



MOODLE AS E-LEARNING SYSTEM FOR ESP CLASS

Iryna Humeniuk

State Agrarian and Engineering University in Podilya, Ukraine

E-mail: rynahumenyuk79@gmail.com

Oksana Kuntso

State Agrarian and Engineering University in Podilya, Ukraine

E-mail: ok.kuntso@gmail.com

Natalia Lebedieva

Vinnitsia Mykhailo Kotsiubynskyi State Pedagogical University, Ukraine

E-mail: nataliswon@gmail.com

Olga Osaulchyk

Vinnitsia Institute of Trade and Economics, Kyiv National University of Trade and Economics, Ukraine

E-mail: aulolga55@gmail.com

Olha Dakaliuk

Vasyl' Stus Donetsk National University, Ukraine

E-mail: olhadakaliuk@gmail.com

Submission: 8/7/2021

Revision: 9/13/2021

Accept: 9/23/2021

ABSTRACT

The aim of the paper is to examine the correlation of the knowledge gained by students in online and offline classes, consequently, the overall performance of e-learning, as well as the effectiveness of the certain language skills among the main four (listening, speaking, reading, writing) by virtue of students' feedback and objective experimental results using statistical methods data processing. The paper demonstrates the results of the e-learning experimental research conducted during the academic year 2020/21, including the remote learning period due to the Covid19 pandemic situation in the spring semester, at the State Agrarian and Engineering University in Podilya, Kamianets-Podilskyi, Ukraine. Online study support for ESP was personally created as a four-credit course due to ECTS in the Moodle Learning Management System (LMS) with the application of Big



Blue Button. The research sample is represented by 100 students majoring in veterinary medicine and enrolled in the mandatory subject of English for Specific Purposes. The group of students was enrolled in the lessons based on their bachelor curriculum. The subjects, referred to as experimental and control groups, accordingly, both wrote the primary test, at the beginning of the course, and the final one at the end. For pre-test content, the online standard test for B1 level was applied. The post-test was created by the educators, who were involved in the experiment. Due to the results procession and test analysis, it is admitted that the students of the experimental group showed slightly worse results in listening comprehension section, while having the same indicators concerning writing skills, and they had essentially worse outcomes in speaking and reading comprehension if compared to their peers from the control group. Mann-Whitney and Wilcoxon non-parametrical pair tests were selected to check the statistical hypotheses, due to the character of input data.

Keywords: ESP; Moodle; e-learning; primary test; final test; questionnaire analysis

1. INTRODUCTION

Nowadays E-learning, highly dependent on transformations within the internet, becomes a crucial part of the conventional educational process. This enables learners to gather knowledge, both synchronously and asynchronously, to successfully meet the urgent requirement to acquire practical knowledge and skills within educational and productive environments. That is, in e-learning the content is delivered via electronic information and communications technologies (ICTs) (Oye, Salleh & Iahad, 2012, p.50).

It should be noted there has been used a number of terms denoting e-learning, such as Internet learning, tele-learning, and telematics distributed learning, network learning, etc. (Bates, 2005).

In our research, we will stick to the term e-learning as the widest one covering all methods and tools of digital education.

The article is dedicated to the results processing of the e-learning experimental research conducted during the academic year 2020/21 on the lessons of English for Specific Purposes (ESP) (with students of Specialty 211 “Veterinary Medicine”) at the State Agrarian and Engineering University in Podilia, Ukraine. The tested period included a completely remote learning time of the spring semester (due to the Covid19 pandemic situation). Online study support for ESP was personally created as a four-credit educational course on the



Moodle Platform which was appropriate for students of B1 language level, using the Big Blue Button application for speaking skills evaluation.

The research sample is represented by 100 students majoring in veterinary medicine and enrolled in the mandatory subject of English for Specific Purposes. Formerly, the respondents were students of 6 subgroups with two educators, conventionally divided into 2 groups as being taught by the same educator due to the same curriculum. One teacher worked with 3 subgroups separately using the exact learning material and tools for each subgroup predominantly offline (the control group), while the other 50 students were taught by the different educator with online learning application (the experimental group). The full ESP course was a yearlong, the first semester – was predominantly offline education with open access to Moodle, while the second semester was completely online just for the experimental group but the last credit class which was face-to-face. The group of students was enrolled in the lessons based on their bachelor schedules.

The aim of the experiment and the objective of the current paper is to analyze the expediency of Moodle application for ESP class, to evaluate the efficiency of online education if compared to the offline one. Admittedly, only students from the experimental group were engaged in fully online education, while the students of the control group had a blended learning semester. At the final stage of the experiment, the learners were suggested to fill in the questionnaires on the effectiveness of e-learning education. The questionnaires consisted of 5 evaluating questions concerning e-learning study in general and mastering every single language skill separately.

Ethical principles such as freewill participation, informed consent (all students were warned about the experiment, its stages, and consequences and agreed to participate), objectivity and justice, anonymity, and confidentiality were fully accomplished in the research.

2. LITERATURE REVIEW

Analyzing some recent papers connected with the topic of our research, we have concentrated on the following items: ICT, ESP, e-learning, lifelong learning, blended learning, remote learning, and e-learning efficacy. The research outcomes of e-learning applied for ESP teaching can find confirmation in thesis and dissertations, conference proceedings indexed in Scopus and WoS databases, etc.



It should be noted that currently, the number of studies on the abovementioned subjects has increased significantly in the European and Ukrainian environment due to the situation the whole world exists in right now (Hurevych, Kademiia & Koziar, 2011). That is why this problem seems to be international and global, not limited to certain communities or countries. This is the challenge provoked by Covid 19 we have to deal with all over the world.

Thus, various prominent scientists studied peculiarities of teaching EFL, namely Flowerdew and Miller (2014); distance learning challenges, Bates (2021), Knysh and Dudziak (2020), Humeniuk (2021); e-learning environment in education, Hamburg and Lindecke (2003), Liu et al. (2010), Donesch-Jezo and Misztal (2012), Roliak (2019); the nature of listening, Derrington and Groom (2004), Donesch-Jezo and Misztal (2012); methods, and tool of teaching the language acquisition skill, Byrne (2007), Chaikovska, Zbaravska and Bilyk (2019), Oye, Salleh and Iahad (2012); etc. Some of the abovementioned papers influenced greatly the current research and therefore need deeper analysis.

Studying Virtual Learning Environment (VLE), Oproiou and Chiciooreanu stated that different platforms have been recently used in lots of universities and are rather complicated and not easy to manage (Oproiou & Chiciooreanu, 2012).

Roliak (2019), a Ukrainian scientist, thoroughly analyzed the process of information and communication technologies implementation in the teacher education system of Nordic countries and their influence on the Ukrainian dimension (Roliak, 2019). The researcher applied a comparative analysis of the key development stages of the ICT in the systems of teachers' professional training in Scandinavia, namely Denmark, Finland, Norway, and Sweden, which keep the lead in this field globally, concerning the positive effect of Information and Communication Technologies on education and society (p.258). The mentioned countries are also experienced in reforming the relevant elements of teacher education with the concern of the extensive use of information and communication technologies.

According to Roliak (2019), Nordic innovation and digital literacy capacity are highly dependent on progress simultaneously taking place in both, applying ICT in the system of professional teacher training and current rapid technology growth, widespread of informatization, priority to multi-skills development in the region of Scandinavian countries. Consequently, the following stages of ICT implementation in the Scandinavian sphere of



education were verified: induction (or introductory) stage, stage of infusion (or partial use), and incorporation (or systematic integration) stage. And each of the mentioned stages is distinguished by the key alike and contrasting regulations inherent to the Nordic pedagogical environment in concern to the information technologies application (Roliak, 2019). Though the findings of the research conducted by Roliak (2019) are mainly focused on teacher education, they can significantly contribute to applying the information and communication technologies into the Ukrainian education system in general 9 (p.258).

The problem of e-learning can be also traced in the paper by Chaikovska, et al. (2019), where the authors investigated the current e-learning process, using podcasts particularly, at the Engineering Faculty of the State Agrarian and Engineering University in Podilia, having conducted and analyzed the pedagogical experiment engaging 50 first-year students, majoring in “Electrical Engineering” (p.1915). The research was focused on speaking and listening comprehension evaluation with the help of a quasi-experiment, applying two evaluation tests at the beginning of the course, and at the end, respectively, and a questionnaire, designed by the authors of the paper.

The study, aiming at investigating the podcasts’ practicability for students’ improving their listening comprehension and speaking performance, showed that the students of the experimental group achieved way better results. The learners, involved in the experiment, demonstrated enthusiasm while working with the engineering podcasts and approved this kind of IC technology to be capable of improving their professional conversational skills, explaining pronunciation and dialect varieties, facilitating social engagement and self-education. Thereby, professional podcasts can be recommended for teaching ESP to students of agricultural universities (Chaikovska, Zbaravska & Bilyk, 2019).

The advantages and drawbacks of distance learning were described in the research by Humeniuk et al. (2021). The author analyzed different platforms to be used while remote learning and distinguished their pluses and minuses (Humeniuk et al., 2021).

Social aspects of e-learning and combining different learning methods were analyzed by Hamburg and Lindecke (2003). Due to the researchers, it is consequently crucial to “blend” different means and approaches of pedagogical science (e.g., constructivism, behaviorism, cognitivism), various modes of learning in both online (e.g., web-based ones) and offline classrooms, and independent and joint training for producing an optimal learning



outcome. According to the authors, it is necessary to mix instructional technology with certain job assignments for balancing learning and working.

They stated some advantages concerning blended learning: organizations are gradually changing the students' educational environment - from school classrooms to e-learning at home, trying to make these changes easier to accept, and supplementing or complementing available learning tools and materials (usually high-priced) rather than replacing them; trainers and tutors uploading little segments of their materials to the Internet and gradually developing the skills required for e-learning; learners are choosing an education method that suits their abilities, goals, and preferences (Hamburg & Lindecke, 2003).

In this study, we also consider the research on developing ESP e-learning course for medical university students, namely therapeutic professionals, conducted by Donesch-Jezo and Misztal (2012). The authors (Donesch-Jezo & Misztal, 2012) thoroughly elaborate on content, development stages, and kinds of interactive tasks. The latter together with computer-assisted exercises, foreseen within the course, contribute to interactive language acquisition, in which the role of the teacher is reduced exclusively to educational process management and learners' progress assessment (Donesch-Jezo & Misztal, 2012).

The educational process in Ukrainian agricultural institutions, facing the COVID-19 challenges, was analyzed by Knysh and Dudziak (2020). The scholars underlined the need to review the existing teaching and learning strategies. This significant and much-needed transformation also means moving from declarative statements to achievable goals and short-term priorities. Thus, exposing problems can be an impetus for radical solutions. Today's challenges will not stay here for just a few weeks, as they will be followed by major economic challenges.

The experience gained under the new conditions is a prerequisite for rapid adaptation to the requirements of the agricultural sector. Improving the quality of higher agricultural education will help increase the efficiency of agricultural production in one of the key sectors of the Ukrainian economy. This, in turn, is crucial to the global challenges governing the impact of the epidemic, as well as the economic crisis (Knysh & Dudziak, 2020, p.166).

Despite many papers written on the subject in Ukraine and abroad, there are so many issues to be covered as technology and education are growing so rapidly and therefore the



learning process has to be up-to-date, always engaging modern and technological tools for achieving educational goals and meeting the societies' requirements.

The current paper aims to analyze the interdependence of the knowledge students obtained via online and offline classes, therefore the general productivity of e-learning, as well as the efficiency of every single language skill among the basic four (listening, speaking, reading, writing) due to the students' feedback and objective results of the experiment, with statistical methods of data processing application.

3. METHODOLOGY

Present researches in education cannot do without the implementation of various research methods. Currently, mixed methods are considered to be the best choice for researches in education and pedagogics (Halcomb & Hickman, 2015).

Thus, to conduct a full-fledged study and obtain objective results, qualitative and quantitative (Bryman, 2006), including statistical (for processing test results when checking the achievements of language skills acquisition) were used.

The research endeavor and analysis of the problem were carried out simultaneously due to the research aim in the following forms:

- a descriptive method for analyzing the result of students' pre- and post-tests, surveys, and general research results;
- experiment as a targeted observation for analyzing the achievements and success of students in acquiring language skills.

The content for the pre-test was taken from the site <https://learnenglish.britishcouncil.org/online-english-level-test>, which is quite a standard test to check the level of language competence. The content of the post-test was selected by the educators considering the educational material had been covered and previously discussed in the department of foreign languages of the university.

Thus, the final test involved 4 sections: listening, writing, reading, and speaking respectively. Each section consisted of 3 tasks of different types including covered lexical and grammatical material. All the students' results were entered into the charts previously processed into a percentage. These procedures were performed using quantitative research methods, while it is sharply recommended to use statistical analysis methods to obtain objective results (McLeod, 2019).



Thus, making the comparison of online and offline knowledge perception, the need to figure out the distributions of both data sources arises. For this purpose, the statistical significance tests (Brownlee, 2019), quantifying the likelihood that the samples have the same distribution, were applied.

Mann-Whitney and Wilcoxon non-parametrical pair tests were selected to check the statistical hypotheses, due to the character of input data. Wilcoxon pair test was used for the dependent samples (the primary and final tests within the same group). For testing independent samples - the primary and final tests within separate groups consequently Mann-Whitney test (U statistic) is applied foremost (Sharpe, De Veaux & Velleman, 2010). The tests were performed at the standard significance level $\alpha = 0.05$, which is typically used in statistics (Kucirkova et al., 2014, p.84). The program Statistic 10 was applied for the calculation.

The results in the primary and final tests were compared for the control and experimental group independently so that it was probable to deduce if the differences considerable for the statistics in individual skills occurred and to check the level of students' success within the examined groups.

After that, the outcomes in the primary and final tests of definite skills among both groups were compared and analyzed to inquire the effectiveness of the e-learning method and discover the statistically considerable evidence in both groups' outcomes. To get some feedback from students the questionnaire (survey) was performed on the final stage of the experiment. The questionnaires involved five questions about personal attitude to the e-learning process and its constituents. The data processing was done by the educators themselves.

4. RESULTS

Four basic skills for language learning were checked and analyzed during the experiment: listening, speaking, reading, and writing.

Table 1: The experimental group primary and final tests results

	The primary and final test	P-value	Comments
Skills	Listening	0,000000	The index of P-value is considered to be lower than the significance level. A statistically considerable contrast is found between the primary and the final tests. Students succeeded a lot in mastering listening skills.
	Speaking	0.021960	P-value is under the significance level. The distinction between the primary and the final tests is statistically essential. Students increased the vocabulary level a bit.



Reading	0.000013	Due to the p-value indicator, the variation between the tests is statistically essential. The subjects highly increased their reading comprehension skills.
Writing	0.029194	The level of significance is higher than the obtained p-value, thus a statistically considerable contrast exists between the primary and the final tests. Therefore, the subjects slightly improved their writing skill.
Totally	0.000000	The indicator of p-value proves statistically essential distinction between total results in the primary and the final tests. Generally, the subjects succeeded greatly.

Source: made by authors

Table 2: The control group primary and final tests results

The primary and final test	P-value	Comments
Listening	0.000003	As the p-value index is under the required 0.05 index, the statistically essential distinctions between the primary and the final test are observed concerning listening comprehension. Students improved a lot.
Speaking	0.000240	The index of p-value is lower than 0.05 index. Thus, a statistically essential distinction is evident while comparing the primary and the final tests. The subjects enhanced greatly in the awareness of professional lexis.
Reading	0.000051	Learners demonstrated an advance in reading comprehension. The distinction between the primary and final tests is statistically essential.
Writing	0.019239	The index of p-value is lower than the significant one so the statistically essential distinctions are characteristic for writing. The subjects succeeded not particularly.
Totally	0.000000	Students succeeded greatly. Due to the p-value, the difference between the primary and final tests is statistically essential.

Source: made by authors

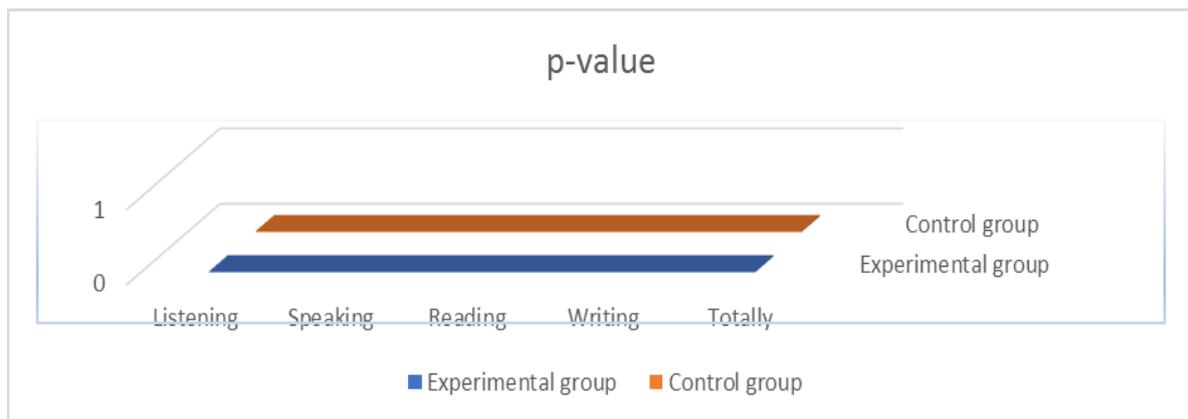


Figure 1: Control and experimental groups' testing results

Due to Figure 1, every p-value indicator in tests is lower than 0.05 point, which is the necessary significance level. Hence, having analyzed the students' improvements in the experimental and control groups, the distinctions between tested skills of ESP at the primary research stage and the final one, are statistically essential in both cases.

To evaluate the results a non-parametrical analog to the parametric two-sample T-test was applied. There were not any statistically essential distinctions in single skills while doing

primary tests. The subjects had almost equal results. Also, totally there were not any statistically essential discords.

Table 3: The experimental and control groups' primary and final tests results

Primary tests			Final tests		
Skills	p-value	comments	skills	p-value	comments
Listening	0.086470	Statistically, essential contrast is absent between the groups, although students of the experimental group had a bit better result.	Listening	0.043689	Due to the low p-value, the groups' difference in listening comprehension is statistically essential. The experimental group showed a better result.
Speaking	0.446861	The difference between both groups in their results is statistically insignificant, although students of the experimental group had a little better result.	Speaking	0.338342	Both groups' results are almost equal, with a statistically insignificant difference between the results.
Reading	0.221575	Statistically, essential contrast is absent between two groups in their outcomes	Reading	0.131053	Both groups' results are almost equal, with a statistically insignificant difference between the results.
Writing	0.887681	The difference between both groups in their results is statistically insignificant.	Writing	0.906610	No statistically essential discords in the groups' outcomes.
Totally	0.716381	At the beginning of the spring semester, there were not any statistically essential differences between the groups. The experimental group was a bit better but not statistically significant.	Totally	0.823319	At the end of the spring semester, the differences in the final test results of both groups were statistically unimportant

Source: made by authors

Thus, as it is obvious from the Table 3, the two groups' overall scores in the final tests are similar. It can be stated that the e-learning method is as efficient as the traditional offline method. The only difference among groups can be observed in obtaining listening skills. As for the rest skills, the differences in compared groups were statistically insignificant.

Generally, the diapason of p-value indicators from 0.05 to 0.75 testifies a minor distinction between tested groups, while p-values higher than 0.75 do not indicate any contrast.

The data processing is grounded on statistical calculation. The aim of the questionnaires, given to the subjects, was to express a personal opinion on the appropriateness of the e-learning inclusion into ESP classes within the remote studying period and the efficacy of e-learning since the language skills are concerned. 100 paper questionnaires were suggested to the selected students (50 respondents participated in the e-

learning process) on the last offline class of spring semester 2020/2021. All the forms were given back filled in. The obtained data were processed by the quantitative method.

The respondents were asked 5 questions about the general expediency of e-learning and the effectiveness of every single skill consequently. The questions, namely: 1) Do you consider e-learning to be an effective language acquisition tool?; 2) Can your listening skills be improved by involving e-learning means?; 3) Can your speaking skills be improved by involving e-learning means?; 4) Can your reading skills be improved by involving e-learning means?; 5) Can your writing skills be improved by involving e-learning means?

The results of the questionnaire were processed into percentages and are shown in Table 4.

Table 4: Questionnaire results

	Effectiveness in %		
	Yes	No	Cannot answer
E-learning	82%	8%	10%
Listening	90%	5%	5%
Speaking	70%	20%	10%
Reading	95%	5%	0%
Writing	70%	15%	15%

Source: made by authors

Due to the questionnaire analysis, 82 (82% consequently) respondents consider e-learning to be highly productive, 10% of respondents could not answer the question, while 8% of students think it is unproductive, mainly because of poor internet connection in their areas. It also should be mentioned that predominantly the students not participating in the fully online studying process answered negatively or could not answer at all. Those respondents who took part in the experiment mostly considered it to be effective and productive.

The subjects considered reading and listening comprehension to be the most productive skills while learning online while speaking and writing is a little bit problematic but not that significantly. As far as the statistical significance is concerned, no statistically essential contrasts characterized for both groups were determined. The total results at the end of the semester in final tests were equal, therefore there were no statistically essential distinctions. Moreover, the experiment results prove that students involved in e-learning may master some skills even better than those having offline classes.

5. CONCLUSIONS

Thousands of schools and universities worldwide are focusing on online learning as a precaution against the Coronavirus COVID-19 outbreak. So, this situation with the pandemic all over the world and the high necessity of remote studying require new priorities alongside with flexibility of the education process, the focus on innovative approaches to student learning, including e-learning, blended learning, remote learning should be done.

E-learning allows students to rearrange the learning process in accordance with their individual needs and agenda, as it is rather flexible and therefore available. It was substantiated and proven that Moodle provides a teacher with a range of activities and educational tools that can be used online; tests and quizzes are immediately assessed and analyzed, while the evaluation is fully automatic; the lesson content can be repeated and gone over several times even using one's mobile device. Although some drawbacks should be mentioned – such particular skills as speaking, for instance, are a bit problematic for mastering online without a mentor, also some technical issues can arise.

As the experiment results showed the students succeeded in their language skills having been involved in the online course of ESP and gave a generally positive evaluation of the e-learning process.

Further research is intended to study the effect of e-learning with different modern methods and tools applied for teaching ESP and other subjects to full-time and part-time high school students.

REFERENCES

Bates, T. (2021). **Online learning and distance education resources**. Retrieved from <https://www.tonybates.ca/>. Access: May 05, 2021.

Brownlee, J. (2019). **Statistical methods for machine learning. Discover how to Transform Data into Knowledge with Python**. Machine Learning Mastery Pty. Ltd.

Bryman, A. (2006). Integrating quantitative and qualitative research: how is it done? **Qualitative research**, 6(1), 97-113. DOI: 10.1177/1468794106058877.

Byrne, T. (2007). Marrying two existing software packages into an efficient online tutoring tool. **Computer Assisted Language Learning**, 20(5), 459-469.

Chaikovska, O., Zbaravska, L., & Bilyk, T. (2019). Podcasts in teaching EFL for students majoring in engineering. **18th International Scientific Conference “Engineering for rural development”**, Latvia: Jelgava, p. 1915-1920. DOI: 10.22616/ERDev2019.18.N344.

Derrington, C., & Groom, B. (2004). **Different types of listening**. Retrieved from http://www.paulchapmanpublishing.co.uk/upmdata/9772_036767pg42_45.pdf . Access: March 05, 2021.



- Donesch-Jezo, E., & Misztal, I. (2012). Developing ESP e-learning course: How an e-learning course was created for medical university students. **International Journal of Learning**, 18(8), 317-324.
- Ginther, A. (2002). Context and content visuals and performance on listening comprehension stimuli. **Language Testing**, 19(2), 133-167.
- Halcomb, E. J., & Hickman, L. (2015). **Mixed methods research**. Nursing Standard, No. 29(32), 41-47. DOI: 10.7748/ns.29.32.41.e8858.
- Hamburg, H., & Lindecke, C. (2003). Social aspects of e-learning and blending learning methods. **4th EUROPEAN CONFERENCE E-COMM-LINE 2003**, Bucharest.
- Humeniuk, I. (2018). Modern issues in teaching English for specific purposes. **II International scientific and practical conference “Problems of training agrarian specialists in educational institutions of higher and vocational education”**, Ternopil, 25-27.
- Humeniuk, I., Kuntso, O., Popel, N., & Voloshchuk, Y. (2021). Mastering listening comprehension at ESP classes using TED Talks. **Advanced Education**, 8(17), 27-34. DOI: 10.20535/2410-8286.226733.
- Hurevych, R., Kademiia, M., & Koziar, M. (2011). **Educational information technologies: an integrated approach**. Lviv: “SPOLOM”.
- Knysh, O., & Dudziak, O. (2020). Overcoming the Challenges – the Impact of COVID-19 on Agricultural Higher Education in Ukraine. **Revista Romaneasca Pentru Educatie Multidimensionala**, 12 (2Sup1), 162-167. DOI: 10.18662/rrem/12.2Sup1/302.
- Oproiu, G. C., & Chicioreanu, T. D. (2012). **Using Virtual Learning Environments in Adult Education**. Scientific Research & Education in the Air Force-AFASES, 1.
- Kucirkova, L., Kucera, P., Vostra Vydrova, H. (2014). English for specific purposes e-learning experimental research. **Journal on Efficiency and Responsibility in Education and Science**, 7(3-4), 80-86. DOI: 10.7160/eriesj.2014.070306.
- Liu, M. et al. (2010). ‘**A Look at the Research on Computer-Based Technology Use in Second Language Learning**’: Review of Literature from 1990-2000. Retrieved from <http://jabba.edb.utexas.edu/it/seclangtechrev.pdf>. Access: December 25, 2020.
- McLeod, S. (2019). What a p-value tells you about statistical significance. **Simply Psychology**. Retrieved from <https://www.simplypsychology.org/p-value.html>. Access: December 26, 2020.
- Ockey, G. J. (2007). Construct implications of including still image or video in computer-based listening tests. **Language Testing**, 24(4), 517-537.
- Oproiu, G. C., & Chicioreanu, T. D. (2012). Using Virtual Learning Environments in Adult Education. **Scientific Research and Education in the Air Force – AFASES**, 1.
- Oye, N. D., Salleh, M., & Iahad, N. A. (2012). E-Learning Methodologies and Tools. **International Journal of Advanced Computer Science and Applications**, 3(2), 48-52.
- Renukadevi, D. (2014). The Role of Listening in Language Acquisition; the Challenges & Strategies in Teaching Listening. **International Journal of Education and Information Studies**, 4(1), 59-61.

Reynolds, B. L., & Anderson, T. A. (2015). Extra-dimensional in-class communications: Action research exploring text chat support of face-to-face writing. **Computers and Composition**, 35, 52-64. DOI: 10.1016/j.compcom.2014.12.002.

Roliak, A. (2019). ICT implementation in the system of teacher education: Nordic dimension. **Information Technologies and Learning Tools**, 69(1), 258-267. DOI: 10.33407/itlt.v69i1.2361.

Shadiev, R., Hwang, W.-Y., & Huang, Y.-M. (2017). Review of research on mobile language learning in authentic environments. **Computer Assisted Language Learning**, 30(3-4), 284-303. DOI: 10.1080/09588221.2017.1308383.

Sharpe, N. R., De Veaux, R. D., & Velleman, P. F. (2010). **Business Statistics**. Boston: Addison Wesley.

