless integration": microlearning is part of everyday work and practical activities, as a result of which micro-content is not perceived as disconnected or incomplete;

2) "peripheral use": microlearning recognizes that many tasks actually consist of several stages, which include searching, filtering and assessment of information, creating and disseminating the student's own information on social networks, and therefore microlearning should complement the main topic or course;

3) "motivation": tasks should provoke the search for relevant information and discussion.

Due to the fact that the amount of information, that students face, is constantly increasing, microlearning is a learning approach that helps to break the material into smaller units that are easier to process (Bell, 2010). In other words, one of the goals of microlearning is to reduce and simplify information, structuring it into successive learning units (Bruck, 2006). In addition, such training focuses on establishing links between these learning units, which promotes development of critical thinking (O'Neil, 2018). However, microlearning may have limitations when it comes to acquiring completely new knowledge, but it has value for understanding a new topic or consolidating already acquired knowledge (Emerson, 2018).

Among the main objectives of microlearning, they are the following:

• promote students' acquisition of basic skills such as flexibility and adaptability, making them aware of the rapid and changing nature of knowledge in the real and online environment;

• create conditions for development of creative skills and critical thinking;

• develop tasks that encourage students to apply previously acquired competencies;

• use students' communication skills as a way of social reconstruction of knowledge acquired during study and work, and try to improve them (Gabrielli et al., 2005).

Microlearning does not focus on hierarchical classification and sequence of modules, but on encouraging students to become active participants in the learning process and co-creators of learning content through active communication in social networks (Kerres, 2007). Thus, compared to traditional learning, the structure of microlearning is more dynamic and plastic, and the focus is not on the content but on the social interaction between students (Buchem, 2010). In addition, microlearning increases students' interest in learning through the use of modern information technology, one of which is *learning management system* (hereinafter – LMS).

Learning management systems are web-based software platforms that provide an interactive online learning environment and automate the administration, organization, reporting of educational content, and learning outcomes (McConachie et al., 2005).

LMS is used for blended and collaborative online learning: posting and supporting course materials on the Internet, familiarizing students with the course, tracking progress, and establishing communication between students in the role of their instructor (Watson & Watson, 2007). Although the LMS environment has many features in common with traditional learning, it has unique features such as flexibility, mobility, time for reflection and anonymity.

LMSs can be implemented for students of any level of success, because they promote communication in various formats (forums, chats, video conferences). A key analytical feature of this tool is the ability to track the effectiveness of developed training systems, find gaps, make changes and continue to improve them. A striking example of LMS, which works today around the world and is actively used in Kherson State Maritime Academy (hereinafter – KSMA), is *Moodle*. The system was developed on the basis of a constructivist philosophy, which emphasized the role of students as creators of content, not just spectators. Among the main functions of the Moodle platform there are such as the ability to disseminate knowledge, assess competency, record student achievement, ensure communication between students and maintain system security (Turnbull, 2019).

LMS is one of the microlearning tools, which allows you to implement it as such. Interacting with the LMS environment, students themselves determine the speed, time and place. They can complete tasks or view learning content as much as they want, do homework using mobile phones and other devices. LMS also facilitates the collection of data that are necessary for educational analytics. The latter is used to develop learning opportunities by improving the training courses (Viberg, 2018).

The concept of "learning management system" is closely related to the concept of "computer training module" (hereinafter – CTM), which implements computer training in maritime English within asynchronous approach in KSMA. CTMs are interpreted as computer training units that cover knowledge and skills on individual topics in their logical sequence. Thus, the content of a course is presented in the form of a series of computer micro modules, after which a student is tested for the level of mastery of the material studied.

In addition to the text part, CTM usually uses drawings, photographs, graphics, computer animations, interactive demonstrations, hyperlinks, a glossary, specialized databases, audio and video recordings of various formats. The homogeneity of the module is determined with the thematic coherence of the material (Zharkykh et al., 2012).

If the CTM provides for a summative assessment as a result of the acquired competencies, the LMS ensures this assessment. However, the LMS is only a mechanism that needs to be filled with educational content, while CTM makes up this educational content in general (Fig. 1.).

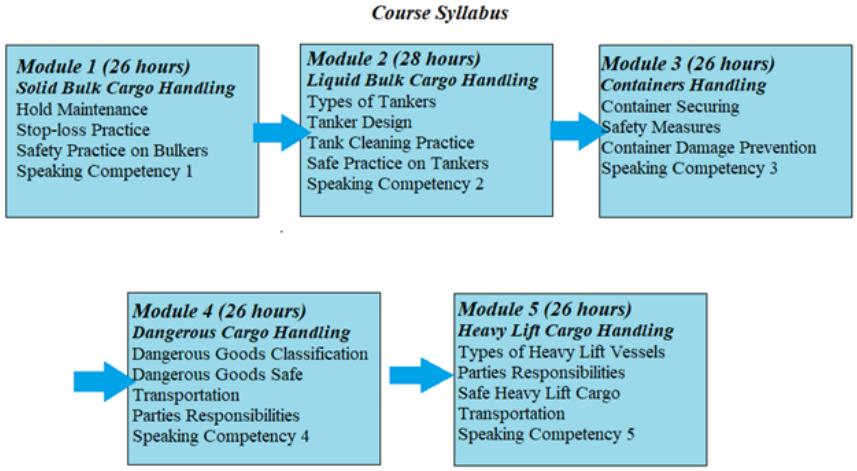


Fig. 1. Computer training module course syllabus for senior maritime specialists

Source: Authors' own conception

An integration of CTM with LMS provides feedback between the instructor and the student, makes the process of fulltime learning flexible, and distance learning – full-fledged with the possibility of objective assessment of students' competencies.

Thus, we interpret "microlearning" as a modern educational and methodological approach involving learning management systems and social

networks, which provides students with access to tasks, discussion topics and educational content thematically dosed, in specific situations, under control of the instructor.

Virtual and online lessons as effective microlearning mechanisms

Within the theory of microlearning, Baumgartner (2013) offers his own model of the spiral of competencies. In the first stage, called Learning I, students acquire basic knowledge by interacting with the instructor. At this stage, the origin of students' knowledge is based on the knowledge possessed by the instructor. Instructors require knowing not only what students need to learn, but also how they can acquire this necessary knowledge.

In the second stage (Learning II), students interact with the online environment and gain their own experience. The learner is an active participant, and that is their activity that supports or even is a necessary condition of the learning process. Learning takes place in an active mode with feedback to the instructor, that is, the whole learning process with all its intermediate stages, difficulties and preliminary results is under the supervision of an instructor.

At the third stage (Learning III) knowledge is formed, where instructors and students work together to master the course materials and discuss problem situations, cases.

After completing the first cycle of the spiral of competencies, the student begins the cycle from the beginning, but at a higher level (Learning I +).

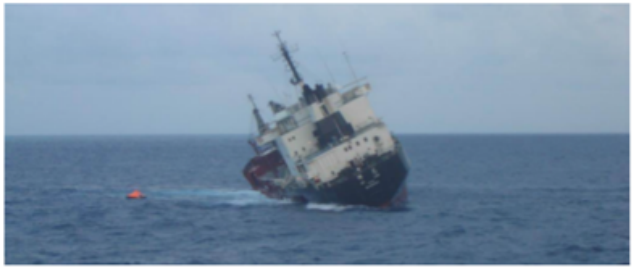
Analysing the model of Baumgartner (2013), we conclude that microlearning can be implemented on the principle of "inverted class". It means that students can perform microlearning activities before the practical lesson, which corresponds to the first and second stages of the model.

Learning time can be used to apply knowledge, discuss ideas, cases and solve any problem situations, which corresponds to the third and fourth stages of this model. Students can also perform individual tasks in specially designed computer modules within the LMS after class to consolidate knowledge. This strategy is suitable for both fulltime and distance learning.

Thus, computer training based on the educational process at KSMA is implemented with the help of LMS *Moodle*. Moodle is an online platform that allows the instructor to create a micro-module that will include a number of thematically related online lessons. Each session should focus on

only one specific learning outcome. The structure of the lesson can contain both controlled activities and free speaking activities (Fig. 2.).

In the first case, the LMS allows the instructor not only to track the attendance of computer classes by students, but also to obtain data on the success of their work. In the second case, LMS activates the student's motivation and prepares to discuss problem situations, cases, videos, hyperlinks, animations, quizzes with other students during practical lessons or outside them through chats, forums, video conferences, etc. In addition, LMS allows a test assessment of students' competencies after each module, which helps to obtain information on the effectiveness of tasks and the level of students' success.



Choose the reason of the accident

Tick possible variants for investigation results

Investigation Conclusions

The following are the main conclusions from the investigation into the sinking

Modern Technologies in Cargo Holds Cleaning

Pros and Cons of using Robots in Bulk Holds Cleaning

Write your opinion concerning the topic "Robots in Bulk Holds Cleaning".

Does marine industry need such technologies? Who will gain in this situation?

Guidence for Crews on the IMSBC Code

Analyse and describe the situation according to the plan

Fig. 2. Computer training module in LMS Moodle
Source: Authors' own conception & Moodle

The thematic CTM can be divided into the main part, which is focused on each student in the group, and additional tasks with a higher level of difficulty, which are designed for more successful students. This will allow students to study at their optimal level of opportunity.

Online lessons using Skype, Zoom or LMS Moodle is another microlearning tool. They can be organized at the initiative of an instructor and a group of students, should be short in duration (not more than an hour) and aimed at solving a particular problem situation.

The lesson is better to be built on an authentic case that coincides with the topic being studied. Such classes provoke students to apply the acquired competencies and develop critical thinking. In addition, online classes enable distance learning and objective assessment of students' competencies in the context of the COVID-19 pandemic.

In addition, microlearning can be seen as an additional pedagogical tool to strengthen social ties between students outside the classroom. For example, with the involvement of social platforms Facebook and Twitter, which have long been accepted as collaborative educational environments that allow creation of thematic posts and hashtags.

Such actions encourage students to be actively involved and respond, to communicate and exchange opinions on debatable and problematic issues in the field of maritime English.

Another tool is usage of group chats (e.g., Viber, Telegram, WhatsApp) (Fig.3.).

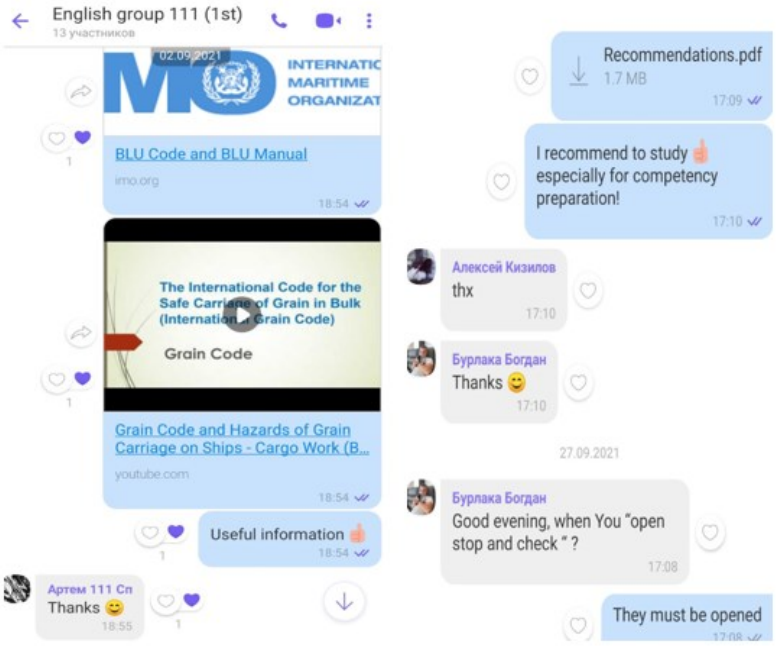


Fig. 3. Microlearning within Viber chat communication
Source: Authors' own conception & Viber

By means of the chats instructor promotes online microlearning on a daily basis, provoking students to react to photos, audio or video materials on the topic, sending hyperlinks to current news or events in the maritime industry, actively involved in dialogues and provoking discussions using maritime English.

Such collaboration tools allow students to learn from each other within a group, and thus benefit from working together. In such a scenario, future maritime specialists can also become creators of educational content by answering questions in social forums (Fig. 4.), by blogging or providing feedback to other students within a common thematic group.

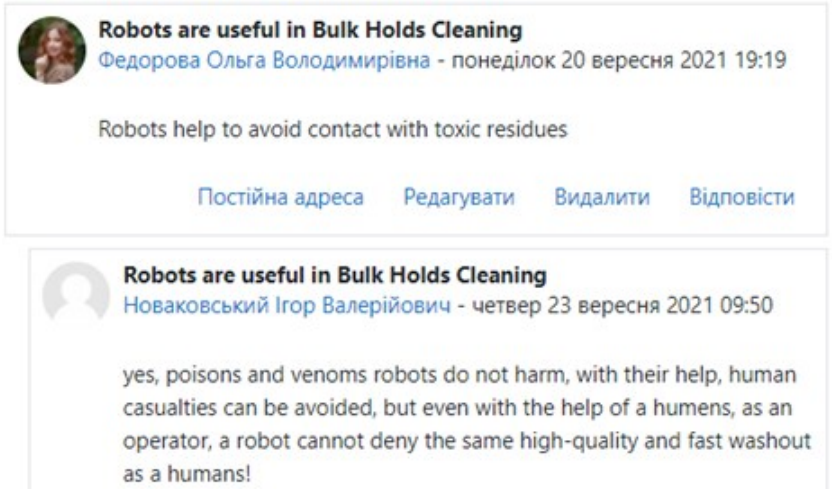


Fig. 4. Microlearning within the forums in LMS Moodle
Source: Authors' own conception & Moodle

Another effective microlearning tool is *virtual reality training* (List of Available Computer-Based Trainings). The purpose of such practical classes is to immerse students in the environment that imitates real professional activities on board and requires students to practice maritime English skills with the use of the phrases of the Model Course IMO 3.17 (Model Course 3.17). Such lessons take place on a separate schedule in a special laboratory of virtual reality, involve a small number of students and a group form of interaction. During the lesson, they demonstrate English-language competency on a certain topic, using maritime English terminology (Fig. 5.).

Typically, these lessons summarize each topic of fulltime learning and online learning by CTMs, allowing students to consolidate their knowledge in a virtual environment.

The structure of such lesson is flexible, but, like traditional English lessons, it must comply with the principles of communicative-competency approach. Before working with a virtual reality simulator, students perform a number of tasks aimed at free speaking, in order to repeat the basic commands, actions and the necessary terminology: interview in pairs, discussion of questions in groups, role-playing situations that imitate real actions on ships, where one student demonstrates and the other describes each step using maritime terminology, and so on.

Fig. 5. Practical lessons involving virtual reality
Source: Authors' own conception & Vimeo

During the lesson a student, using a virtual reality simulator, should perform a series of commands in English. The correctness of his/her actions depends on understanding and reaction to the tasks set in the program. At this time, other students do not just monitor the performance of tasks on a large screen, they actively discuss these actions' compliance or noncompliance in pairs or groups, looking for possible options for action in

similar situations. The program can be stopped at any time and the user will be changed. This motivates students to follow the process attentively, as if they are all involved in a virtual environment.

There are options when the student performs tasks on the simulator, and other students in turns voice or comment on his / her actions using terminology. This is followed by an analysis of all steps of the procedure, discussion of mistakes and consolidation of stages on which the student acted hesitatingly.

At the end of the lesson, the instructor should work on the most common lexical and grammatical mistakes that are noted during the lesson.

Microlearning can also be implemented as a supplement to traditional classroom activities. Microlearning tools that can be used during practical classes include short video or audio clips, screen shots from classes in a virtual environment, slides with presentations, posters and drawings, schematic images, cards, quick reading materials, short quizzes containing concise information in an accessible form, clearly focused on the topic.

Large texts should be reduced to the main material, and it should be supplemented with visual elements, graphics, animation to focus attention and increase learning motivation. Consolidation of textual information can be presented in the form of slides, posters or cards with the image (for example, steps of procedure of an entrance to the closed space on the vessel, types of dangers, fire-fighting equipment, etc.). Text-graphic and animation programs such as AdobeSpark, Animaker, Canva, Infogram, Infographia, Mind the Graph, Piktochart, Snappa, Venngage, Visualize.me can be useful in this case. In addition, there are programs that creatively design small amounts of information without photo materials: Pablo, Quotes Cover, Quozio, Stencil.

As for the videos, they should be accompanied by exercises that "provoke to action" (The Micro Manual):

• "ask an expert": ask the student to study the questions in advance and give his answer before watching the video, then analyse and compare the information after watching in groups or pairs;

• "split screen": ask several students to answer the key questions of the video, then watch it step by step, discussing each of the questions;

• "5 * 5": Create a sequence of five video scenes, each no more than five seconds. Further discussion may include the correct / incorrect procedure of the operation, compliance / non-compliance with the procedure, violation / compliance with safety standards, etc.;

• "points of view": create a series of short videos that show different points of view on a current topic.

Taking into account that KSMA practical lessons in maritime English are built on the models of PPP (Presentation, Practice, Production) and ESA (senior courses in the sequence "boomerang" (Engage – Activate – Study – Activate) and "patchwork" (Activate – Study – Activate – Study – Engage)) within the communicative-competency approach, they already include most of the above-mentioned tools or techniques of microlearning. Thus, we conclude that microlearning and learning in the communicative-competency approach have many common features that complement each other:

• student-centred learning;

• in the focus of attention there is communication both in class during practical lessons and outside (in real time and on social networks);

• hierarchical structure of learning, where large topics are divided into modules, which in turn are divided into separate units (lessons), each is aimed at achieving a specific goal and is interconnected with others;

• gradual mastery of communicative competencies;

• use of tasks that "motivate to action" (problem situations, round tables, cases, role-playing games, discussions, imitation exercises);

• assessment of acquired competencies upon completion of each module and analysis of results.

After analysing the main tools of microlearning, we offer our own strategy for organizing the learning process on the example of Kherson State Maritime Academy based on the principle of rotation of traditional, online and virtual learning:

1) the topic revealed in the practical lesson in line with the communicative-competency approach is deepened and diversified by students outside the classroom through online learning based on the Moodle platform (micro modules) and exchange of views on social networks (Twitter, Viber, Facebook). All video and audio materials presented at the practical lesson are available within the CTM with the ability to view, share links and discuss outside the audience;

2) at the stage of Starter / Engage of the next practical lessons the instructor provokes a short discussion / debate between students face to face, which gives them the opportunity to speak freely and exchange information on previously discussed on social networks or current topic / problem situations / news / case;

3) the Study stage with its controlled exercises can be partially or completely implemented by means of LMS Moodle, which will allow students to change the type of activity from traditional to online (and, as a result, increase attention and interest) in a computer class or in classroom with gadgets;

4) traditional classes are supplemented by short online classes via Skype, Zoom or Moodle, built on authentic cases, in the frequency of one lesson on a topic or micro module;

5) each topic is summarized by a practical lesson in the laboratory of virtual reality, where the students practice the acquired skills in maritime English;

6) at the end of each topic and the corresponding micro-module there is an assessment of students' competencies: test tasks through LMS Moodle and speaking assessment with the instructor using the method of interview, discussion or debate.

Microlearning on the principle of rotation of traditional, virtual and online learning allows students to immerse deeply in a communicative environment, where the instructor constantly changes the format of social interaction, provokes discussion and stimulates the interest of students.

Conclusions

In the course of study, it was found out that microlearning is an effective complement to traditional learning (especially based on the communicative-competency approach) in terms of information technologies. The flexibility of this innovative approach allows the instructor to form his own learning strategy, using core tools such as computer training modules by means of the learning management system, online lessons via Skype or Zoom and practical lessons in the virtual reality lab, exchange of ideas and problem solving within social networks like Twitter or Facebook, group discussion of topics and current news in Viber, Telegram, WhatsApp chats.

The value of microlearning is both in the fact that it extends the learning process beyond the classroom, allows distance learning, objective assessment of students' competencies in a pandemic, and also allows to consolidate and deepen the knowledge gained in practice through immersion in virtual reality, constant social interaction based on information technologies.

As the approach of microlearning in education just starts taking turns, the study and comparison of different tools of its implementation on the basis of educational establishments of Ukraine and the world remain relevant.

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