

# AET 2020

Proceedings of the 1st Symposium on  
Advances in Educational Technology

Volume 2

Kyiv - Ukraine

November 12 - 13, 2020

Supported by

**ACNS - Academy of Cognitive and Natural Sciences**

Co-organized by

**MDPU - Bogdan Khmelnytsky Melitopol State Pedagogical University**  
**NULES - National University of Life and Environmental Sciences of Ukraine**  
**UEM - University of Educational Management**

Sponsored by

**KSPU - Kryvyi Rih State Pedagogical University**  
**KNU - Kryvyi Rih National University**  
**IITLT - Institute of Information Technologies and Learning Tools of the NAES of Ukraine**

Copyright © 2022 by SCITEPRESS – Science and Technology Publications, Lda.  
All rights reserved

Edited by Serhiy Semerikov, Viacheslav Osadchyi and Olena Kuzminska

Printed in Portugal

ISBN: 978-989-758-558-6

DOI: 10.5220/0000155000003364

Depósito Legal: 494058/22

[https://aet.easyscience.education/2020/  
semerikov@gmail.com](https://aet.easyscience.education/2020/semerikov@gmail.com)

# CONTENTS

---

## PAPERS

### FULL PAPERS






|  |     |
|--|-----|
| Assessing Augmented Reality Possibilities in the Study of School Computer Science<br><i>Vasyl Oleksiuk and Olesia Oleksiuk</i>   | 5   |
| Comparing Google Lens Recognition Accuracy with Other Plant Recognition Apps<br><i>Zhanna Bilyk, Yevhenii Shapovalov, Viktor Shapovalov, Anna Megalinska, Sergey Zhadan, Fabian Andruszkiewicz, Agnieszka Dołhańczuk-Śródka and Pavlo Antonenko</i>  | 20  |
| Construction of an Education Model of Natural Disciplines' Students in the Distance Learning Conditions<br><i>Nataliia Valko, Viacheslav Osadchyi and Liudmyla Kuzmich</i>   | 34  |
| Use of Information and Communication Technologies in the Organization of Blended Learning of Future Vocational Education Professionals<br><i>Svitlana Kucher, Roman Horbatiuk, Olga Serdiuk, Mykhailo Ozhha, Natalia Hryniaieva and Mark Fridman</i>   | 44  |
| Virtualization Technologies in the Training Future IT Specialists to the Subject "IP Telephony"<br><i>Maksym Pavlenko, Liliia Pavlenko and Vitaliy Mezhuyev</i>  | 52  |
| Application of R Programming Language in Learning Statistics<br><i>Liliia Pavlenko, Maksym Pavlenko, Vitalii Khomenko and Vitaliy Mezhuyev</i>   | 62  |
| Development of Media Education in Ukraine: Current State and Modern Requirements<br><i>Iryna Naumuk and Nataliia Valko</i>   | 73  |
| Features of Implementation of Augmented and Virtual Reality Technologies in the Psycho-correctional Process of Development of Emotional Intelligence of High School Students in Terms of Professional Self-determination<br><i>Hanna Varina, Kateryna Osadcha, Svetlana Shevchenko and Olena Glazunova</i> | 85  |
| Main Determinants of the Use of Cloud Technologies in the Development of Professional Stability of the Future Specialist in the Conditions of Adaptive Learning<br><i>Hanna Varina, Kateryna Osadcha, Svetlana Shevchenko, Valentyna Voloshyna, Ivan Riznitskii and Aleksandr Uchitel</i>                  | 101 |
| The State of ICT Implementation in Ukrainian General Secondary Education Institutions in 2019 and 2020<br><i>Tetiana Vakaliuk, Dmytro Antoniuk and Olga Kalinichenko</i>   | 115 |
| Trends in the Development of e-Learning for Civil Servants<br><i>Yevhen Khrykov, Olga Ptakhina, Tetiana Sych, Dmytro Dzvinchuk and Maryna Kormer</i>   | 126 |
| Perception and Interpretation of Emoji in the Pedagogical Process: Aposterior Features of Artificial Digital Language<br><i>Rusudan Makhachashvili, Svetlana Kovpik, Anna Bakhtina, Nataliia Morze and Ekaterina Shmeltser</i>   | 141 |
| Guessing Games Experiments in Ukraine. Learning towards Equilibrium<br><i>Oleksii Ignatenko</i>  | 156 |

|   |     |
|---|-----|
| The Implementation of Inquiry-based Learning in the Organization of Students' Research Activities on Mathematics<br><i>Kateryna Vlasenko, Olha Rovenska, Iryna Lovianova, Oksana Kondratyeva, Vitaliy Achkan, Yana Tkachenko and Mariya Shyshkina</i>   | 169 |
| The Formation of a Successful Personality of Primary School Children during Media Education Implementation (Using Praxeological Tales)<br><i>Hryhorii Tereshchuk, Iryna Kuzma, Oleksandra Yankovych, Halyna Falfushynska and Iryna Lyakhova</i>   | 181 |
| Using Personal Smart Tools in STEM Education<br><i>Yevhenii Shapovalov, Zhanna Bilyk, Stanislav Usenko, Viktor Shapovalov, Kateryna Postova, Sergey Zhadan and Pavlo Antonenko</i>  | 192 |
| Analysis and Summarization of the Experience of Developing Adaptive Learning Systems in Higher Education<br><i>Kateryna Osadcha, Viacheslav Osadchyi, Vladyslav Kruglyk and Oleg Spirin</i>   | 208 |
| Psychological Security in the Conditions of using Information and Communication Technologies<br><i>Larysa Zhuravlova, Liubov Pomytkina, Alla Lytvynchuk, Tetiana Mozharovska and Valerii Zhuravlov</i>  | 216 |
| Media Education Technology at Preschool Educational Institutions<br><i>Volodymyr Chaika, Iryna Kuzma, Oleksandra Yankovych, Kateryna Binytska, Oksana Pysarchuk, Tetiana Ivanova, Halyna Falfushynska and Iryna Lyakhova</i>  | 224 |
| Features of the Use of Software and Hardware of the Educational Process in the Conditions of Blended Learning<br><i>Dmitriy Bukreiev, Alona Chorna, Iryna Serdiuk and Vladimir Soloviev</i>   | 236 |
| Web-based Support of a Higher School Teacher<br><i>Vitaliy Achkan, Kateryna Vlasenko, Iryna Lovianova, Olha Rovenska, Iryna Sitak, Olena Chumak and Serhiy Semerikov</i>  | 245 |
| Digital and ICT Literacy Skills as One of the Key Competences of Future Foreign Language Teachers<br><i>Tetiana Konovalenko, Yuliia Nadolska, Olga Serdiuk, Tamara Poyasok and Andrii Striuk</i>  | 253 |
| Implicit Potential of Immersive Technologies Implementation in the Educational Process at the Universities: World Experience<br><i>Kateryna Binytska, Olha Bilyakovska, Oleksandra Yankovych, Galyna Buchkivska, Olena Binytska, Valentyna Greskova, Inna Ocheretna, Oleksandr Burov and Svitlana Lytvynova</i> | 264 |
| Opportunities and Ways of using Laboratory Equipment in a Distance Learning Environment<br><i>Liudmyla Vasylieva, Denys Mikhieienko, Iryna Getman and Maryna Kormer</i>   | 275 |
| Augmented Reality in the Literary Education of Primary School Children: Specifics, Creation, Application<br><i>Liudmyla Nezhyva, Svitlana Palamar, Halyna Vaskivska, Olha Kotenko, Liudmyla Nazarenko, Maryna Naumenko and Andrei Voznyak</i>   | 283 |
| Using Intelligent Agent-managers to Build Personal Learning Environments in the E-Learning System<br><i>Nadiia Pasko, Oleksandr Viunenko, Svitlana Agadzhanova and Karen Ahadzhanov-Honsales</i>  | 292 |
| Digital Twin of an Educational Institution: An Innovative Concept of Blended Learning<br><i>Liubov Kartashova, Andrii Gurzhii, Valentyn Zaichuk, Tamara Sorochan and Feliks Zhuravlev</i>   | 300 |

|  |     |
|--|-----|
| Training Teachers-to-Be to Create Infographics and Its Expert Evaluation<br><i>Nadiia Olefirenko, Nataliia Ponomarova, Vira Andriievaska, Olena Gulich, Andrii Gaidus and Iryna Lyakhova</i>   | 311 |
| The Algorithm of Electronic Multilingual Terminological Dictionary Compilation<br><i>Tetiana Vakaliuk, Oksana Chernysh and Vitalina Babenko</i>  | 323 |
| Features of Utilization Information and Communication Technology in the Process of Teaching the "Environmental Impact Assessment" Course<br><i>Iryna Barna, Liudmyla Hrytsak, Halyna Henseruk and Svitlana Lytvynova</i>   | 332 |
| Organisation of Business English for Specific Purposes Course on Moodle<br><i>Hanna Shalatska, Olena Zotova-Sadylo, Oksana Balanaieva and Hennadiy Kravtsov</i>  | 346 |
| Innovative Methods of Information Visualization in Transport Logistics and Training Organization<br><i>Olena Mikhailutsa, Tatiana Melikhova, Andriy Pozhuyev and Hennadiy Kravtsov</i>   | 360 |
| Educational Trainings as One of the Effective Forms of Digital Competence Development of Secondary School Teachers<br><i>Tetiana Hodovaniuk, Tetiana Makhometa, Irina Tiahai, Mariia Medvedieva, Svitlana Pryshchepa and Andrei Voznyak</i>  | 372 |
| Practical Activity Organization of Primary School Students with using e-Simulators<br><i>Nadiia Olefirenko, Vira Andriievaska, Nataliia Ponomarova, Olena Gulich, Lyudmila Ostapenko and Iryna Lyakhova</i>  | 382 |
| Information and Communication Technologies in Application, Dissemination and Evaluation of Erasmus+ Jean Monnet Activities<br><i>Mariia Galaburda, Olena Kuzminska and Mykola Halaburda</i>  | 396 |
| Using the LearningApps.org Online Service in the Moodle System in the Process of Training of Specialists in Economic Specialties<br><i>Roman Horbatiuk, Uliana Dudka, Vitalii Kabak, Liliia Rebukha, Olga Serdiuk and Ivan Riznitskii</i>  | 403 |
| Peculiarities of using LearningApps Service in the Process of Developing a Motivational Component of Professional Training of Future Professionals in Terms of Adaptive Learning<br><i>Hanna Varina, Viacheslav Osadchyi, Svetlana Shevchenko, Kateryna Averina and Evgeniy Lavrov</i> | 416 |
| Development of Future Foreign Language Teachers' Soft Skills by Means of ICT in Ukrainian Universities<br><i>Natalia Bondar, Tetiana Konovalenko and Ivan Riznitskii</i>   | 425 |
| EdTech Landscape in Ukraine: Smart Education Future in Digital Age<br><i>Maryna Nehrey, Larysa Zomchak and Abdel-Badeeh Salem</i>  | 434 |
| Moodle Tools for Educational Analytics of the Use of Electronic Resources of the University's Portal<br><i>Olena Glazunova, Maksym Mokriiev, Olena Kuzminska, Valentyna Korolchuk, Nataliia Morze, Liliia Varchenko-Trotsenko and Roman Zolotukha</i>                                  | 444 |
| Integrated Use of the LearningApps.org Resource and Information Devices in the Process of Biology School Course Studying<br><i>Alla Stepanyuk, Liudmyla Mironets, Tetiana Olendr, Ivan Tsidylo and Maryna Kormer</i>   | 452 |
| The Current State of using the Cloud-based Systems of Open Science by Teachers of General Secondary Education<br><i>Maiia Marienko</i>   | 466 |

|  |     |
|--|-----|
| Analysis and Prospects of the Future Teachers Training of the Integrated Course "Natural Sciences"<br><i>Nataliia Valko and Viacheslav Osadchyi</i>  | 473 |
| Formation of Information Culture of Vocational Education Specialists<br><i>Oksana Voitovych, Roman Horbatiuk, Ihor Voitovych, Mariya Shyshkina and Nadiia Shostakivska</i>   | 480 |
| The Use of Serverless Technologies to Support Data Processing within the Open Learning and Research Systems<br><i>Ihor Bezverbnyi and Mariya Shyshkina</i>   | 489 |
| Model of the Competences in Educational Robotics<br><i>Nataliia Morze and Oksana Strutynska</i>  | 495 |
| Using Unity to Teach Game Development<br><i>Vladyslav Kuznetsov, Mykhailo Moiseienko, Natalia Moiseienko, Bohdan Rostalny and Arnold Kiv</i>   | 506 |
| Expanding Opportunities for Professional Development through the Use of Integrated Teaching<br><i>Svitlana Bodnar, Viktor Koval, Nataliia Stuchynska, Tetiana Lesina, Larysa Filippova and Antonina Kichuk</i>   | 516 |
| The Development of Creative Thinking as an Important Task of Educational Process<br><i>Arnold Kiv, Kateryna Kolesnykova, Tatyana Koycheva, Alina Vinkovska and Ivan Donchev</i>  | 528 |
| Modern Information and Communication Technologies in Professional Training of Sociology Students: The Mainstreaming of the Needs and Significance<br><i>Liudmila Kalashnikova, Alla Lobanova, Iryna Hrabovets, Liudmila Chernous, Viktoria Chorna, Yevhen Davydenko and Feliks Zhuravlev</i> | 535 |
| Research of Teachers' Occupational Health by Means of Digital Technologies<br><i>Halyna Meshko, Oleksandr Meshko, Iryna Trubavina, Nadia Drobyk, Vasil Grubinko, Nadiia Bilyk and Nataliia Habrusieva</i>  | 544 |
| MOOCs Types and Course Development<br><i>Zarema Seidametova</i>  | 560 |
| Ensuring the Effectiveness of e-Learning based on Online Technology Analysis of Factors Influencing the Cognitive Independence of Students<br><i>Evgeniy Lavrov, Viktoriya Logvinenko, Viacheslav Osadchyi, Olga Siryk and Yana Chybiriak</i>  | 569 |
| Some Geometric Objects Related to a Family of the Ballistic Trajectories in a Viscous Medium<br><i>Zarema Seidametova and Valerii Temnenko</i>   | 578 |
| An Inverse Method of the Natural Setting for Integer, Half-integer and Rational "Perfect" Hypocycloids<br><i>Zarema Seidametova and Valerii Temnenko</i>   | 584 |
| AUTHOR INDEX   | 591 |

# Using the LearningApps.org Online Service in the Moodle System in the Process of Training of Specialists in Economic Specialties

Roman M. Horbatiuk<sup>1</sup><sup>a</sup>, Uliana T. Dudka<sup>2</sup><sup>b</sup>, Vitalii V. Kabak<sup>3</sup><sup>c</sup>, Liliia Z. Rebukha<sup>4</sup><sup>d</sup>,  
Olga Yu. Serdiuk<sup>5</sup><sup>e</sup> and Ivan G. Riznitskii<sup>6</sup>

<sup>1</sup>*Ternopil Volodymyr Hnatiuk National Pedagogical University, 2 M. Kryvonosa Str., Ternopil, 46027, Ukraine*

<sup>2</sup>*Berezhany Professional College of NULES of Ukraine, 4A Sonyachna Str., Berezhany, 47501, Ukraine*

<sup>3</sup>*Lutsk National Technical University, 56 Potebni Str., Lutsk, 43018, Ukraine*

<sup>4</sup>*West Ukrainian National University, 9 Shevchenko Blvd., Ternopil, 46009, Ukraine*

<sup>5</sup>*Kryvyi Rih National University, 11 Vitalii Matusevych Str., Kryvyi Rih, 50027, Ukraine*

<sup>6</sup>*State University of Economics and Technology, 5 Stepana Tilhy Str., Kryvyi Rih, 50006, Ukraine*  
{gorbaroman, osvita.batk, kabak.volyn}@gmail.com, L\_Rebukha@ukr.net, olgajs28@knu.edu.ua

**Keywords:** Interactive Tasks, Distance Learning, Moodle, LearningApps.org Online Service, Competencies.

**Abstract:** The article deals with the peculiarities of using LearningApps.org online service in the Moodle system in the process of training of specialists in economic specialties. Methodology of integrating interactive tasks in economic disciplines of LearningApps.org online service into the Moodle learning management system has been considered. Practical aspects of using interactive tasks while teaching professionally oriented educational disciplines by education applicants of economic specialties have been reflected. The didactic component of the Moodle system in the process of realization of distance and mixed learning in the pandemic period and formation of future specialists' professional, informational and communicative competencies, development of their creative thinking has been revealed in the process of research activities.


## 1 INTRODUCTION


Accession of Ukraine into the world informational and educational community requires training of skillful specialists in economic specialties, able to respond flexibly to labor market conditions. Nowadays, one of the priorities of the system of professional pre-higher and higher education is training of competitive specialist, who has got a high level of professional competence. Innovative processes in educational system need some new studying strategies, which would correspond to the world tendencies of creation of global markets, formation of a new information society and transformation of knowledge into direct productive force (Boliubash, 2012).


Sarkar (Sarkar, 2012) believed that the use of ICT in education can increase access to learning opportu-


nities. It can help to enhance the quality of education with advanced teaching methods, improve learning outcomes and enable reform or better management of education systems. The continued use and development of ICTs within education will have a strong impact on: What is learned, how it is learned, when and where learning takes place, & who is learning and who is teaching. The continued and increased use of ICTs in education in years to come, will serve to increase the temporal and geographical opportunities that are currently experienced. The integration of ICTs in higher education is inevitable (Sarkar, 2012).


The importance of didactic component of modern information technologies in the process of training of specialists in economic specialties is that they can be used both during training for transferring knowledge and for providing feedback between higher education applicants and scientific and teaching staff. In the process of using information technologies, the skills of independent work, which plays an important role in the formation of the future highly qualified competitive economic specialist, are developed and predominated in higher education applicants. Since in mod-

<sup>a</sup>  <https://orcid.org/0000-0002-1497-1866>

<sup>b</sup>  <https://orcid.org/0000-0002-0204-7457>

<sup>c</sup>  <https://orcid.org/0000-0001-9823-825X>

<sup>d</sup>  <https://orcid.org/0000-0002-0054-0651>

<sup>e</sup>  <https://orcid.org/0000-0003-0505-0800>

ern conditions of rapid development of science, quick information updating it is impossible to provide the higher education applicant with a knowledge base that will be relevant throughout life – it is important to develop his interest in the accumulation of knowledge, to continuous self-education. The task of the institution of higher education is to train future specialist, ready for regular professional growth, social and professional mobility, capable of self-regulation in the field of continuous education (Kinash, 2011). One of the main problems of introducing innovative forms of education is the choice of the optimal ratio of the best traditions of the existing educational system, modern pedagogical innovations and tools of information and communication technologies (Semerikov et al., 2021; Isaikina and Zlenko, 2021).

The relevance and possibilities of using information technologies in the educational process have covered in (Bonk and Lee, 2017; Boichuk et al., 2019; Bykov et al., 2001; Gergei and Mashbits, 1986; Gryniova et al., 2019; Kononets, 2015; Lavrentieva et al., 2021; Markova et al., 2015; Morze et al., 2017; Osadchyi and Osadcha, 2015; Poyasok et al., 2020; Ramsky and Rezina, 2005; Semerikov et al., 2018; Spivakovsky et al., 2013; Trius et al., 2004); the use of ICT in the training of future economists was described in (Boliubash, 2012; Kostenko et al., 2018); Bilousova et al. (Bilousova et al., 2013), Bulakh and Mrouga (Bulakh and Mrouga, 2007) explored the theory and methods of computer testing higher education applicant's achievements.

The researches (Bobyliiev and Vihrova, 2021; O'Reilly, 2012; Patarakin, 2002; Vlasenko et al., 2020; Zhaldak et al., 2021) are devoted to the problem of using Internet, Web 2.0 technologies and online services in education.

The use of Internet and dependency on digital gadgets has transformed the learning and knowledge sharing approaches (Sarkar, 2012; Arkorful and Abaidoo, 2015). ICT has not only revolutionized and transformed the classroom learning and teaching methods, but also mutated distance learning programs, leading to reshaped libraries as well as accessibility towards learning materials (Farid et al., 2015). Thus, persistent up gradation of technology aided the access to the digital world of information (Soomro et al., 2018).

Theoretical and methodological principles of distance learning technology have been substantiated in (Boliubash, 2012; Franchuk and Prydacha, 2021; Kukharenko and Oleinik, 2019; Petrenko et al., 2020; Polhun et al., 2021; Vakaliuk et al., 2021).

Despite the considerable attention of scientists to the study of innovative learning technologies, the or-

ganizational and methodical aspects of study to create a modern educational information environment that meets the educational information needs, insufficiently studied. The mechanisms for the introduction of fundamentally new forms and methods of studying, based on the Moodle distance learning system, which is a leader among educational systems of a new type – Learning Management Systems (LMS), need further development (Boliubash, 2012).

## 2 METHODS

The following empirical and theoretical methods of research were used in the process of study: analysis of scientific works on using information technologies in the process of training of specialists in economic specialties, in particular, the LearningApps.org online service and the Moodle learning management system; synthesis of ideas for the use of interactive tasks in the teaching of economic disciplines; observation of higher education applicants in the process of studying economic disciplines; generalization of advanced national and foreign experience in the use of interactive tasks of the LearningApps.org online service in the Moodle system; statistic method – allowed to make a conclusion about the effectiveness of interactive study in the Moodle system.

Study of features of using the LearningApps.org online service in the Moodle system in the process of training of specialists in economic specialties proceeded in the Separated Structural Subdivision (SSS) “Berezhany Professional College of NULES of Ukraine”. The higher education applicants of economic specialties became the participants of the pedagogical research.

## 3 RELATED WORK

Enhancing and upgrading the quality of education and instruction is a vital concern, predominantly at the time of the spreading out and development of education. ICTs can improve the quality of education in a number of ways: by augmenting student enthusiasm and commitment, by making possible the acquirement of fundamental skills and by improving teacher training. ICTs are also tools which enable and bring about transformation which, when used properly, can encourage the shift an environment which is student centered (Sarkar, 2012).

The development of information society involves the widespread use of information technologies in the process of training of future specialists of economic



specialties that is determined by the number of factors (Kinash, 2011):

- introduction of information technologies into economic education significantly accelerates the transfer of knowledge and accumulated technological and social experience of humanity not only from generation to generation, but also from one person to another;
- modern information technologies, improving the quality of economic education and study, allow the specialist to adapt to the environment and social changes, which occurs, much faster. This gives an opportunity to each person to get necessary knowledge both today and in the future;
- active and effective introduction of these technologies into economic education is an important factor of creating education system that meets the requirements of modern information society and the process of transformation of traditional education system into a new system.

The process of introduction and the further use of various components of educational information environment is based on a number of principles, in particular: resource availability, systemic, adaptability, interactivity, practical orientation, security, transparency, efficiency and mobility. This process contributes to the formation and development of intellectual potential of higher education applicants, improving the forms and content of the educational process, introducing computer methods of study that gives the possibility to choose problems of specialists' training at a better level, taking into account international requirements. The improvement of educational process management, individualization of study, improving the quality of education at all levels of specialists' training, organization of systematic control of knowledge, integration of educational, research and practical activities, the ability to take into account psychophysiological features of each higher education applicant and research and teaching staff, etc., is the result of such implementation (Petrovych and Rymar, 2012). Cox (Cox, 2020) believes there will be an increase in concepts that have been around, such as Massive Open Online Courses (MOOCs), or textbooks that are free to access.

The special tools for distance learning – Course Management Systems (CMS), also known as Learning Management Systems (LMS) or Virtual Learning Environments (VLE) are used to conduct this type of training. Such systems are designed to store training materials, automatic testing for higher education applicants, their distance communication, storing information about them and their achievements, keeping

reports on the work of distance learning subjects (Osadcha and Osadchyi, 2013).

Using LMS in the learning process helps facilitate e-learning as it provides educational material without the constraint of time or place (Ain et al., 2016), enabling students and teachers to interact via the internet and facilitates sharing of course-related information and resources (Lonn et al., 2011). A few examples of LMS used in educational institutions include Moodle, WebCT, Blackboard, and Desire2Learn (Waheed et al., 2016). Hassanzadeh et al. (Hassanzadeh et al., 2012a) revealed in his study that, with the advent of information technology, the definition of higher education had been changed. In recent times, the acceptance of e-learning systems and technologies is being investigated by researchers in different educational environments around the world, using different models based on distinct criteria (Hassanzadeh et al., 2012b; Khan and Rafi, 2020; Raza et al., 2021). It is worth to mention that Moodle is the most popular Course Management System, as evidenced by both the results of Google Trends statistics and data from the ListEdTech.com resource (Osadcha and Osadchyi, 2013).

The heart of Moodle is courses that contain activities and resources. There are about 20 different types of activities available (forums, glossaries, wikis, assignments, quizzes, choices (polls), SCORM players, databases etc) and each can be customised quite a lot. The main power of this activity-based model comes in combining the activities into sequences and groups, which can help you guide participants through learning paths. Thus, each activity can build on the outcomes of previous ones. There is a number of other tools that make it easier to build communities of education applicants, including blogs, messaging, participant lists etc, as well as useful tools like grading, reports, integration with other systems and so on (Moodle, 2021).

As an example of a successful combination, we consider the LearningApps.org online service – free Web 2.0 service, which contains exercise blocks of general use and allows creating tests, prepare training exercises for fixing the material and further use in educational process. This resource supports the developments and contains a bank of exercises in 20 languages, including Ukrainian, English, German, Russian, Bulgarian, Romanian, Polish and others. It should be mentioned that LearningApps.org information is not translated into all languages, but is filled by its users (Korniienko and Fedchenko, 2016). The proposed by this service set of tools is interesting because it allows you to control the achievement of cognitive goals not only at lower levels of Bloom's

taxonomy (remembering, awareness, application), but also higher (analysis and evaluation). All exercises are evaluated. Some of them have an input rating scale (for example, Quizzes), for most other types mark has the character of enrollment, and the exercise is performed until the correct answer is found (Bihun, 2018). Note that this service is one of the most functional and convenient; higher education applicants easily can independently study the functionality of the service and create interactive tasks.

The LearningApps.org can be used for creating various interactive visual exercises in games, competitions, classes. There are the following types of interactive exercises in the LearningApps.org system: category Choice (Quiz, Multiple-Choice Quiz, Highlight the words, The Millionaire Game, Words from letters); category Distribution (Pairing Game, Group assignment, Matching Pairs, Puzzle “Vpiznaiko (Recognizer)”, Sorting, Correlation) and others. Important helpful function of this resource is possibility to look through the tasks of other users, as, for example, for creating own interactive exercise. After creating some task, you will be able to publish, download, or share it with other users (Pavlenko, 2016).

Sablina (Sablina, 2017) reports that the LearningApps.org service is a Web 2.0 service to support processes of learning and teaching with a help of not big interactive modules. These modules can be used directly as learning resources or for independent work and for self-assessment of education applicants. Interactive educational environment of the LearningApps.org proposes some interactive exercises divided into the following categories: by subject, by level of education degree and ready-made templates that you can use or create your own. Creation of tasks in the LearningApps.org environment is performed on the basis of the proposed templates.

Stechkevych and Stechkevych (Stechkevych and Stechkevych, 2020) mention that didactic materials created by means of this service perfectly fit into the program of competitions, quizzes and other extracurricular activities. The benefit of these resources is possibility for teacher to create his/her own repository exercises, add interactive elements into educational process, and at the same time to raise the level of interest of education applicants, which is relevant in the conditions of distance learning.

Taran (Taran, 2014) determined that education applicants with the help of templates of the LearningApps.org service create both practical and control parts of the educational module that allows to examine the level of formation of special abilities of education applicants of different ages.

LearningApps.org – designer of interactive tasks,

which allows you to conveniently and easily create electronic interactive exercises, which promotes activity, independence, efficiency, connection of theory with practice, a combination of collective and individual forms of educational work and more (Isaikina and Zlenko, 2021).

Using modern information technologies, including interactive learning technologies, opens wide prospects of deepening theoretical base of knowledge, strengthens motivational orientation to studying of disciplines, provides mastering of skills of person’s self-development, an opportunity to think, create (Sablina, 2017).

The process of technologicalization of education is certainly accompanied by the involvement of students in mastering the methods of using the capabilities of information computer technologies (Boichuk et al., 2019). A number of researchers have already begun to propose various tools, techniques and approaches to support the active involvement of both teachers and students in the design of learning tasks and environments; new instructional and learning design practices are emerging that are based on the idea of student ownership of tasks, and that emphasise the importance of allowing flexibility, encouraging self direction and choice as well as promoting creativity in the performance of tasks (McLoughlin and Lee, 2010).

Results of the conducted research of using interactive tasks in the educational process indicate the intensification of the educational process and the intensification of cognitive activity of higher education applicants (Osadchyi and Osadcha, 2015).

The last period is characterized by active process of implementation of distance education into national learning environment. Higher education institutions intensify activities and develop various electronic educational resources (manuals, textbooks, virtual workshops, repositories, web-based learning support systems, distance learning courses, etc.), study possible ways of organization of distance classes, presentation of educational material, solve issues of technical support of online learning, study other theoretical and practical problems, related to the introduction of distance learning in Ukraine. Educators used previously electronic learning resources only as teaching aids, in today’s reality e-learning resources are the only way to ensure the educational process by improving its quality due to the high degree of visualization of learning material and accessibility, individualization, interactivity, self-control in study. The system of e-learning resources, which can be proposed by instructors and institutions of higher education, is a powerful didactic resource for providing a system of

support for distance education as a requirement of the time (Gryniova et al., 2019).

The instructors of SSS “Berezhany Professional College of NULES of Ukraine” place all electronic educational and methodical complexes on the portal of distance and blended learning Moodle (<http://www.nipba.tk/>). In such way the higher education applicants have opportunity, after identification, get access to distance learning courses at any time convenient for them. Also there are electronic manuals, tutorials, workshops, multimedia presentations, etc. on the portal to provide a system of support for distance and mixed learning.

Given the situation in connection with COVID-19, the distance and mixed learning portal Moodle is used actively now and, accordingly, helps to form professional competencies, information culture of future economic specialists, professional self-awareness, to realize the creative potential in higher education applicants.

## 4 RESULTS

Introduction of interactive study by means of the LearningApps.org online service in the Moodle system into educational process took place on the basis of SSS “Berezhany Professional College of NULES of Ukraine”. The developed interactive tasks with the help of the LearningApps.org online service on disciplines of “Banking operations”, “Insurance services”, “Economic analysis” were used during the classes with higher education applicants of economic specialties.

Introducing the traditional professional training of network technologies on the basis of Moodle system in the educational process of future specialists in economic specialties is accompanied by creation of the didactic information environment which is a platform for realization of process of training via the Internet, contains educational information and information with results of educational activity. Moodle Learning Management System has wide possibilities for multimodal presentation of educational information, automatization of control and monitoring, performing interactive network communication, parallel actions and exchange of information, using which need making adjustments to the organization of forms and methods of teaching (Boliubash, 2012). Despite the fact that Moodle system is multimodular, but when there is a need to create interactive explanatory-illustrative materials, simulators, questionnaires simply, quickly and attractively, you should use a special separate software tool.

Important aspect of using the Moodle platform in the educational process of future specialists in economic specialties is the ability to use external resources that can be built into the system.

External systems can be integrated easily, to maintain authentication, enrolments and other things, allowing Moodle to react smoothly as data in other systems is modified (Moodle, 2021).

Moodle is widely considered by students as a platform for weekly access, rather than a site they visit daily, and they are more likely to log in on the day of their lectures – they generally see it as a resource location, holding the slides necessary for the week’s lectures (Mogaji, 2018).

From the view of practical experience of using means of modern information technologies in the educational process we want to note that interactive tasks, developed with the help of the LearningApps.org online service, activate the activities of higher education applicants and act as a mean of control or self-control in the Moodle system.

The advantage of the LearningApps.org service is that the exercise templates have an attractive design, allow to switch on interface elements (markers of reactions to correct and incorrect answers), which have a positive emotional impact on students. Formation of positive emotions is facilitated by the playful nature of many exercises included in the instruction templates, which allow correcting mistakes. Due to this fact the reason for the negative attitude to learning, as failure to perform tasks is eliminated (Stanislavova, 2018). Using the LearningApps.org service helps higher education applicants better fix the studied theoretical material, increase their activity, motivation and interest, acquire skills of independent and collective search for ways to solve the tasks. For clarity, consider the algorithm for creating an interactive exercise on the LearningApps.org online service.

Note that you do not need to register to create and do exercises. But registration is necessary for students to be able to create groups, monitor performance, and create exercises. We will not detail the registration of a new account, but will focus on creating an interactive exercise “Crossword”, which is used to develop new concepts of the topic “Credit granting and repayment operations”, in more detail.

We recommend to be acquainted with ready-made exercises before starting work on the online service. To do this, you need to activate the option “View exercises” and select an educational discipline from these categories. Each task can be added to your account page (“My exercises”), and soon will use in the classroom, changing to your own needs or creating a completely different exercise. To create an exercise you

need to click the option “Create an exercise” and select the exercise “Crossword”.

The next step of creating the exercise “Crossword” is to fill in the form of the template, adding text, images, sound, video, description of task, help, feedback, and finally, activate the “Save exercise” option. After saving, the exercise is displayed on the LearningApps.org online service in the “My exercises” tab for use and, if necessary, editing. The exercise status also can be changed from private into public. When the exercise is ready for use, we can give higher education applicants access to its implementation using the QR-code automatically created by the service, which will provide a quick transition to the exercise or by providing higher education applicants with a link to demonstration of the exercise in normal or full screen mode.

Interactive tasks, developed with the help of the LearningApps.org, can be done both directly on the web site of the online resource and on other web resources, in particular in our case on the portal of distance and mixed learning of SSS “Berezhany Professional College of NULES of Ukraine”. It should be mentioned that for correct work with the LearningApps.org online service and to be able to embed tasks on other web resources, you must register and obtain your own account.

To place interactive tasks on the Moodle distance and mixed learning portal, you need to copy the link to the task we created in the LearningApps.org online service (figure 1, item 1) or download the SCORM package to your computer (figure 1, item 2).

Consider one of the ways to place interactive tasks of the LearningApps.org online service in the Moodle system, which was used the most often in the process of teaching economic disciplines, namely: the creation of tasks using the SCORM package.

To integrate the created interactive task into the study course, first of all it is necessary to click the “Edit” button in the Moodle system for the corresponding course in which we plan to insert it. When this option is enabled, the developer has the ability to add and edit resources, which are placed in the electronic course. To add the SCORM package it is necessary choose the option “Add an activity or resource” (figure 2), and from the presented list – the SCORM package (figure 3).

After these steps, a window with detailed settings will appear. We will highlight only a few of the most important, in our opinion, settings. For example, after entering the task name and downloading the SCORM package we recommend:

- to click “Show less...” in the item “Appearance” and change setting “Disable preview mode” into

“Yes”;

- to select “1 attempt” in the item “Attempts management” – “Number of attempts”;
- immediately look through the create task, you need to click “Save and display”. If necessary, you can change settings.

These settings help higher education applicants take tasks more seriously and conduct self-control of knowledge and skills.

Note that if you select “Unlimited attempts”, “2 attempts” and more in the settings in the “Attempts management” item, then higher education applicants will be able to re-perform the interactive task.

More detailed information on settings of the SCORM package you can view by following the link on the Internet: <https://docs.moodle.org/311/en/SCORM.activity>.

After saving the settings mentioned above, a message will appear stating the number of allowed attempts to perform the task and score, and using the “Enter” button the finished interactive task will open.

Consider the sequence of execution of one of the most interesting interactive task for future specialists in economic specialties, built into the Moodle system – the “Group-Puzzle”. To do this task it is necessary to choose the correct answer (figure 4, item 2) to each category (figure 4, item 1). If the answer is correct, some part of the picture will be shown, but if the answer is incorrect, a message will appear stating the cause of the error and the answer itself will be highlighted in red. If the interactive task would be done correctly, a welcoming message will appear.

The advantage of integration of interactive tasks into the LMS Moodle using the SCORM package is that the scores for their performance are displayed in the score journal in the Moodle system. It is always possible to observe whether the higher education applicant (figure 5, item 1) has completed the task, how much time was spent on its completion and how many attempts were made to complete it (figure 5, item 2). The score (figure 5, item 3) of the future specialist is credited only for the correctly performed task. An important component of ensuring monitoring control of studying activities of higher education applicants is that the score journal (figure 5, item 4) can be downloaded in a convenient format.

In addition to interactive task, mentioned above, we used other tasks of the LearningApps.org online service in training of future specialists in economic specialties, including:

- to fix the basic concepts in economic disciplines we use the task “Cloze text” (figure 6), in which

**Прийоми економічного аналізу (Techniques of economic analysis)** 2021-03-19

До якісних (абстрактно-логічних) прийомів дослідження відносять (Qualitative (abstract-logical) research techniques include):

До кількісних прийомів дослідження відносять (Quantitative research techniques include):

До описових прийомів відносять (Descriptive techniques include):

Аналітичні прийоми поділяються на (Analytical techniques are divided into):

|   |  |  |   |
|---|--|--|---|
| індукцію, дедукцію (induction, deduction)                                   | аналіз, синтез (analysis, synthesis)   | ряди динаміки, графічний прийом (time series, graphic technique) | прийоми для дослідження стохастичних взаємозв'язків (techniques used to study stochastic relationships) |
| описові прийоми (descriptive techniques)                                    | порівняння, евристичні прийоми (comparisons, heuristic techniques)                                 | аналітичні прийоми (analytical techniques)                       | середні та відносні величини (average and relative values)  |
| структурні та типологічні групування (structural and typological groupings) | прийоми для вивчення функціональних залежностей (techniques used to study functional dependencies) | описові прийоми (descriptive techniques)                         | ряди динаміки, графічний прийом (time series, graphic technique)  |

Use App Report copyright or misuse

Weblink: <https://learningapps.org/display?v=p1fq1hf7j21>

Fullscreen-Link: <https://learningapps.org/watch?v=p1fq1hf7j21>

Embed: `<iframe src="https://learningapps.org/watch?v=p1fq1hf7j21" style="border:0px;width:100%;height:500px" all`

SCORM IBooks Author QR-Code

Figure 1: Placing a link or SCORM in the LearningApps.org online service.

Question bank

Site administration

Сайт БАТК

Add a block

Add...

- Інструкційна картка до теми 4. (Instruction sheet for topic 4.)
- Завдання 4.1. (Task 4.1.)
- Завдання 4.2. (Task 4.2.)
- Завдання 4.3. (Task 4.3.)
- Тестові завдання по темі 4. (Test assignments on topic 4.)
- Модульний контроль (Modular assessment)
- Модульна робота 1. (Module test 1.)

+ Add an activity or resource

Figure 2: Activation of option “Add an activity or resource”.

you should choose a correct notion from the specified list, and the task “Crossword”, in which it is necessary to fill in some notions to the specified definitions, the task “Freetext input” (figure 7), in which you must enter the missing words

or calculated data. Such exercises can be used while studying the topics “Subject and types of economic analysis”, “Methods of factor analysis”, “Methodical techniques of economic analysis”, “Analysis of resource provision of the enterprise

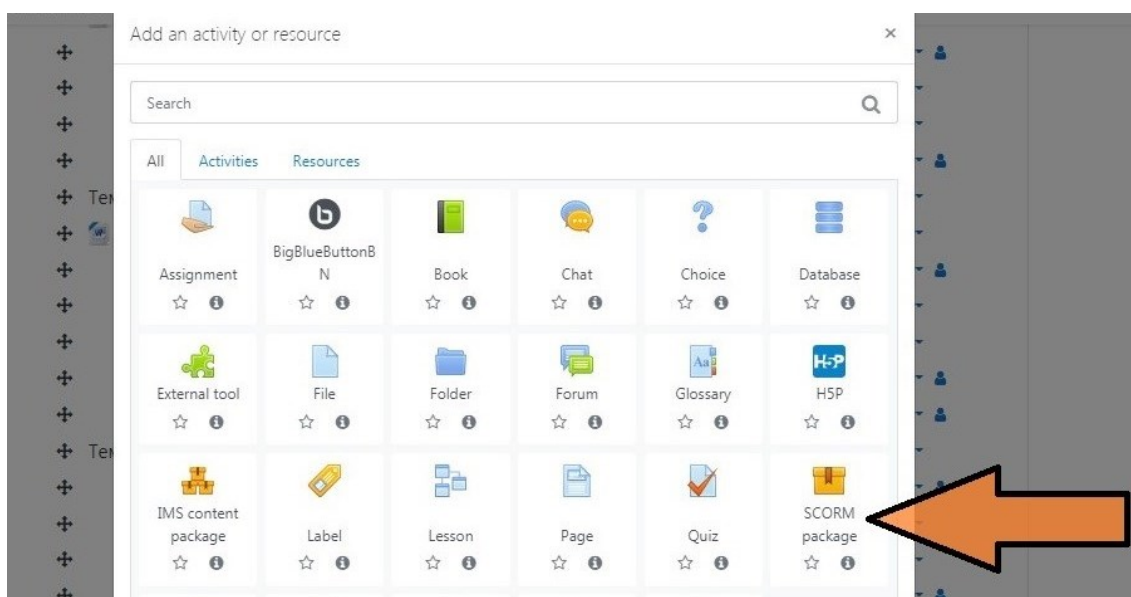


Figure 3: Selection of the “SCORM package”.

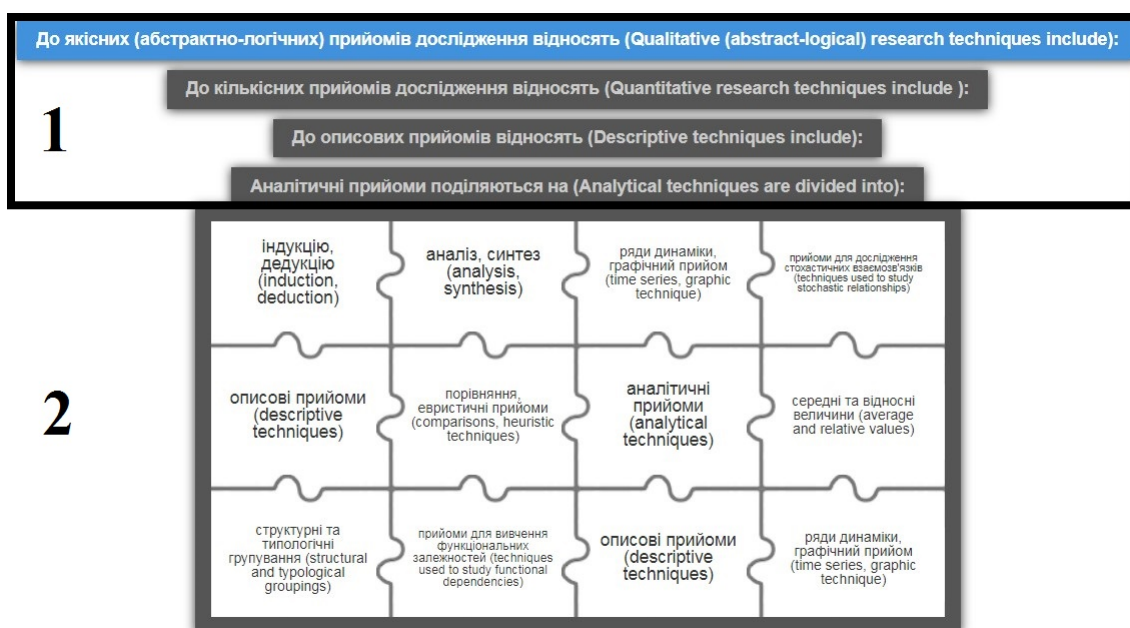


Figure 4: Example of “Group-Puzzle” interactive task.

and evaluation of the efficiency of its resources”, “Analysis of production costs”, etc.;

- to solve typical questions – the task “Freetext input”, in which it is necessary to fill in missing words or calculated data, and the task “Guess”, in which you also must enter calculated data or missing words. However, the difference from the previous task is that it is possible to choose an opponent during perming the task. These interactive tasks help future specialists in economic special-

ties to master such topics as “Analysis of production, works and services”, “Analysis of production costs”, “Analysis of resource provision of the enterprise and evaluation of the efficiency of its resources”, etc.

Thanks to the LearningApps.org online resource future specialists in economic specialties are interested in creating interactive tasks on their own (figure 8) that help them to fix studied material, to develop cognitive activity, to form professional and per-

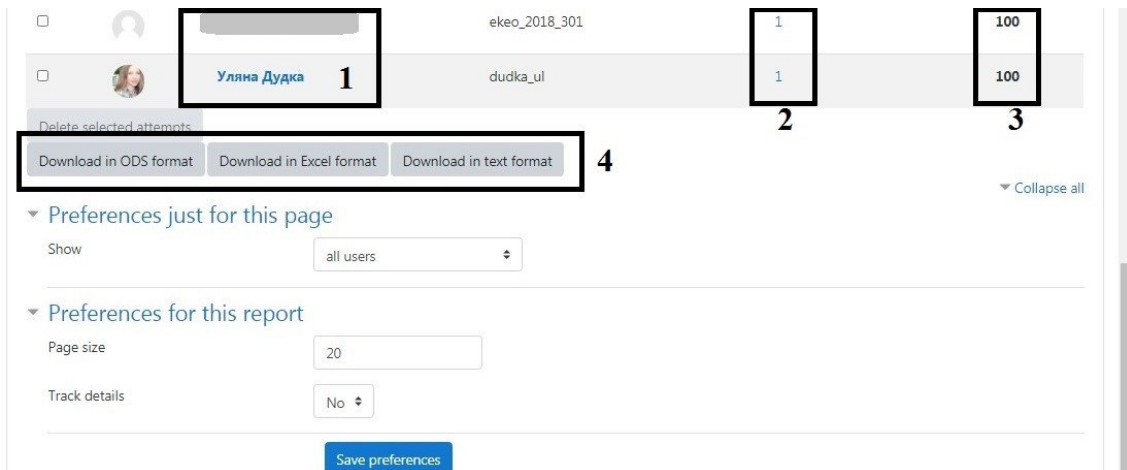


Figure 5: Score journal on the portal of distance and mixed learning Moodle.

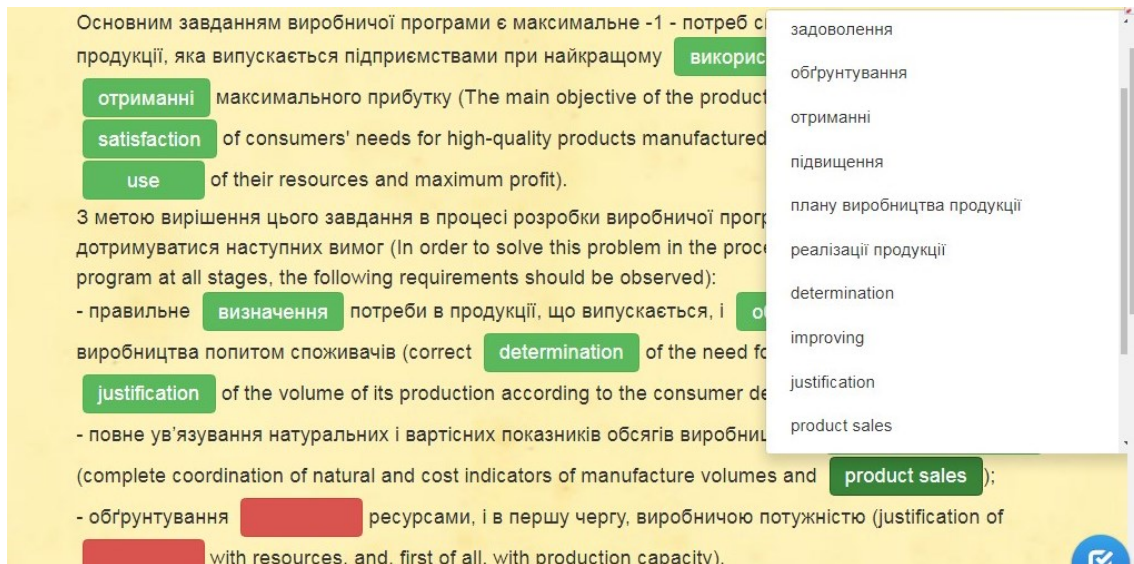


Figure 6: Example of interactive task "Close text".

sonal qualities.

Joining the possibilities of the Moodle system and online services guarantees the improvement of any training course, gives the ability to make it more productive, and the educational process more interesting and high quality for higher education applicants. The result depends on the professionalism of teaching staff, given the number of such educational services (Korniienko and Fedchenko, 2016).

## 5 CONCLUSIONS AND FUTURE WORK

In conclusion we can say that the implementation of the information and communication technology

in education with learning management system allows improving effectiveness of the education. The use of LMS allows better cooperation among the learners, the tutors and the students. The accessibility, usability and student collaborative learning are improved. Higher motivation among the students and the teachers is achieved (Nedeva, 2005).

The use of network technologies in the process of training of specialists in economic specialties allows the instructor to design the optimal strategy for studying the discipline and contributes not only to the assimilation of knowledge, abilities, skills, forms of professional behavior, but also to the formation of a certain structure of personal qualities.

Study of the conditions of formation of professional competence of future specialists in economic

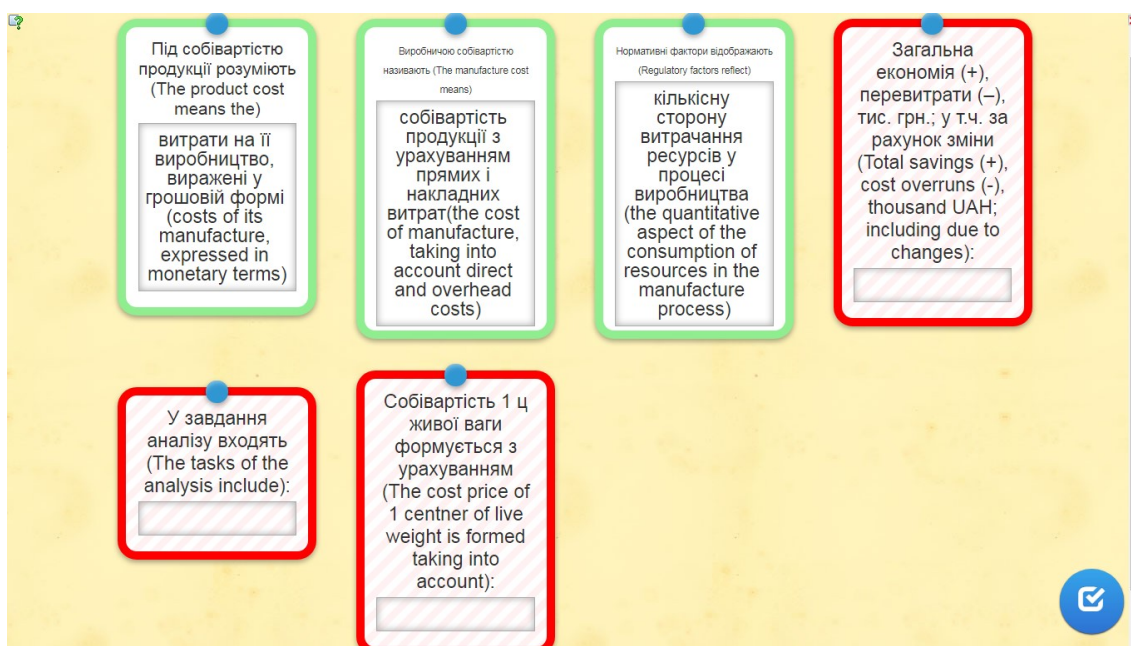


Figure 7: Example of interactive task “Freetext input”.

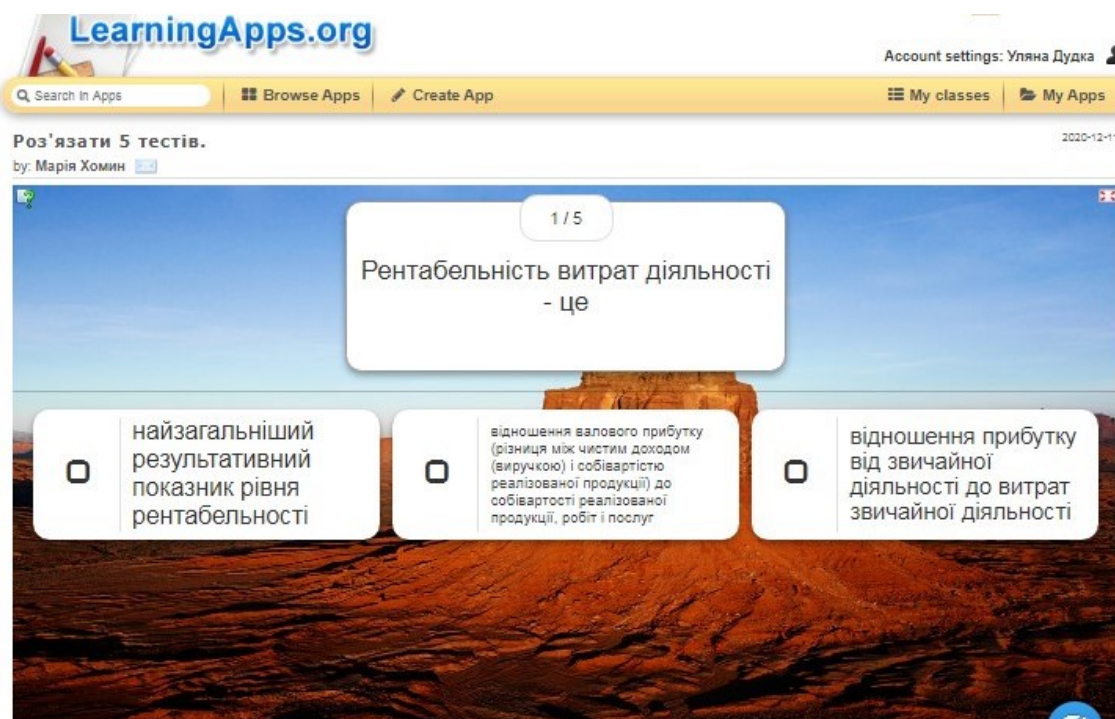


Figure 8: Example of interactive task “Multiple-Choice Quiz” on the LearningApps.org online service.

specialties by means of network technologies allowed to establish that the introduction of educational and methodical complex, which includes distance learning courses developed by the Moodle system tools, using a modular approach in combination with interactive tasks of the LearningApps.org, presentation of

knowledge as a dynamic, multimodal structure, which involves future specialists in economic specialties, helps them gaining experience in self-replenishment and updating professional knowledge, personal involvement in this process and responsibility for it (Boliubash, 2012).



It is proved that usage of gamification approach (an approach of usage game mechanics in non-gaming activities like learning access) in e-courses has many advantages: the activities are varied and flexible; they motivate students to study; provide high level of engagement; helps to practice real-life situations; effectiveness. Platform LearningApps.org proposes 20 templates to be used in e-courses with the help of SCORM package. Their advantages for teachers are easy to use, available anytime and anywhere, big variety of examples which can also be used. The advantages for students are: 1) they experience “fun” during the game and still learn if the level of engagement is high; 2) e-Learning is interactive; 3) better learning experience (Yurzhenko, 2019). The use of the LearningApps.org online service in the Moodle system in combination with other means of information technologies provides the maximum possible interrelation of pedagogical, scientific and teaching staff and higher education applicants of economic specialties.

Poll of the education applicants on the use of interactive tasks of the LearningApps.org online service in the Moodle system and the results of evaluation made it possible to conclude that education applicants are more interested in studying and fixing the educational materials.

Activation of cognitive activity and interest in future specialists in economic specialties is caused by the LearningApps.org online service, as it allows you to develop interactive tasks, using templates, which saves a lot of time, allows you to quickly make your own posts in the created multimedia applications (exercises, tasks), without using and having special knowledge of high-level programming languages, generate a QR-code for each interactive task, which provides a quick transition to the service to perform the exercise, working online or offline without access to the Internet and provides a number of other benefits of implementing the didactic process online.

In the process of didactic activity of future specialists in economic specialties, the use of Moodle has a number of advantages: after personalization, higher education applicants have constant access to study material from different disciplines, which is very important, because they do not need to move from one learning platform to another; the possibility of the Moodle system to embed external resources helps in the teaching of economic disciplines, because the use of, for example, interactive tasks of the LearningApps.org online service helps to form knowledge, abilities and skills in higher education applicants, develops their creative potential in the form of games, when they are interested in achieving high

results. An important thing is that by inserting the interactive tasks of the LearningApps.org online service into the Moodle system, the lecturer, instead of having different platforms and monitoring points, can observe the progress of education applicants and view the results of completed tasks in a centralized place.

We plan to outline the methods of using the tasks of the LearningApps.org online service in further scientific researches that will be put into the Moodle system using the links.

## REFERENCES

- Ain, N., Kaur, K., and Waheed, M. (2016). The influence of learning value on learning management system use: An extension of utaut2. *Information Development*, 32(5):1306–1321.
- Arkorful, V. and Abaidoo, N. (2015). The role of e-learning, advantages and disadvantages of its adoption in higher education. *International Journal of Instructional Technology and Distance Learning*, 12(1):29–42. [https://www.itdl.org/Journal/Jan\\_15/Jan15.pdf](https://www.itdl.org/Journal/Jan_15/Jan15.pdf).
- Bihun, M. I. (2018). Using Learningapps interactive exercises as a controlled activity in Moodle distance learning courses. In *MoodleMoot Ukraine-2018: Theory and practice of using the Moodle learning management system*. <http://2018.moodlemoot.in.ua/course/view.php?id=15>.
- Bilousova, L., Kolgatin, O., and Kolgatina, L. (2013). Pedagogical diagnostics with use of computer technologies. *CEUR Workshop Proceedings*, 1000:209–220.
- Bobyliiev, D. Y. and Vihrova, E. V. (2021). Problems and prospects of distance learning in teaching fundamental subjects to future mathematics teachers. *Journal of Physics: Conference Series*, 1840(1):012002.
- Boichuk, V. M., Horbatiuk, R. M., and Kucher, S. L. (2019). Methods of using information and communication technologies in preparing future craft and technology teachers for project activities. *Information Technologies and Learning Tools*, 71(3):137–153. <https://journal.iitta.gov.ua/index.php/itlt/article/view/2838>.
- Boliubash, N. M. (2012). Organizational and methodological aspects of learning based on the MOODLE information environment. *Naukovi pratsi [Chornomorskoho derzhavnoho universytetu imeni Petra Mohyly kompleksu “Kyievo-Mohylianska akademiia”]*. Ser. : *Pedahohika*, 187(199):55–60. [http://nbuv.gov.ua/UJRN/Npchduped\\_2012\\_199\\_187\\_11](http://nbuv.gov.ua/UJRN/Npchduped_2012_199_187_11).
- Bonk, C. J. and Lee, M. M. (2017). Motivations, achievements, and challenges of self-directed informal learners in open educational environments and moocs. *Journal of Learning for Development*, 4(1). <https://jl4d.org/index.php/ej14d/article/view/195>.
- Bulakh, I. and Mrouga, M. (2007). Applicability of international documents for quality assurance of educational assessment in Ukraine. *Cadmo*, 15(1):21–32.

- Bykov, V., Dovgiallo, A., and Kommers, P. (2001). Theoretical backgrounds of educational and training technology. *International Journal of Continuing Engineering Education and Life-Long Learning*, 11(4-6):412–441.
- Cox, E. (2020). The future of K-12 education, Part 3: flexibility and alternative schools. <http://curtbonk.com/pdfs/future-of-K-12-3.pdf>.
- Farid, S., Ahmad, R., Niaz, I. A., Arif, M., Shamshirband, S., and Khattak, M. D. (2015). Identification and prioritization of critical issues for the promotion of e-learning in pakistan. *Computers in Human Behavior*, 51:161–171.
- Franchuk, N. P. and Prydacha, T. V. (2021). Organization and conduct of classes in educational institutions during distance learning. *Journal of Physics: Conference Series*, 1840(1):012054.
- Gergei, T. and Mashbits, E. (1986). Psychological and pedagogical problems of effective computer use in the educational process. *Russian Education & Society*, 28(10-11):213–229.
- Gryniova, M. V., Kononets, N. V., Dyachenko-Bohun, M. M., and Rybalko, L. M. (2019). Resource-based learning of students in the health-saving educational environment. *Information Technologies and Learning Tools*, 72(4):182–193. <https://journal.iitta.gov.ua/index.php/itlt/article/view/2783>.
- Hassanzadeh, A., Kanaani, F., and Elahi, S. (2012a). A model for measuring e-learning systems success in universities. *Expert Systems with Applications*, 39(12):10959–10966.
- Hassanzadeh, A., Kanaani, F., and Elahi, S. (2012b). A model for measuring e-learning systems success in universities. *Expert Systems with Applications*, 39(12):10959–10966.
- Isaikina, O. and Zlenko, A. (2021). Socio-communicative and information aspects of training of documentaries in the conditions of distance learning. *Society. Document. Communication*, 1(10):281–309.
- Khan, K. A. and Rafi, S. M. T. (2020). Online Education & MOOCs: Teacher Self-Disclosure in Online Education and a Mediating Role of Social Presence. *South Asian Journal of Management*, 14(1):142–158.
- Kinash, I. A. (2011). Information technologies in economic education. *Journal of Information Technologies in Education (ITE)*, (10):080–087. <http://ite.kspu.edu/index.php/ite/article/view/419>.
- Kononets, N. (2015). Experience in implementing resource-based learning in Agrarian college of management and law Poltava State Agrarian Academy. *Turkish Online Journal of Distance Education*, 16(2):151–163.
- Korniienko, Y. K. and Fedchenko, Y. S. (2016). On testing in Moodle using external online-resources. In *MoodleMoot Ukraine-2016: Theory and practice of using the Moodle learning management system*. <https://tinyurl.com/mshjx5xx>.
- Kostenko, R. V., Zakharchenko, O. V., Topalova, I. A., Zakharchenko, N. V., and Balakhonova, O. (2018). The innovative technologies of education in the higher economic education of ukraine. *European Research Studies Journal*, 21(1):340–351.
- Kukhareno, V. and Oleinik, T. (2019). Open distance learning for teachers. *CEUR Workshop Proceedings*, 2393:156–169.
- Lavrentieva, O., Horbatiuk, R., Skripnik, L., Kuchma, O., Penia, V., and Pahuta, M. (2021). Theoretical and methodological bases of designing the educational institution information and consulting environment. *Journal of Physics: Conference Series*, 1840(1):012060.
- Lonn, S., Teasley, S. D., and Krumm, A. E. (2011). Who needs to do what where?: Using learning management systems on residential vs. commuter campuses. *Computers & Education*, 56(3):642–649.
- Markova, O. M., Semerikov, S. O., and Striuk, A. M. (2015). The cloud technologies of learning: Origin. *Information Technologies and Learning Tools*, 46(2):29–44. <https://journal.iitta.gov.ua/index.php/itlt/article/view/1234>.
- McLoughlin, C. and Lee, M. J. W. (2010). Personalised and self regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Educational Technology*, 26(1). <https://ajet.org.au/index.php/AJET/article/view/1100>.
- Mogaji, E. (2018). With the integration of learning apps, what are Moodles prospects? *Compass: Journal of Learning and Teaching*, 11(2). <https://journals.gre.ac.uk/index.php/compass/article/view/826>.
- Moodle (2021). Pedagogy - MoodleDocs. <https://docs.moodle.org/311/en/Pedagogy>.
- Morze, N. V., Smyrnova-Trybulska, E., and Glazunova, O. (2017). *Design of a university learning environment for SMART education*.
- Nedeva, V. (2005). The possibilities of e-learning, based on Moodle software platform. *Trakia Journal of Sciences*, 3(7):12–19. [https://www.academia.edu/30891375/The\\_possibilities\\_of\\_e\\_learning\\_based\\_on\\_Moodle\\_software\\_platform](https://www.academia.edu/30891375/The_possibilities_of_e_learning_based_on_Moodle_software_platform).
- O'Reilly, T. (2012). What is web 2.0?: Design patterns and business models for the next generation of software. In *The Social Media Reader*, pages 32–52.
- Osadcha, K. P. and Osadchyi, V. V. (2013). Organizational problems of implementation of course management systems into the process of professional training of future specialists in information technologies. In *MoodleMoot Ukraine-2013: Theory and practice of using the Moodle learning management system*. <http://2013.moodlemoot.in.ua/course/view.php?id=24>.
- Osadchyi, V. V. and Osadcha, K. P. (2015). Modern realities and trends of information and communication technologies development in education. *Information Technologies and Learning Tools*, 48(4):47–57. <https://journal.iitta.gov.ua/index.php/itlt/article/view/1252>.
- Patarakin, E. (2002). Network communities and education. *Journal of Eurasian Research*, 1(1):40–44.
- Pavlenko, I. M. (2016). Using existing services to create interactive exercise. In *Elektroni informatsiini resursy: stvorennia, vykorystannia, dostup: Zbirnyk materialiv Mizhnarodnoi naukovo-praktychnoi Internet-konferentsii*, pages 374–379.

- Vinnitsia. VNTU. <http://novomyrgorod-school2.kr.sch.in.ua/Files/downloads/konferencia2016.pdf>.
- Petrenko, L., Kravets, S., Bazeliuk, O., Maiboroda, L., and Muzyka, I. (2020). Analysis of the current state of distance learning in the vocational education and training institutions. *E3S Web of Conferences*, 166:10010.
- Petrovych, J. and Rymar, Y. (2012). Information systems of learning process management in hei: comparative analysis. *Bulletin of the National University "Lviv Polytechnic"*, 735:167–175.
- Polhun, K., Kramarenko, T., Maloivan, M., and Tomilina, A. (2021). Shift from blended learning to distance one during the lockdown period using moodle: test control of students' academic achievement and analysis of its results. *Journal of Physics: Conference Series*, 1840(1):012053.
- Poyasok, T., Chenchevoi, V., Bespartochna, O., and Chencheva, O. (2020). Application of the augmented reality technology to training future electrical engineers. In *Proceedings of the 25th IEEE International Conference on Problems of Automated Electric Drive. Theory and Practice, PAEP 2020*, page 9240788.
- Ramsky, Y. and Rezina, O. (2005). Study of information search systems of the internet. *Lecture Notes in Computer Science*, 3422:84–91.
- Raza, S. A., Qazi, W., Khan, K. A., and Salam, J. (2021). Social Isolation and Acceptance of the Learning Management System (LMS) in the time of COVID-19 Pandemic: An Expansion of the UTAUT Model. *Journal of Educational Computing Research*, 59(2):183–208.
- Sablina, M. A. (2017). Interactive environment LearningApps as a tool of the presentation of theoretical material in the training process of students. *Open educational e-environment of a modern university*, (3):288–294. [http://elibrary.kubg.edu.ua/id/eprint/20186/1/M\\_Sablina\\_OPENEDU\\_2\\_KITMD.pdf](http://elibrary.kubg.edu.ua/id/eprint/20186/1/M_Sablina_OPENEDU_2_KITMD.pdf).
- Sarkar, S. (2012). The role of information and communication technology (ict) in higher education for the 21st century. *The Science Probe*, 1(1):30–41. [https://www.academia.edu/download/51978861/research\\_paper\\_2.pdf](https://www.academia.edu/download/51978861/research_paper_2.pdf).
- Semerikov, S. O., Teplytskyi, I. O., Soloviev, V. N., Hamaniuk, V. A., Ponomareva, N. S., Kolgatin, O. H., Kolgatina, L. S., Byelyavtseva, T. V., Amelina, S. M., and Tarasenko, R. O. (2021). Methodic quest: Reinventing the system. *Journal of Physics: Conference Series*, 1840(1):012036.
- Semerikov, S. O., Teplytskyi, I. O., Yechkalo, Y. V., and Kiv, A. E. (2018). Computer simulation of neural networks using spreadsheets: The dawn of the age of Camelot. *CEUR Workshop Proceedings*, 2257:122–147.
- Soomro, S., Soomro, A. B., Bhatti, T., and Ali, N. I. (2018). Implementation of blended learning in teaching at the higher education institutions of pakistan. *International Journal of Advanced Computer Science and Applications*, 9(8).
- Spivakovsky, A., Petukhova, L., Spivakovska, E., Kotkova, V., and Kravtsov, H. (2013). Three-subjective didactic model. *Communications in Computer and Information Science*, 412 CCIS:252–273.
- Stanislavova, L. L. (2018). Forming motivations for students to study culture of language using it technologies. *Scientific Notes of Ostroh Academy National University: Philology Series*, (68):166–169. <https://journals.oa.edu.ua/Philology/article/view/1851>.
- Stechkevych, S. and Stechkevych, O. (2020). Organization of work with the learningapps service in the conditions of distance learning. In *ICSR Conference Proceedings*, pages 67–69. <https://ojs.ukrlogos.in.ua/index.php/mcnd/article/view/1953>.
- Taran, I. B. (2014). Using LearningApps.org by future educators to create interactive exercises. In Bykov, V. Y. and Spirin, O. M., editors, *Zbirnyk materialiv II Vseukrainskoi naukovo-praktychnoi konferentsii molodykh uchenykh "Naukova molod-2014"*, m. Kyiv, 11 hrud. 2014 r., pages 121–125, Kyiv. IITZN NAPN Ukrainy. <http://repository.mdu.in.ua/jspui/handle/123456789/1277>.
- Trius, Y. V., Solov'ev, V. N., Serdyuk, O. A., and Piskun, O. V. (2004). Regional educational portal as the main information resource for supporting continuous education and open learning. *Upravlyayushchie Sistemy i Mashiny*, (4):74–81.
- Vakaliuk, T. A., Spirin, O. M., Lobanchykova, N. M., Martseva, L. A., Novitska, I. V., and Kontsedailo, V. V. (2021). Features of distance learning of cloud technologies for the organization educational process in quarantine. *Journal of Physics: Conference Series*, 1840(1):012051.
- Vlasenko, K., Volkov, S., Sitak, I., Lovianova, I., and Bobyliev, D. (2020). Usability analysis of on-line educational courses on the platform "Higher school mathematics teacher". *E3S Web of Conferences*, 166:10012.
- Waheed, M., Kaur, K., Ain, N., and Hussain, N. (2016). Perceived learning outcomes from moodle: An empirical study of intrinsic and extrinsic motivating factors. *Information Development*, 32(4):1001–1013.
- Yurzhenko, A. (2019). The use of learningapps gamification activities as controlled exercises in Moodle e-course. *Pedagogical sciences: theory, history, innovative technologies*, 1(85):278–288. [http://nbuv.gov.ua/UJRN/pednauk\\_2019\\_1\\_27](http://nbuv.gov.ua/UJRN/pednauk_2019_1_27).
- Zhaldak, M. I., Franchuk, V. M., and Franchuk, N. P. (2021). Some applications of cloud technologies in mathematical calculations. *Journal of Physics: Conference Series*, 1840(1):012001.