

Moodle course in teaching English language for specific purposes for masters in mechanical engineering

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Abstract. The central thesis of this paper is that e-learning courses can have a significant impact on English language for specific purposes (ESP) proficiency of mining mechanical engineering students. The purpose of this study is to assess the effectiveness of ESP Moodle-based course “English for Mining Mechanical Engineers” and to reveal the results of its experimental approbation. In order to identify the lectures’ and learners’ needs we have applied the survey research. The survey confirmed the greatest demand for Moodle courses that include all the elements of a coherent training manual to provide self-development of engineering students. The interview results contributed to design of author’s ESP course syllabus. The importance and originality of this study are that to approbate the course materials’ effectiveness two approaches have been adopted simultaneously. The first is blended learning method based on e-learning platform applied in the experimental group and the second one is classic in-class instructor-led studying used in a control group. Students’ progress in ESP proficiency has been assessed using the cross assessment method. The experiment has validated the initial hypothesis that the special online courses focused on honing foreign language skills and integrated in the domain of specific professional knowledge have a beneficial effect on students’ communicative competencies in general. There were identified the advantages of self-tuition based on Moodle platform. The Moodle course lets the teachers save considerable in-class time to focus more on communicative assignments. The findings of this study have a number of practical implications in ESP online courses development.

Keywords: Online Learning, Moodle Platform, Blended Learning, ESP Course, Masters in Mechanical Engineering.

1 Introduction

The tendency to move from traditional education to blended [5; 11] and virtual [6; 22] learning applies to Ukrainian higher education, and an increasing number of courses appear for teaching at a distance. E-assessments have become a major component of student’s independent work [14; 16; 31]. Information and communication technology (ICT) skills play a major role in today’s technology world and led to an increasing use

of web-based systems like Moodle [1; 19; 21]. Researchers have not treated Moodle in studying English for specific purposes (ESP) for master's students in much detail so far. This study seeks to consider the ways of using different assignments of Moodle-based ESP course for organizing student's independent work according to the curriculum.

Analysis of recent research and publications. Latest studies describe the use of Moodle as a suitable platform to support distance learning courses, assess its functionality and potential. Al Nadabi's study focuses on the use of technology in assessment, contributes some guidelines that can be useful for creating, developing, implementing, and researching large-scale high-stakes tests on Moodle. According to his research, "Moodle activities are used in a blended learning approach either as practice materials or as informal assessment tools for some course components" [3, p. 6]. Jing Liu investigates the factors influencing ESL college students' acceptance and use of Moodle in their English classes [17]. Wajeha Thabit Al-Ani identifies factors behind the usage of a blended learning approach that could have an effect on students' achievement, motivation, collaboration and communication as perceived by students, analyzes obstacles faced by students in using Moodle in blended learning [4]. Kateryna V. Rudnitska and Veronika V. Drozdova analyze the problem of first-year students' of economic specialties self-study organization by means of Moodle system in the process of foreign language learning [24]. Aliona Yu. Yurzhenko describes and analyses the work of the future maritime specialists in the e-course [32]. Hicham Ziad examines tertiary education students' acceptance of and engagement in a Moodle-hosted writing course, measures time spent in activities, number of downloads from the platform and number of online feedback comments [34]. Group of scientists analyses the main tools available on the online platform, and concludes that Moodle is mainly used as a repository for materials [33]. Maria del Mar Camacho i Martí's doctoral thesis provides an online instructional model to train English Language Teachers in the use of ICT, a general vision on the new instructional modalities from blended learning to distance learning, and deals with the difficulties of including ICT into educational management, such as need to catch-up and update their equipment and training programs for their teachers and students [7].

Despite these existing studies, the level of research related to using of Moodle platform in modern ESP teaching and learning is still constrained and limited. Recent investigations analyze the benefits of Moodle, different areas of the system like resources, users and ways of learning management system (LMS) integration as online support throughout a semester course; however, long-term academic studies are also requested for obtaining a clearer picture of applying online platform in teaching and learning of ESP.

The purpose of the article is to explore ESP e-based courses as an effective method of improving the level of English language proficiency within the framework of Concept of English Language Development at Universities established by the Ministry of Education and Science of Ukraine; and to represent the curriculum of ESP course "English for Mining Mechanical Engineers" based on Moodle platform for students of mining mechanical engineering and reveal the results of its approbation.

It is hoped that this research will contribute to a deeper understanding of significance

of blended learning approach to improving the level of English language proficiency of engineering students. Taking into account the objectives we have determined the tasks of our study. They are:

- to analyze the relevant scientific literature;
- to conduct a survey;
- to design the special course “English for Mining Mechanical Engineers” and identify the most appropriate tasks and assignments for e-learning;
- to assess the efficiency of this course through its contribution to enhance ESP proficiency of mining mechanical engineering students.

2 The theoretical backgrounds

We have analyzed and consolidated existing experience and practices at the initial stage of the study. Tom Hutchinson and Alan Waters claim that ESP must be seen as an approach not as a product [12]. It is approach to language learning, which is based on learner needs. The foundation of all ESP is the simple question: Why does this learner need to learn a foreign language? Peter Strevens defines characteristics of ESP as English language teaching which is designed to meet specified needs of the learner; it is related in content to particular disciplines, occupations and activities, and it is centered on the language appropriate to those activities in syntax, lexis, discourse, semantics, etc. [29, pp. 1–2].

Anthony Laurence in his book “Introducing English for Specific Purposes” investigates four pillars of ESP. Based on the works of the scholars who played the role of torch-bearers for innovative ESP approach to education, the 1st pillar is considered to be *needs analysis*. It is also significant that interests of all the stakeholders are also taking into account. The second pillar is *learning objectives* which mean how language is used in different contexts. The third one is *methods and materials*. The fourth is *evaluation* which includes reliability, validity, and practicality. In our research we have used Anthony Laurence’s treatise as a basis, and have developed practical materials on the above-mentioned principles [15].

Weaving subsequent scholarly works as a thread through ESP is an approach to language teaching which aims to meet the needs of particular learners [2; 13]. Tony Dudley-Evans and Maggie Jo St John define ESP as a teaching method which emphasizes specific learner needs and a set of teaching patterns that recognize the learner’s subject-matter expertise [9]. Hence, it may be concluded that the benchmarking of students’ needs provides the basis for further practical guidance for implementing ESP courses. They have specified age of ESP students and the level of their language proficiency. They conclude that ESP is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. ESP is designed for intermediate or advanced students. Most ESP courses assume some basic knowledge of the language systems.

From the perspective of that, Olga M. Demidova has drawn up the textbook “Engineering Mechanics (ESP)”. Each module consists of an authentic professional oriented text, vocabulary and system of exercises. The author selected materials

according to the criteria of authenticity, professional relevancy, and informative value [8]. This therefore corresponds fully with four pillars of ESP and the core recommendations of British Council.

K. Sasirekha, K. Rathiga, M. Sarpparaje and G. S. Suresh make a point that teaching materials for ESP have evolved several changes in recent years as a consequence of access to the relevant teaching materials via the Internet. It makes able-to-get all sorts of texts and all kinds of domain specific materials; whereas the role of a teacher is to make the information comprehensible for a student [25].

With regard to ESP teacher's tasks they are similar to any language teacher's the main one is to encourage the student to attend the classes, be active, to make students interested in writing by involving them in real-world and interesting activities, provide them with the opportunity to interact in groups, to share their ideas, and to help each other deal with specific problems. Besides, group work usually brings personal satisfaction, self-confidence, gives students a chance to be creative and imaginative through assignments such as revising a story or changing its ending and their motivation and enthusiasm also increase when they make their contribution and ideas in the written product [27].

Moodle LMS is a one of the most popular existing educational platforms available for providing a flipped classroom [10], conducting learning activity at flexible times and places through the Internet. Jing Liu gives explanation to the term "flipped classroom" that means the teaching method flips, or reverses from the traditional method. In a flipped classroom, the instruction is delivered online, which provides students with more opportunity to gain practical skills, preview lessons via video or audio and then accomplish various activities and exercises [17].

Aliona Yu. Yurzhenko [32, p. 71], Oksana V. Tynkaliuk and Iryna Z. Semeriak [30] emphasizes that using the e-course makes English training more effective, enhances the possibilities for obtaining knowledge, stimulates self-education, and the most efficient tools for increasing the learning motivation include: Forum, elements of the gamification (Game-based Exercises, Easter eggs, Leaderboards, Points, QR Code Quest), Glossary, Presentations, Test Tasks (Quizzes), Grade books.

Wajeha Thabit Al-Ani indicates that Moodle has more impact on context of learning, implements knowledge-centered learning techniques and develops students' self-regulated skills [4]. Furthermore, Hicham Zyad notices that Moodle is "a learning management system with several useful features that can transform the learning environment into a site for interactivity, connectivity and great amounts of extensive learning" [34, p. 314].

However, some researchers argue that "the successful use of e-learning platforms in the teaching and learning context critically depends on the teachers having knowledge about the tools, being aware of how they should be used and being capable of organizing all the communication process" [33, p. 289]. The results of Dr. M. Marti's research provide evidence of ICT in teaching English as a foreign language applied as a tool to work, to search for the information and to manage administrative tasks. Teachers have more skills in the use of e-mail and word processors, the different reference tools such as the online dictionaries, encyclopedias, virtual resource centers, educational portals, whereas they demonstrate the lack of instruction and knowledge in

the usage of forums and chats [7].

In view of all that has been mentioned so far, we may suppose that ESP course based on electronic platform is a science-relevant subject to investigate and develop.

3 Methods

To investigate teachers' expectations, needs and difficulties we have applied a method of survey. The total number of respondents was 62 teachers from 6 departments.

The majority of those who responded reported that they used Moodle platform and special courses particularly in their teaching practice. Only a small number of respondents 3% indicated that they had not used Moodle yet. One of the reasons they mentioned was lack of experience in ICT applying. Interestingly, 42% of the lecturers observed the important role of Moodle courses in self-paced training of students.

More than half of those surveyed have agreed with the statement that applying of Moodle courses contributes to improvement of their classes' efficiency (62%), motivation of their students (59%) and quality of teaching (25%), individualization and differentiation of learning process (84%). 95% of the respondents have uploaded the author courses on Moodle platform at least once that contrasted somewhat with the low intensity of Moodle use (according to the questionnaire results it is on average twice a month). In this regard a question occurs: what are the reasons of lecturers' underactivity? We tried to seek the answers initiating the snap poll for the lecturers. The identified hindering factors towards Moodle platform usage can be summarized into: lack of personal computers in the class, restricted Internet access or speed, insufficiency of technical support (software), and inadequate knowledge needed to provide teaching via the Moodle platform. Taken together, these results suggest that there is poor flexibility of technology which includes poor flexibility in functioning, use and modification. Dave E. Marcial explains that poor flexibility of technology is an obstruction to innovative teaching and learning. Likewise, poor structural and process flexibility significantly influences the high adoption of technology in the classroom [18].

Let us turn to the learners' interview. In total 134 students of Mining and Metallurgical, Mechanical and Machine Engineering Faculties and Faculty of Geology and Ecology have been interviewed. The learners note they prefer working online to learning in class (89%). One of the reasons for this is global digitalization of different life areas, and young generation tends to be engaged to. The students explain their choice that IT makes training interesting, individual and varied in form. Some of them (37%) mention ability to manage the learning process themselves like a great advantage of online learning.

To find out the topics that the prospective participants of the experiment are interested in; we have offered them the list of themes selected from vocational disciplines curriculum and they should choose the most important ones to be learned properly in English. Some interviewees argue they will not deal with any foreign language in their future career (17%), while others 83% realize and support the need to have sufficient foreign language skills. The respondents have not selected only from

offered but added several topics which they would have to cope with in their future career. The results of students' interview have become really meaningful to design our ESP course syllabus.

Taken together, these results suggest that there is a demand on special ESP courses and students are interested in improving the language proficiency, on the one hand. On the other hand, there are not enough courses which are narrowly focused on specifications of technical majors.

4 Findings

Accordingly, based on the results of the survey, students' and tutors' interviews we have designed the special course "English for Mining Mechanical Engineers" [26]. It is intended for advanced students specializing in mining engineering, geodesy, mining machine building engineering, mechanical engineering and other related specialisms. The purposes of the course have been established in accordance with to the criteria of authenticity, purposiveness of the language, and professional appropriateness of the content. This therefore corresponds fully with four pillars of ESP and the Concept of English Language Development at Universities [20]. The program of the course is targeted at the wide range of students of engineering specialisms of the 4th and 5th years of studying. It stems from their willingness and readiness to adopt learning material and to understand its applicability in their career context. We have in mind the proper level of professional knowledge and also their level of language proficiency. Besides, the ESP course demands motivation, dedication and responsiveness from the students. The graduate students, we are convinced, are in conformity with these criteria. The main objective of the special course is to improve students' reading, listening, writing and speaking skills within professional engineering context. The course is structured at different levels of proficiency and our program integrates the skills in professional area into foreign language proficiency.

Let us detail the learning outcomes according to language domains. By the end of the course students will be able to:

- reveal subject-specific language from a range of authentic sources;
- communicate about technical topics;
- read and comprehend specific engineering texts, tables and graphs, course brochures and job advertisements;
- differentiate and exploit various sources of information (written, spoken and video);
- be aware of principles of writing study- and work-related letters;

The special course "English for Mining Mechanical Engineers" consists of ten topical units, which are summarized in Table 1.

The special course has been used as an element of an educational experiment which we started in September of 2018 in Kryvyi Rih National University. The *objective of the experiment* is to test the designed special course "English for Mining Mechanical Engineers" on the Moodle platform basis and evaluate its effectiveness.

Table 1. Syllabus of special course “English for Mining Mechanical Engineers”

No	Topical Unit	Learning Outcomes <i>By the end of this unit you will be able to:</i>
1	Organisational Structure	<ul style="list-style-type: none"> • understand topical vocabulary and learn to use it in an appropriate context; • identify the key sentence (topic sentence) in a paragraph; • develop critical thinking abilities and cultivate work ethics; • analyse graphs and digammas in terms of organisational structure;
2	Career	<ul style="list-style-type: none"> • select and analyse the contents of job advertisements; • write appropriate CV; • write a covering letter in response to the advertisement on the company’s website.
3	Minerals	<ul style="list-style-type: none"> • acquire fundamental skills of speaking about of basic properties of minerals; • develop an understanding of authentic topical video; • identify some minerals by their basic physical, chemical and mechanical properties and describe their properties.
4	Four States of Matter	<ul style="list-style-type: none"> • master the information of the topical text “Four States of Matter: Solid, Liquid, Gas, Plasma”; • make up a plan using the keywords and phrases; • annotate the texts.
5	Mining Machining	<ul style="list-style-type: none"> • identify the giant mining machines and their importance in mining (video); • improve listening skills; • select and summarize the important information.
6	Autonomous Mine	<ul style="list-style-type: none"> • develop skills of summing up the video information about autonomous trucks; • summarize the information about their functions and applications in the autonomous mine.
7	Iron Mining and Geology	<ul style="list-style-type: none"> • be aware of exploiting iron in the modern world, creation and excavation of iron ore deposits; • adopt the information from video; • draft the report of the survey.
8	Iron Ore Processing	<ul style="list-style-type: none"> • analyse the information of the video; • speak confidently about the key terms connected with concentration, palletisation and alloying; • plan a presentation on the topical video.
9	Surface Mining Demonstration	<ul style="list-style-type: none"> • identify important functions of surface mining procedure (based on the video); • analyse a written text in terms of layout, genre, functional types; • write an informational e-mail with regard to repairing of some mining machines.
10	Impacts of Mining	<ul style="list-style-type: none"> • understand a range of processes involved in mines affect the environment and investigate ways of reducing the impact; • establish clear aims for practices at mine sites that reduce environmental impacts of mining; • find out how scientific understandings influence mining practices; • design strategy plan in terms of land rehabilitation measures.

To provide the educational experiment properly we have selected a control (58 students) and an experimental (61 students) group as well as 11 lecturers from the amount of participants who have taken part in the ascertaining experiment. Total number of students there are 119 who are studying at the Mechanical and Machine Engineering, Mining Faculties, Faculty of Geology and Ecology. The group of 11 lecturers has taken initiative in promoting the experimental activity too. According to the experiment procedure the students have to master the learning material within the syllabus of the discipline “Business Foreign Language” (BFL) as approved by the University curriculum. The course “English for Mining Mechanical Engineers” has become the major component of experimental group’s educational activity. BFL program includes 32 academic hours of in-class activity and 58 extracurricular hours. The special course has been a meaningful component of self-directed students’ training. The top page of newly architected course is presented on Figure 1. It contains its short description, the goals of the special course and structure navigation.

The screenshot shows the top page of a Moodle course. At the top, there is a blue header with the university name 'ДВНЗ "Криворізький національний університет"' and a user profile for 'Ганна Миколаївна Шалацька'. Below the header, the course title 'English for Mining Mechanical Engineers' is displayed in a large font, with a settings gear icon to its right. A breadcrumb trail below the title reads: 'Home / Courses / Загальноосвітні предмети / Кафедра іноземних мов / Mining Engineering'. The main content area is titled 'Mining Engineering' and contains a paragraph describing the course: 'English for Mining Engineering provides engaging activities to improve your reading, listening, writing and speaking while preparing you for the engineering industry. The course is structured at different levels of proficiency and our program integrates the skills you need to improve your English and engineering vocabulary quickly.' Below this, there are three sections: 'Speaking:' with a bullet point 'to communicate about technical topics.'; 'Reading:' with two bullet points: 'to understand a wide variety of text including diagrams, tables, graphs, course brochures, and job advertisements;' and 'to compare different sources of information, written and spoken.'; and 'Writing:' with two bullet points: 'to write simple description and explanations on technical subjects related to student's field of study;' and 'to write study- and work-related letters.' At the bottom left of the content area, there is a 'Glossary' link with a small icon.

Fig. 1. Top page of the course “English for Mining Mechanical Engineers”

It should be noted that only enrolled students had access to the course materials during the experiment (2018-2019 academic year). The materials and activities of the course are meant to be used in class and distantly since it was available online on the Moodle platform. The students of the control group used the materials of the course in class only. The self-training of the control group based on the exercises from the traditional study guide arranged and published in 2011. The experimental (Moodle) group spends most of the class time doing communicative exercises and discusses project, completing all homework assignments on Moodle, while the control group (CG) does homework assignments in a conventional way – on paper.

The learners in the Moodle group (MG) have access to the Glossary loaded onto

Moodle course “English for Mining Mechanical Engineers”, which can be updated and edited, while the learners in the CG have printed word lists that can not be updated after they have received them. Furthermore, the glossary on Moodle provides the opportunity of including sound clips, i.e. students can hear the pronunciation of the words, and upload images. The learners are able to contribute to the glossary, which provides collaborative learning opportunities, for example definition creation help them to learn new words and concepts such as “bucket wheel”, “conveyor belt”, “crawler tracks”, “pressure”, “property” etc.

By using of Moodle audio and video authentic materials provided with the help of online platform recreate the kind of real-life atmosphere that is close to real working situation. To improve listening skills and pronunciation some audio materials and video clips have been included in the course content. For example, the learners should answer the questions by watching a video from YouTube “Mining Technology Product Demo – MINExpo 2016” in Topical Unit “Autonomous Mine” and “A Monster of Mining” in Topical Unit “Mining Machining”. The students can access to the listening and video material without limitation, they can control the mode of playback – pause, stop, or use rewinds the video. The students in CG watch the same videos only in the class, as a rule, twice.

Different forms of learning, remembering and recalling are at teacher’s and student’s disposal due to applying of Moodle. For example, in the process of studying Topical Unit “Career” there are two job offers of European and Canadian companies under internship programs (Figure 2).

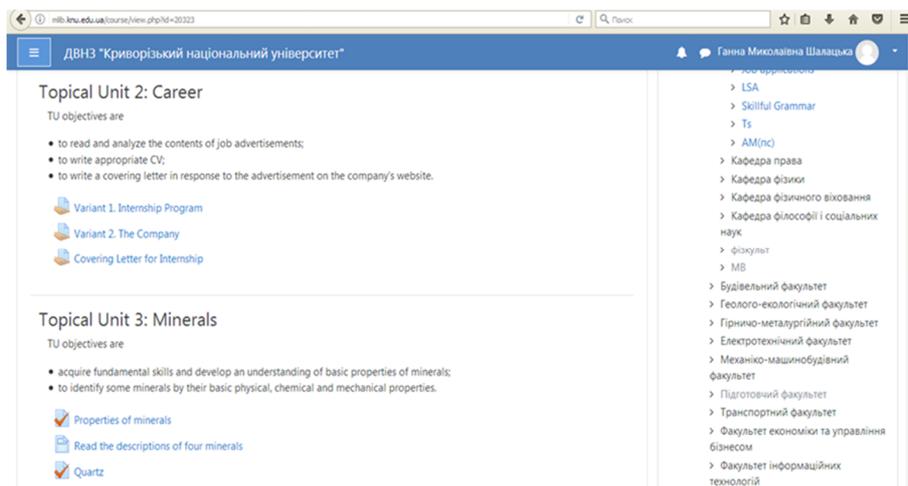


Fig. 2. Design of Topical Unit “Career” and “Minerals”

Besides the information included in the special course further details on the vacancy are available on the website of the company, and students can click the link and apply for a post. It is worth noting that about half of the participants (48%) of the experimental group did not confine themselves to complete the course’s assignments and submitted

their CV and covering letters to the real companies via the Internet, and as a consequence they had got feedback from both a university teacher and a real employer. Such form of work that implied linking between new information/skills and real life experience is really helpful, since it enables to identify learners' own strengths and weaknesses and draw the necessary conclusions.

In addition, there are other options of online learning run on the Moodle platform. We have developed assignments, quizzes and exercises for the Moodle course, which are available to the students online, and can be accessed from anywhere. The participants of the experiment have completed the same tasks during blended and traditional classes that have shown the difference between paper and computerized tests. When completing a quiz or assignment on Moodle platform, the students receive immediate feedback on their answers, re-attempt quizzes (pass the test once more time) or resubmit the assignment. On the contrary, the learners in the CG have to wait to receive their graded assignments or tests from the teacher. In the MG, the questions and answers in quizzes are shuffled and the learners all receive different questions. The learners in the CG get the similar content and the same sequence of questions per group. Online course quizzes have the titles and descriptions that reflect the content and the type of questions. Multiple choices, matching, essay type, short answers and true or false questions have been used on the time-limited basis. The students are allowed two attempts and the quizzes are set to use the highest grade of all attempts. In addition, they have been allowed to review past attempts of the quiz. This enables them to learn from their own mistakes. For essay type questions, the learners' grade is updated after the educator has marked the question. It is absolutely objective assessment and greatly facilitates the teacher's routine activity (Figure 3).

The screenshot shows a Moodle quiz page for 'Properties of minerals'. The page includes a navigation menu on the right, a quiz description, attempt limits, and a table of previous attempts.

Properties of minerals

Minerals are naturally occurring crystalline solids which can be identified by their basic physical, chemical and mechanical properties. The most common minerals can be identified by "luster", "hardness", "cleavage and fracture", "colour", "streak", "transparency", "magnetism", "specific gravity or density" and "crystal form". One of the properties is used twice.

Attempts allowed: 2
Time limit: 10 mins
Grading method: Highest grade

Summary of your previous attempts

Attempt	State	Grade / 10.00	Review
Preview	Finished Submitted Tuesday, 1 October 2019, 5:14 PM	1.00	Review

Highest grade: 1.00 / 10.00.

Fig. 3. Evaluation options of student's activity (using the example of Topical Unit "Properties of Minerals")

The special course includes a great variety of activities. The exercises have been categorized according to Bloom's taxonomy cognitive domains from basic ones – knowing, understanding to the top domains like evaluating and creating [28]. The assignments correspond to the categories of the cognitive domains and expected outcomes as well. At the stages of knowing and understanding, for example, these are multiple choice answers, matching the words and their definitions or choosing the synonyms and antonyms and so on (Figure 4).

Fig. 4. Example of exercise based on multiple choice options

As we can see on the screenshot the Moodle software gives an opportunity to complete the activity on the limited time and number of attempts, on the other hand, the learners are able to analyze their mistakes due to the platform's options as well.

The next element of our course is a discussion forum which provides a title and description of what learners can expect to read in the forum. The learner can reply on a post created by the teacher for discussion. Forum allows students to exchange their ideas, express opinions, leave messages, post a picture or resource link, receive points for the correct answer. For example, the students in the process of studying Topical Unit "Mining Machining" analyze the problem connected with the proper work of the truck's diesel engine and find out the possible causes of power loss.

At the next stage of applying and analyzing the students should categorize some aspects of activities. For instance, when the students are studying Topical Unit "Impacts of Mining" they have got a task to look closely at the diagram of a mine site and consider the features and activities that could have an effect on the environment (Figure 5).

At the final evaluating and creating stage outcomes are following: to annotate the text, draft the report of the survey, develop the presentation, design the strategy plan etc. For example, two formats of presentations are included in the course content (Focusky and PowerPoint). Focusky offers possibilities to create different kinds of presentations such as online and video presentations, mind-mapping design. Students are able to develop animated presentations, edit the flash based templates and logically arrange contents, due to 3D zooming, panning and rotating effects they can make the presentation play like a 3D movie. Focusky is more powerful than PowerPoint and has

only English interface that allows students to expand their vocabulary and practice foreign language in professional context. The learners can also add the text, images, video and animation in their slide presentation. They have created the presentations on the following topics: “Career of Mechanical Engineer in Mining Company”, “What does job of a mechanical engineer involve?”, “Mining Mechanical Engineering Society”, “Popular Skills for Mechanical Engineer” etc. Links to additional information and choices of assignments allow the learners to be more active participants in the studying process. The deadline for these assignments has been set and announced. Students upload their works to Moodle course, and then get teacher’s feedback and assessments, after that the presentation should be discussed in class.

Source: <http://www.oresomesources.com/resources/category/mining/page/2/>

1. Look closely at the Diagram of a mine site and consider the features and activities that could have an effect on the environment (air, water, land, energy and waste management). List them in the table below.
2. Consider which features and activities at the mine site could reduce these impacts. List these in the last column of the table.

Aspects of environment	Mining activities that can impact on the environment	Action taken at the mine to reduce the impact
Air		
Water		
Land		
Energy		
Waste management		

Fig. 5. Topical Unit “Impacts of Mining”

To assess objectively engineering students’ communication proficiency we have applied the complex of monitoring methods. These are the presentation of research papers at the international scientific conference “Problems of Energy Efficiency and Mechanization in Mining and Metals Sector Industry” (2019) and the term thesis on vocational subjects in English [23]. The experts assessed the level of English language proficiency based on appropriate checklists. Additionally, the students were proposed to evaluate their progress in speaking, listening, reading and writing used the same checklists.

Let us analyze the qualitative changes of the level of language proficiency at the final stage of the experiment in view of the results of self-assessment. The respondents have rated, on a scale of 1 to 10, their progress. But previously at the ascertaining stage we determined the benchmark language proficiency based on the same checklists. The quantitative results are visually represented on Figures 6 and 7.

What stands out in this figure is the steady growth of the students’ language proficiency in both experimental (Moodle) and control groups. In the CG this can be attributed to the traditional system of training in accordance with the curriculum and

using the special course materials in class. At the same time Figure 7 reveals that there has been a marked increase in four types of activities and obviously the growth rates is steady higher in the MG. For example, the respondents of the MG asses their listening at 8,7 points whereas the average grade in the CG is 6,9. The experimental group maintains the positive tendency of growth on other skills as well.

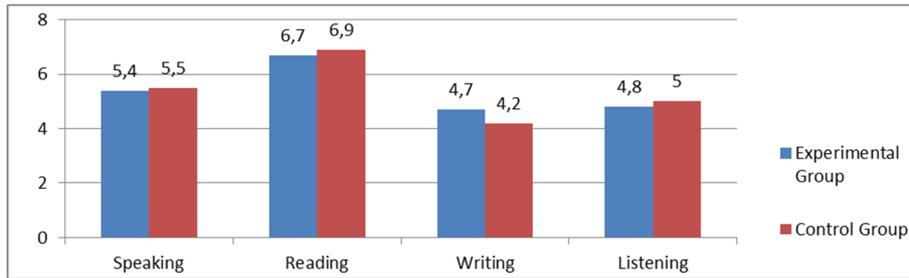


Fig. 6. Self-assessment results of English language proficiency before the experiment

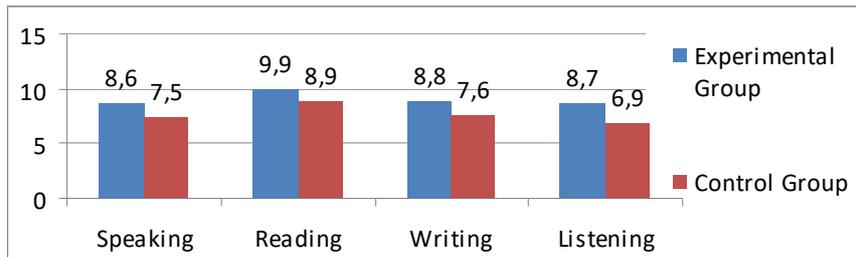


Fig. 7. Self-assessment results of English language proficiency after the experiment

In order to verify the objectivity of the results of students' self-assessment we asked the experts to evaluate students' activity using the checklist. The analysis of the results is shown in the Figure 8.

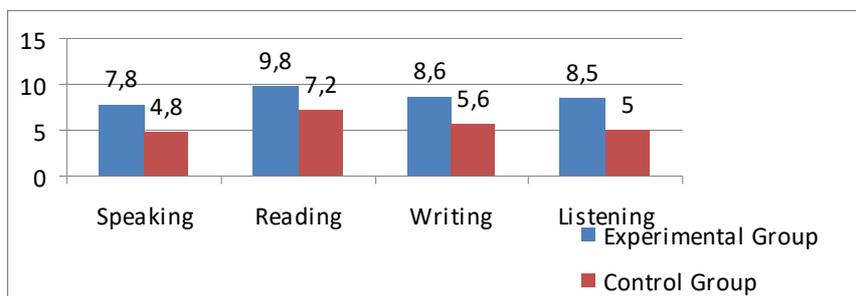


Fig. 8. The results of experts' assessment of English language proficiency after the experiment

There is general tendency of discrepancy between English language proficiency of the mechanical engineering students of two groups. Two graphs constructed using the available data confirm it.

Thus, the effectiveness of the special course “English for Mining Mechanical Engineers” and its didactic abilities clearly emerges from data. Comparing parameters of two groups at the final stage of the experiment we have aimed to determine the results of formation impact of Moodle course on the English language proficiency of the students of two groups.

Let us characterise qualitative changes in language proficiency of the engineering students of both experimental and control groups. During the conference and thesis defence the experts assessed speaking, listening and writing skills without informing the students about it, this ensured fairness of the experiment and friendly working environment. It should be noted that the experts had been able to observe the students previously at the ascertaining stage. The experts’ assessment at the final stage of the experiment was focused on comparison of the language proficiency of the respondents before and after the experiment and identifying the qualitative changes or their absence. According to the experts’ evaluations the students of the MG demonstrate high level of public speaking, they manage to represent their reports successfully, literacy and vocabulary have been improved too, the students are proficient enough in professional terminology and scientific terms as well. It stands to mention that students of both groups have been highly active during discussion of other participants’ reports and thesis. However in compliance with the experts students of the Moodle group formulate questions more accurately and correctly, find valid arguments for debates, are more flexible and more responsive in general. This is resulting from their purposeful vocational oriented training English proficiency; they have got an opportunity to improve their skills in class and additionally got an access to online course which contained authentic vocational oriented videos, texts, listening materials and appropriate exercises and tasks. They could train their language skills at their own pace. This approach has provided excellent results.

5 Conclusions and prospects for further research

The present study has been undertaken to design an ESP special course on Moodle platform for mining mechanical engineers, evaluate its effects on English language proficiency of the learners and reveal the advantages of e-learning approach to teaching and learning ESP. This research has found that Moodle can be an ideal platform for promoting efficient in-class teaching and distant self-studying because it creates multi-tool learning environment that is convenient to use by teachers and students as well.

The performed experiment has confirmed that an author’s special course “English for Mining Mechanical Engineers” has had a significant positive impact on the level of English proficiency of the experimental group students. In complying with the experts’ assessments and opinions the difference between students of experimental and control groups is distinctive. The expertise reflected in the scores on 10-point scale reveals that increase of average grades of experimental group’s students is +3,0 in speaking, +3,5 in

listening, +2,6 in reading and +3,0 in writing in comparison with the control group. Considering that two groups have been trained according to the same curriculum and the only difference was that the experimental group have been engaged into Moodle course practice not only in class but as a part of individual work, and taking into account the results of students' self-assessment, experts' assessments and summed up their evaluative judgments we could make a conclusion that the author's special course "English for Mining Mechanical Engineers" on Moodle platform has exercised significant influence upon mining mechanical engineering students' English proficiency. Collected data suggest that the sufficient competence level of English can be achieved by comprehensive in-system approach of instructor-led activities and self-studying based online learning. Multimedia resources have enriched the content and made the learning environment more interesting and appealing to the learners. The experimental experience has revealed the advantages of e-learning approach to teaching and self-tuition based on ESP Moodle course "English for Mining Mechanical Engineers". These are:

- *technological flexibility*; the e-platform provides easy-to-use, affordable and diverse teaching toolkit; it allows learners to reach the course content as many times as they need so they get a deeper understanding of the educational material; the special course assignments have contributed to improve English language proficiency of prospective engineers in reading, listening, writing and speaking stemming from complex approach: glossary, texts depository and databases provide access to a vast range of information and allow students to develop skimming and scanning techniques in reading; authentic materials and communication via discussion forums facilitate foreign language fluency; word-processing applications allow students to prepare and edit the writing assignments and then upload them on the e-platform; multimedia and flash-based presentations enables to practice technological skills along with foreign language skills; on the other hand, Moodle supports the lectures to design author's courses to be fully online, to focus on learning outcomes but not on seeking for appropriate textbooks, printing out and replication materials; in addition, content of courses can be updated easily;
- *adaptability to student's individual aptitude and abilities*; each learner has his own pace of understanding and remembering of the language materials and Moodle based course makes available to follow it; students are not limited in number of attempts, there is no time restrictions if only it is not a reading or listening comprehension test; video clips can be slowed and replayed repeatedly according to student's individual needs and improve their listening skills;
- *preventing from premonition of failure*; individual work combined with ongoing online support to assist the students in his education and to avoid mishaps and criticism from other group mates makes it possible to succeed in achieving the anticipated outcome;
- *impartial assessment*; Moodle grounded course makes available quick feedback on learner's activity and clear-eyed evaluation; offered tools ensure quality of assessment and prevent from cheating; there are self-check, machine check and tutor's assessment at participants' disposal; besides, the course can provide group-

mates' feedback exchange; as we have seen from experience, the last way of control motivates students to improve their language skills as they have not only produce own outcome but be an expert;

- *differentiation*; before designing online ESP course the authors have studied the potential learners' needs, interests and level of proficiency; the outcomes, authentic texts, video or listening elements of the course "English for Mining Mechanical Engineers" are relevant to these requirements; Moodle offers some ability to differentiate tasks and assignments according to learners' needs and pace of studying; the authors have developed the tasks with various complexity levels, preplanned and programmed different quantity of attempts or time of completing exercises, opened or closed access to some types of activities, verified deadline etc.

A further study could assess the long-term effects of self-study courses in ESP on Moodle platform. Based on the findings of this study, further research might evaluate the increasing use of the Moodle platform for studying different language programs; explore development capacity and growth perspectives in this domain. The findings from this study contribute in several ways to the current methods of ESP teaching and provide a basis for educators who are engaged in ESP course design.

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