MoPED
Modernization of Pedagogical Higher Education by Innovative Teaching Instruments

Co-funded by the Erasmus+ Programme of the European Union

H. Mohylnyi, M. Semenov, V. Matiievskyi

METHODOLOGY OF USING DIGITAL TECHNOLOGIES IN SCHOOL EDUCATION

2021 p.

Handbook «Methodology of Using Digital Technologies in School Education»

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HANDBOOK

TITLE OF THE COURSE:

METHODOLOGY OF USING DIGITAL TECHNOLOGIES IN SCHOOL EDUCATION

Speciality - *«014.04 Secondary education (Mathematics)».*

Higher Education Degree: *Bachelor*

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Department of Information Technologies and Systems

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BRIEF SUMMARY OF THE COURSE:

The training course " Methodology of Using Digital Technologies in School Education" provides conditions for preparing future teachers for the use of digital technologies in school and creates opportunities for research and pedagogical activities. The peculiarity of the course is the practical focus on the pedagogical construction of the educational content of digital learning, the use of teamwork and business games to model pedagogical situations and evaluate the developed methodology.

The content of the course contains materials on several main topics: theoretical principles of digital learning, methodology of digital learning, basics of pedagogical design of digital course, development of digital course in a team, support of digital course. The course also focuses on: working with computer e-learning platforms; organization of communication and cooperation in e-learning environments, use of constructivism and connectivism; modern services for the organization of digital educational environment at school; teacher tools to ensure the quality of e-learning.

KEY WORDS:

DIGITAL COMPETENCE, DIGITAL LITERACY, DIGITAL PEDAGOGICAL TECHNOLOGIES, DIGITAL TEACHING TOOLS, CONNECTIVITY, DIGITAL LEARNING, BLENDED LEARNING, DISTANCE LEARNING, LMS

CONTENT

1. DESCRIPTION OF THE COURSE

1.1. The volume of the course in ECTS credits and its distribution in hours by the forms of organization of educational process and types of classes

3,0 ECTS credits.
Total hours: 90, incl. full-time form of study: 18 lecture hours, 42 hours for practical and laboratory classes, 30 hours – consultations, individual student work.

1.2. Characteristics of the course by form of study

Full-time, part-time (using digital learning technologies)

1.3. Course status

Compulsory (014.04 Mathematics. Physics), selective (for other specialties)

1.4. Prerequisites for studying the course

List of disciplines that should be studied before: Pedagogy, Didactics, General Psychology, Age Psychology, Methodics of Teaching Informatics, School Course of Informatics, Basic knowledge and skills in digital literacy

1.5. Year of study, semester

3th year, 5th semester

1.6. Form of the final control

Test

1.7. Language of the course

English

1.8. Internet address of the permanent placement of educational content of the course

http://do.luguniv.edu.ua/course/view.php?id=28213

1.9. Developers

Hennadii Mohylnyi,
Mykola Semenov,
Volodymyr Matiievskyi

1.10. Aims of the course

The course is intended for future teachers to form their professional and pedagogical digital competences; to prepare students for implementation of modern pedagogical technologies and ensuring the quality of digital learning in secondary education institutions.

1.11. Competences that are formed during the study of the course

Integral competency (IC)

Ability to create and implement pedagogical technologies at school that are based on the use of digital instruments

General competences (GC):

GC-6 Digital competency. (Ability to use digital technologies in various fields of activity.)
GC-7 Cognitive flexibility. Ability to acquire new knowledge

Professional (special) competences (PC):

PC-3 Ability to organize the learning and teaching process with the use of digital technologies.
PC-6 Ability of integrated application of pedagogical technologies and digital instruments.
PC-7 Ability to use digital technologies for evaluation of students' learning outcomes.

1.12. Expected learning outcomes of the course

LO 1.1. Know the essence of digital technologies, the genesis of this concept, its differences from information and communication technologies.
LO 1.2. Understand the theoretical justification for planning and organizing the learning process with the use of digital technologies.
LO 1.3. Understand the transdisciplinarity of digital technologies and their significance for STEAM.
LO 2.1. Create educational digital content.
LO 2.2. Gain the skills of using digital instruments in the educational process.
LO 3.1. Evaluate students' digital educational achievements.
LO 3.2. Create educational and methodological support for digital education at school.
LO 3.3. Prepare and conduct a STEAM project.

1.13. Control of academic achievements of students.

The following activities are evaluated: activity in the project, practical classes, laboratory classes, control modular works (test and project defense).

- 100 points for the course:
- 70 points – defense of laboratory works and practical tasks; team project.
- 30 points – control modular works.

Control modular work (CMW) 1 is performed in the form of a computer test.
Control modular work (CMW) 2 is performed in the form of public defense of the team project.

Код	Бал	Код	Бал
А1.1	2	П2.1	2
А1.2	2	Л2.1	2
П 1.1	5	Л2.2	2
П 1.2	5	Л.2.3	2
А1.3	3	П2.2	3
А1.4	3	П2.3	3
П1.3	5	Л2.4	2
П1.4	5	Л2.5	3
КМР1	15	П2.5	3
		Л.2.6	3
		П2.6	2
		Л2.7	3
		П2.7	2
		Л2.8	3
		П2.8	2
		Л2.9	3
		КМР2	15
	45		**55**

Information about the results of evaluation is available to students on the site with the course content. The grades have teacher's reviews with remarks and instructions.

Each task has a time limit for its completion. The teacher conducts an evaluation of the tasks completed. Defense and correction of the grade is done during consultations and f2f sessions. Project work is evaluated during open defense: presentation and answers to questions.

Consultations are planned in the weekly schedule of the course, implemented both virtually and f2f. Teacher's contacts are present in the course as an e-mail address. During the final assessment the following HEI grading scale is used.

Scale of assessment of HEI

Amount of points	ECTS Grade	Exam	Test
90–100	A (outstanding performance without errors)	excellent	pass
83–89	B (above the average standard but with minor errors)	good	
75–82	C (generally sound work with some errors)		
63–74	D (fair but with significant shortcomings)	satisfactory	
50–62	E (performance meets the minimum criteria)		
21–49	FX (Fail – some more work required before the credit can be awarded)	fail	fail (with possibility of retake)
0–20	F (Fail – considerable further work is required)		fail (without possibility of retake)

Evaluation criteria for practical / laboratory class results

Level	Evaluation criteria
Excellent	- The obtained result fully meets the task requirements; - the substantiation is consistent with the theoretical principles of digital learning; - during the task completion student used modern theories, methods and methodologies or digital tools; - tasks were completed independently.
Satisfactory	- the obtained result generally meets the task requirements; - the substantiation in general is consistent with the theoretical principles of digital learning; - tasks were completed mostly independently.
Bare minimum	- the obtained result meets the task requirements for most of cases and criteria; - the substantiation is consistent with the basic theoretical principles of digital learning; - tasks were completed with external assistance.

2. COURSE CONTENT AND STRUCTURE

The content of the discipline for full-time and part-time form

Names of content modules and topics	Number of hours											
	full-time form						part-time form					
	total	including					total	including				
		l	p	lab	ind	self.		l	p	lab	ind	self.
1	2	3	4	5	6	7	8	9	10	11	12	13
Module 1												
General methodology of using digital technologies in educational process												
Topic 1.1 Theoretical rationale of digital learning The philosophy of digital technologies and their place in higher education: opportunities and risks. European and Ukrainian regulatory documents, standards about digital competence of the teacher. Digital learning: theoretical substantiation, principles of digital learning and different approaches to its organization.	16	8	2			6	16	2				14
Topic 1.2. Methodology of digital learning organization Technology of creating digital content.	28	10	6			12	28	4	2			22

1	2	3	4	5	6	7	8	9	10	11	12	13
Methods of supporting students in digital learning. use of digital tools. Methods of evaluating students' learning achievements in digital learning. Digital technologies in STEAM education.												
Total for module 1	44	18	8	0		18	44	6	2	0	0	36
Module 2 Application of digital technologies in educational process												
Topic 2.1 Basics of pedagogical design of a digital course Ensuring the quality of digital learning. Digital content planning (distance course). LMS Basics.	12		2	6		4	12					12
Topic 2.2 Development of the digital course in a team Curriculum design for the team course. Presentation of theoretical material in the digital course. Organization of practical activities in the team course	18		8	6		4	18		2			16
Topic 2.3 Support of the digital course Organization of student support for digital learning. Course improvement. Organization of evaluation of learning outcomes.	16		6	6		4	16			2		14
Total for module 2	46	0	16	18		12	46	0	2	2	0	42
Total hours	90	18	24	18		30	90	6	4	2	0	78

2.1. MODULE 1. GENERAL METHODOLOGY OF USING DIGITAL TECHNOLOGIES IN EDUCATIONAL PROCESS

2.1.1. Topic 1.1. Theoretical rationale of digital learning

Aims and expected learning outcomes

Aims:

Enhance and expand knowledge of the philosophy of digital technologies, consider their place in the system of higher education, highlight opportunities and risks of using digital technologies. Describe modern European and Ukrainian regulatory documents, standards of teachers' digital competence. Highlight modern information regarding digital learning, the basic principles of digital learning and different approaches to its organization.

Expected learning outcomes

After finishing the topic students should understand the basic paradigms of the course, have their own ideas about features of digital technology (ILO 1.1 and formation of competency GC-6).

Students should understand basic European and Ukrainian regulatory documents, standards of teachers' digital competence. The following competences are formed: GC-7, PC-3.

Students also should understand the concept of digital learning, know the principles of digital learning, be able to choose a rational approach to organization of digital learning (LO 1.1, LO 1.2, LO 1.3). The following competences are formed: PC-3, PC-6.

Criteria and forms for evaluating learning outcomes on the topic

Evaluation criteria:

- level of awareness of the concept of digital technologies and their impact on education;
- awareness of the main regulatory documents and standards of teachers' digital competence;
- ability to formulate ways of possible use of digital technologies for organization of educational process at school;

- ability to compare European and Ukrainian regulatory documents;
- knowledge of the theoretical rationale of digital learning, ability to explore its characteristics.

Levels: excellent, satisfactory, bare minimum.

Excellent:

- student demonstrates a high level of understanding of the concept of digital technologies in education;
- knows main regulatory documents and digital competence standards;
- knows the ways of possible use of digital technologies for organization of the educational process;
- can compare European and Ukrainian regulatory documents;
- demonstrates a high knowledge of the theoretical basis of digital learning.

Satisfactory:

- student has an average level of understanding the concept of digital technologies in education;
- knows main regulatory documents and standards regarding digital competence;
- demonstrates confidence regarding the means of possible use of digital technologies for organization of the educational process;
- can compare European and Ukrainian regulatory documents;
- demonstrates an average level of knowledge of the theoretical rationale of digital learning.

Bare minimum:

- student has an average level of understanding of the concept of digital technologies in education;
- knows main regulatory documents and standards regarding digital competence;
- shows confidence regarding the means of possible use of digital technologies for organization of the educational process;
- demonstrates fragmentary knowledge of the theoretical rationale of digital learning.

Digital tools

During the learning LMS Moodle is used. Tools for working on the Internet. Digital tools for collaborative reporting (Google Docs). Data search tools (google.com, bing.com). Messengers (Telegram, Viber).

Innovative learning technologies

The learning process involves the use of connectivist methods, open discussion on the features of digital technologies in the educational process, peer-to-peer assessment. Team work, work in groups. Contextual learning.

Lectures 1.1, 1.2, 1.3, 1.4

Lecture 1.1 (2 hours)
Topic: The philosophy of digital technologies and their place in higher education: opportunities and risks.
Aims:
Explain the essence of digital technologies and their place in the higher education system, consider the opportunities they bring to the educational process and the main risks of their use.
Outcomes are aligned to the LOs mentioned above.
Lecture plan

1. Introduction to digital technologies.
2. Paradigms of digital education.
3. Trends and challenges of digital education.

Lecture 1.2-1.3 (4 hours)
Topic: European and Ukrainian regulatory documents, standards about digital competence of a teacher.
Aims:
Learn about the main European and Ukrainian regulatory documents related to the digital competence of person and teacher.
Lecture plan

1. What is digital competence and why is it important?
2. European documents that regulate digital competency DigComp 2.0, DigComp 2.1
3. UNESCO ICT Competency Framework for Teachers

4. Ukrainian documents that regulate digital competence of the teacher (Digital agenda UA 2020)

Lecture 1.4. (2 hours)
Topic: Digital learning: theoretical substantiation, principles of digital learning and different approaches to its organization.
Aims:
Give information about the theoretical rationale for digital learning, show the importance of the principles of digital learning and learn different approaches to its organization.
Lecture plan

1. Learning theories (behaviorism, cognitivism, constructivism, connectivism)
2. Synchronous and asynchronous learning.
3. Role of teacher in digital learning.
4. MOOC.

Practical class P 1.1

Practical 1.1. Development of recommendations for organization of digital learning at school
Brief instruction

- How would you implement digital learning at school?
- What issues and challenges exist that should be addressed today?
- Develop your recommendations in a text document and write a commentary. After you finish, send a text file in a .zip archive.

General approaches to evaluation of the outcomes are the same for all practical classes and presented in Table 2.

Topics for individual and / or group tasks

A 1.1. Discussion "What is digital technology in education?"
Brief instruction

- Discuss the next questions using digital tools:
- Are digital technologies effective in lessons?
- What are the most effective ways of using digital technologies in lessons?
- How digital technologies are used at school?

- What are examples of digital technologies for education?
- Is “digital” the same as “technological”?

A 1.2. Making a summarizing report “Digital literacy” (group work)
Brief instruction

- Analyze information about digital competence given in the lectures and spend 5-10 minutes searching for the topic in the web.
- Write a summarizing report (1-2 paragraphs) about digital literacy standards and principles that ensure improvement of citizens' digital competence in modern society.
- Please say if this is the first time you see the term “Digital competence” or you have heard it before. How did your understanding of digital competence change after exploring it?
- This is “A single simple discussion” forum so it consists of a single theme. Each course participant only has to reply with one message.

Tasks for independent work

Search for additional information on the topic on the Internet.

- Search and analyze information about the definition of the term “digital technologies”.
- Critically analyze the proposed paradigms of digital education, suggest your own solutions:
- find the latest posts on Twitter about current trends, opportunities and risks of using digital learning.
- conduct an independent assessment of digital competences using the tool (https://digital-competence.eu/)

Do additional independent studying and processing of documents.

- Pay attention not only to the Council Recommendation of 22 May 2018 on key competences for lifelong learning, but also to the working documents of this group COMMISSION STAFF WORKING DOCUMENT Accompanying the document Proposal for a COUNCIL RECOMMENDATION on Key Competences for LifeLong Learning SWD / 2018/014 final - 2018/08 (NLE).
- Also, the UNESCO ICT Competency Framework for Teachers, Digital Education Action Plan (https://ec.europa.eu/education/education-in-the-eu/digital-education-action-plan_en) may be of interest for learning.

It is important to search for documents that were released after the publication of the manual; use keywords, search systems.
Create additional summaries of answers to the following questions:

- The concept of digital learning and its theoretical justification.
- Principles of digital learning.
- Main approaches to the organization of digital learning.

It is recommended to consider the role of web-technologies in the educational process, educational blogs and resources for the effective learning and teaching process, learning management systems and teaching strategies by the leading pedagogical methods.
It is also recommended to familiarize with the SELFIE system (Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies); if possible, assess the level of use of digital technologies in any educational institution.
The following topics deserve special attention:
Inclusion.
Digital technologies in education as modern methods of blended learning for people with special needs also.

Methodological materials and instructions

During this topic attention should be paid to the independent search for information on the subject. It is also recommended to investigate the scale of effectiveness of digital technology usage in the educational institution (digiplex approach), SAMR levels of technology use, etc.

Topic 1.2 Methodology of digital learning organization

Aims and expected learning outcomes

Aims:
Generalize knowledge about the creation of digital content, knowledge about supporting students in digital learning and available digital tools. Formation of future teachers' competences in the use of technology for evaluating students' achievements in digital learning.

Expected learning outcomes

- After finishing the topic students should know:
- basic technologies for creating digital content (LO 2.1, LO 2.2) - competences PC-3, PC-6, GC-7 are formed;
- basic methods of supporting students in digital learning, create recommendations for support (LO 1.2, LO 2.2) - competences PC-3, PC-7 are formed;
- main groups of digital tools and an idea of how to work with them (LO 2.1; LO 2.2; LO 3.1).
- After finishing the topic students should understand the features of evaluating student achievements in digital learning, have skills to choose the optimal assessment methodology (LO 3.1; LO 3.2) and be able to structure the basic methods of using digital technologies in STEAM education (LO 3.3). The following competences are formed: PC-6, PC-7.

Criteria and forms for evaluating learning outcomes on the topic

Form of evaluation – check of the completed tasks of practical classes.

Evaluation criteria:

- knowledge of different approaches and methodologies for creating digital content;
- ability to perform modeling and planning of digital learning;
- knowledge of basic digital tools for digital learning;
- knowledge of the support and facilitation features in digital learning;
- ability to formulate criteria and organize assessment in digital learning;
- knowledge of the basic theoretical principles of STEAM.

Levels: excellent, satisfactory, bare minimum.

Excellent:

- student demonstrates a high level of understanding the theoretical principles and approaches to modeling and planning of digital learning and finds ways to effectively implement them in educational practice;
- plans the activity for teachers and students using all known activities;
- knows and understands pedagogical features of digital tools;

- the pedagogical scenario of the digital course developed by the student contains opportunities for facilitation;
- the criteria and assessment tools developed by the student meet all the requirements and expected learning outcomes;
- performs the tasks of practical classes with high quality.

Satisfactory:

- student demonstrates an average level of understanding the theoretical principles and approaches to modeling and planning of digital learning;
- plans the activity for teachers and students using significant number of activities;
- the pedagogical scenario of the digital course developed by the student meets the basic requirements;
- the criteria and assessment tools developed by the student meet most of the requirements and expected learning outcomes;
- performs the tasks of practical classes on time.

Bare minimum:

- student demonstrates an average level of understanding the theoretical principles and approaches to modeling and planning of digital learning;
- plans the activity for teachers and students using a minimum set of activities;
- criteria and assessment tools developed by student meet the most of the requirements;
- performs almost all the tasks.

Digital tools

During the topic LMS Moodle, Google Docs, Skype are used.

Innovative learning technologies

Comparative analysis of different methods of student support in digital learning. Creative activity. Group learning activities, online communication between groups, computer information technology. Contextual learning.

Lectures 1.5, 1.6, 1.7, 1.8, 1.9

Lecture 1.5.
Topic: Technology of creating digital content**.**
Aim
Learn the basics of pedagogical design of digital courses, review the technologies of creating educational videos, screencasts, data visualization with use of infographics.
Lecture plan (2 hours)

1. Basics of pedagogical design of digital course.
2. Expected learning outcomes and competences formed in a digital course.
3. Creating educational videos.
4. Creating screencasts.
5. Data visualization with use of infographics.

Lecture 1.6.
Topic: Methodology of supporting students in digital learning.
Aims:
Form knowledge about facilitation and support of students in digital learning.
Lecture plan (2 hours)

1. Effective student support in digital learning.
2. Facilitation.

Lecture 1.7.
Topic: Use of digital tools.
Aims:
Give information about the use of certain types of digital tools, as wellPrezi, Moovy, Go-Lab, Graasp, Adobe Captive, Kahoot!
Lecture plan (2 hours)

1. Digital tools in e-learning.
2. Creating presentations with Prezi.
3. Creating video content with Moovy.
4. Go-Lab and Graasp.
5. 3D modeling tools.
6. Creating simple courses with Adobe Captivate.
7. Creating tests with Kahoot!

Lecture 1.8.
Topic: Methodology of evaluating students' learning achievements in digital learning.
Aims:
Give information about the methods of evaluating students' achievements in digital learning. Form assessment skills in digital learning with use of rubrics.
Lecture plan (2 hours)

1. Assessment in education.
2. Feedback in assessment.
3. Rubrics in the assessment process.

Lecture 1.9.
Topic: Digital technologies in STEAM education.
Aims:
Form students' knowledge about STEAM education, demonstrate the current state of STEAM education in Ukraine, develop students' skills of using the STEAM approach.
Lecture plan (2 hours)

1. Paradigms of STEAM education.
2. Implementation of STEAM in school education.

Practical classes P 1.2, P 1.3, P 1.4

Practical 1.2 Development of pedagogical scenario of digital content
Brief instruction

- Now after you finished the lecture, try to create a course scenario taking into account that digital technologies are involved in its realization. Describe approaches for digital content presentation that you decided to use in the course.
- Write your scenario with argumentation in a text document. Archive the file in .zip format and upload it here.
- Evaluation criteria are the same for all practical classes.

Practical 1.3 Design of rubrics for criteria. Design of computer test scenario.
Brief instruction
1. Create a set of rubrics for a simple digital course in a spreadsheet.
2. Create a test scenario for the chosen subject or topic which can be completed by students. Every question in the test should have an evaluation

score assigned to it. Pay attention to rubrics when you create the test: the questions content and difficulty should be aligned with criteria that you expect to evaluate.
Note: you do not need to integrate the test into a digital environment, your goal is to develop the sequence in a text document.
Send the result of your work in a text document archived in .zip format.

Practical 1.4 Developing a STEAM lesson scenario.
Brief instruction

- Develop a scenario for a single school lesson of STEAM topic and present it the way you find convenient (it can be text document, web-page, presentation, graphics etc.).
-
- How each of STEAM components is applied in it? Justify the usage of these components in your lesson and point out it in the scenario.
- Send the result of your work in a .zip archive.

Topics of individual and / or group tasks

A 1.3. Group discussion "Organization of support in digital learning"
Brief instruction
Suggest a set of recommendations that you think are necessary to ensure effective support in a digital course. Try to address problems that exist in modern education when it comes to use of digital technologies in teaching. Post your thoughts in the forum and discuss this issue with other learners.

A 1.4. Group discussion "Digital tools in course development"
Brief instruction
Share your opinion about the use of digital tools in a course. Which of the tools described in the lectures you have discovered for yourself? Are there any tools that you already use in your work?
As a summary, post your list of existing digital tools that you recommend to use in a digital course. Briefly describe the purpose and features of each (1-3 sentences).
If you have any other suggestions or questions, feel free to express them in this forum.

Tasks for independent work

Create summaries of answers to the following questions:
Digital content and its role in digital learning.
Main technologies of creating digital content.
It is necessary to pay attention to web-searching for the information about new technologies of creation of digital content.
Looking for the information in the sources and creating a summary of answers to questions:
The concept of student support.
Features of the organization of student support in the conditions of digital learning.
While learning the topic attention should be paid to the work of the ISTE (The international society of technology in education), in particular NETS (National Education Technology Standard) for students (https://www.iste.org/standards/for-students).
Pay attention to the following digital tools: tools for creating a website or blog; tools for shortening hyperlinks; tools for creating scribing; tools for creating educational materials; QR codes; survey and testing tools, etc.
It is recommended to explore: https://kahoot.com/ - one of the most exciting services for students; https://www.plickers.com/ - an online service that does not require students to use a phone or a computer. https://quizizz.com/ - a handy tool for creating quizzes.
It is also recommended to read Scientix (a european community for science and mathematics teachers) and European Schoolnet (a network that includes representatives of the Ministries of Education of 34 European countries). A particularly useful project catalog is http://www.scientix.eu/projects.
It is advised to analyze the suitability of using https://www.golabz.eu/ for a STEAM lesson.

2.2. MODULE 2. APPLICATION OF DIGITAL TECHNOLOGIES IN EDUCATIONAL PROCESS

2.2.1. Topic 2.1 Basics of pedagogical design of a digital course

Aims and expected learning outcomes

Aims:
Formation of future teachers' competences that are necessary to ensure the quality of digital learning required for the implementation of digital content and the formation and enhancement of competences required to work with LMS.
Expected learning outcomes:
Ability to create learning content for digital learning at school (LO 3.2) taking into account the need to ensure the quality of digital learning.
Understanding of the theoretical rationale for planning and organizing the learning process using digital technologies (LO 1.2).
Ability to create educational digital content (LO 2.1).
The following competences are formed: PC-3, PC-6.

Criteria and forms for evaluating learning outcomes on the topic

Form of evaluation – check of the completed tasks of practical and laboratory classes.
Evaluation criteria:

- knowledge of the main features of LMS for the organization of digital learning;
- ability to implement learning content in LMS;
- alignment of the course's learning content to the quality requirements.

Levels: excellent, satisfactory, bare minimum.
Levels:
Excellent:

- student demonstrates a high level of understanding of the theoretical principles and approaches to the creation of digital

content in LMS and finds ways to effectively implement them in educational practice;
- implements the digital course in LMS using all known activities;
- use of digital tools by the student is based on an understanding of their pedagogical features;
- educational content developed by the student contains adapted recommendations for the organization of students' educational activities and opportunities for facilitation;
- criteria and assessment tools developed by the student meets all of the requirements and expected learning outcomes;
- all the tasks are completed with high quality.

Satisfactory:
- student demonstrates an average level of understanding of the theoretical principles and approaches to the creation of digital content in LMS;
- implements the digital course in LMS using most known activities;
- educational content developed by the student contains recommendations for the organization of students' educational activities;
- criteria and assessment tools developed by the student meets most of the requirements and expected learning outcomes;
- all the tasks are completed.

bare minimum:
- student demonstrates an average level of understanding of the theoretical principles and approaches to the creation of digital content in LMS;
- implements the digital course in LMS using minimum set of activities;
- the criteria and assessment tools developed by the student are aligned with most of the requirements;
- almost all tasks are completed.

Digital tools

During the topic LMS Moodle is used.

Innovative learning technologies

contextual learning

Practical class P 2.1

Practical 2.1 Development of requirements for digital learning.
Brief instruction
Is it possible to ensure high quality of digital learning? Can it be practiced similarly to the traditional learning model or is it too different? Express your opinion and suggest a set of methods and requirements for ensuring the quality of learning in a digital environment. Write them in a text document and send it in a .zip archive.

Laboratory works L 2.1, L 2.2, L 2.3

Laboratory work 2.1 Setting up the course
Brief instruction
Your first task before you start working with course elements is to explore different course settings. Please go to the course settings and do the following:
1. Choose any topic for the training course and give it a name (instead of default one).
2. Set the start date of the course to 01 September current year.
3. Change course display format from weeks to topics.
Send the link to the course here.

Laboratory work 2.2 Creating course prototype
Brief instruction
After you have done the first step (course set up), try to figure out how the course will look like and what structure it will have. Do the following:
1. Develop a simple course prototype (i.e. visualization of how your course would be presented in Moodle). Present it in a text document (in written or graphical form, as you like).
2. Now go to the digital course in Moodle and give each week a name (it should match with appropriate course topics).
3. Write a short description for each week (1-2 sentences is enough). It should be done in the digital course either as “Label” element or in each topic's settings (as a description).
Send an archived document with course prototype and link to the digital course.

Laboratory work 2.3 Adding elements to the course
Brief instruction
Your next task is to explore different elements that exist in Moodle.
1. Create a Page module and fill it with some theoretical information.
2. Create a Lesson module (2-3 pages), using text and visual materials. Create a task at the end of the lesson.
3. Create an Assignment activity and add a practical task there.
4. Create a Workshop module, set up it and add a practical task for peer-review.
5. Create a Quiz with 5-10 questions (try out different question types).
After you finish send a link to the results. There are no strict requirements for content you use in modules, your main goal for now is to learn how these elements work in a Moodle course.

Tasks for independent work

During the learning of this topic, it is recommended to pay attention to the system of quality assurance of educational activities and quality of higher education system of internal and external quality assurance and consider which of the systems can be used at school.
Also pay attention to the differences in planning when digital technologies are used in the learning process (compared to the standard approach).
It is recommended to focus on Moodle and compare it to other LMSs.

2.2.2. Topic 2.2 Development of the digital course in a team

Aims and expected learning outcomes

Aims:
Formation of future teachers' competences necessary for the presentation of theoretical material in a digital course and for the formation of students' practical skills in digital learning.
Intensify skills in course planning and using tools of personal communication.
Expected learning outcomes:

- The ability to create educational digital content (LO 2.1).
- The following competences are formed: GC-6, PC-3.
- Ability to create methodological materials for digital learning at school (LO 3.2). The following competences are formed: PC-3, PC-6.

Criteria and forms for evaluating learning outcomes on the topic

Form of evaluation – check of the completed tasks of the project, practical and laboratory classes.

Evaluation criteria:

- ability to design a digital course in a team;
- ability to organize and support digital learning in real conditions;
- ability to evaluate a digital course and find ways to improve its quality.

Levels: excellent, satisfactory, bare minimum.

Levels:

excellent:

- student performed the project task in the team as a leader and with high quality;
- the developed course meets all quality requirements;
- organizes support of a digital course in real conditions using all facilitation features;
- demonstrates a high level of the skills of evaluating a digital course and points out ways to improve it.

satisfactory:

- student performed the project task in the team with high quality;
- the developed course meets most of quality requirements;
- organizes support of a digital course in real conditions using most of facilitation features;
- demonstrates skills of evaluating a digital course.

bare minimum:

- student performed the project task only as a performer;
- the developed course in general meets quality requirements;
- organizes the support of the digital course in real conditions using most of the facilitation opportunities;

- student demonstrates the basic skills of evaluation of a digital course.

Digital tools

During the topic LMS Moodle is used.

Innovative learning technologies

flipped learning

Practical classes P 2.2, P 2.3, P 2.4, P 2.5

Practical 2.2 Creating the syllabus for the team course
Brief instruction

- The first stage of your team work is course planning.
- Designing the curriculum is the task you've done in previous weeks individually.
- After you choose the subject for the course, start your collaborative work on the curriculum sticking to requirements set for this kind of work.
- When the work is done, one person from your team should send a text document (in a .zip archive) with the curriculum.

We also ask all team members to share their impressions in the forum.

Practical 2.3-2.4 Designing theoretical material for the course
Brief instruction

Now that you have already planned your course carefully, proceed to the next stage of your work - write theoretical information for the course. Decide what kind of work will be done by each member of your team (information search, writing, editing etc.).
After you finish, one person from your team should send a link to the course in this assignment.

Practical 2.5 Development of scenarios of practical classes for the course
Brief instruction

Practical activities (whether they happen in a virtual environment or not) should be represented in a digital course just as theoretical materials.

However, before actually integrating them to the course your team should perform some work that involves careful development with detailed schedule planning, content design and aligning activities to expected learning outcomes.
Make a detailed spreadsheet that demonstrates content of practical activities and how each of them will be implemented in the team course. One member of your team should send the document with a sheet in a .zip archive when you finish the development process.

Laboratory works L 2.4, L 2.5, L 2.6

Laboratory work 2.4 Presentation of planning in the course.
Brief instruction
Now that you have carefully planned your course, explore how to present your syllabus in a Moodle project.
For a check provide a link to the course with the course schedule displayed.
Laboratory work 2.5 Presentation of learning content in the course.
Brief instruction
After collecting and adding theoretical materials to the course, it is important to present it in such a way that the student can process this information and work with it to achieve the expected learning outcomes set by the teacher.
Improve the lectures so that they become the main components of learning that could lead the topic and set clear goals for the students. If necessary, refer to the recommended template. When you're done, send a link to your course (only one team member is required to do it).
We also ask each team member to share their comments and impressions of the work done at this week's forum.
Laboratory work 2.6 Implementation of practical classes in the course
Brief instruction.
After you have finished developing content of practical activities, integrate it in digital format to your team course so that these activities could be viewed and performed by the students. Also provide a way for the teacher to rate these practical tasks.
One of your team members should send the link to the team course when the work is done.

Tasks for independent work

During the learning attention should be paid to LMS Moodle and the main elements for the presentation of theoretical material in it.

2.2.3. Topic 2.3 Support of a digital course

Aims and expected learning outcomes:

Aims:
Formation of future teachers' competences necessary to organize student support in digital learning and improve courses; formation of teachers' competences necessary for the organization of assessment of students' learning outcomes in digital learning.
Expected learning outcomes - skills of using digital tools in the learning process (LO 2.2). The following competences are formed: PC-3, GC-6.
Ability to assess students' digital learning achievements (LO 3.1). Competency PC-7 is formed.

Criteria and forms for evaluating learning outcomes on the topic

Form of evaluation – check of the completed tasks of the project, practical and laboratory classes.
Evaluation criteria:

- ability to organize additional communication in a digital course;
- ability to correct own mistakes when developing a course;
- ability to evaluate a digital course and find ways to improve its quality.

Levels: excellent, satisfactory, bare minimum.
Levels:
excellent:

- means of communication implemented in the course have a high level of quality;
- student demonstrates the maximum skills to take into account the feedback for improving the digital course;
- student demonstrates a high level of the skills of continuous evaluation of the digital course and indicates ways to improve it.

satisfactory:

- means of communication implemented in the course have an average level of quality;
- student demonstrates the skills to take into account the feedback for improving the digital course
- student demonstrates the skills of continuous evaluation of the digital course.

bare minimum:

- means of communication implemented in the course have a minimum level of quality;
- student demonstrates the basic skills of continuous evaluation of the digital course.

Digital tools

During the learning of the topic LMS Moodle is used.

Innovative learning technologies

Flipped Learning

Practical classes P 2.6, P 2.7, P 2.8

Practical 2.6 Development of scenarios for consultations, chats and other communication features

Brief instruction

Support activities (whether they are in a virtual environment or not) should also be presented in a digital course. However, before you can actually integrate them into the course, your team needs to do some work that involves a thorough review of the theoretical information regarding the development of consultation and communication scenarios.

When you have completed the development process, one member of your team should submit a document with a link to the .zip archive.

Practical 2.7 Considering the methods of improving the course

Brief instruction

- Any activity in the digital course can be optimized and improved.
- Before the practical work you need to learn theoretical information about methods and practices for improving courses.
- Discuss all aspects of the course with the team, develop an improvement strategy, make a plan for improvement.

When you have completed the development process, one member of your team should submit the final document with a link to the .zip archive.

Practical 2.8 Development of evaluation criteria

Brief instruction

- Learn theoretical information on the development of criteria.

- Develop evaluation criteria for the team course and submit them as rubrics.

When you have completed the development process, one member of your team must submit the final document with a link to the .zip archive.

Laboratory works L 2.7, L 2.8, L 2.9

Laboratory 2.7 Creating support components in the course
Brief instruction

- 1. Create Forum and Chat elements in the team course.
- 2. Create a Wiki component and develop it, adding information that would be helpful for students of your discipline.
- Justify use of each element you added (describe their purpose and functions).

Send a link to the course and provide commentary after you finish.

Laboratory 2.8 Improving course content
Brief instruction

- Improve your course taking into consideration the result of self-analysis done previously and feedback received from the other team.
- One member of your team should send a link to the team course.

Laboratory 2.9 Methods of assessment in the course
Brief instruction

- Add assessment components to the course.
- .Your team should provide a detailed explanation on how the assessment works and what criteria you use when evaluating students' progress (based on methods and instruments you've used in your project).
- When the work is done, one member of your team should send a link to the course with a report you've done together.

Tasks for independent work

Preparation for the classes. It's important to pay attention to search for information about new tools for questioning and testing. Compare them with well-known tools.

TASKS FOR SUMMATIVE ASSESSMENT

List of questions for summative assessment

1. Philosophy of digital technologies and their place in the system of higher education: opportunities and risks.
2. European and Ukrainian regulatory documents, standards on digital competence of teachers.
3. Modern idea of digital literacy of the student, stages and methods of its formation.
4. Digital learning: theoretical substantiation, principles of digital learning and different approaches to its organization.
5. Technology of creating digital content.
6. Methods of supporting students in digital learning.
7. Teacher's use of digital tools.
8. Methods for assessing students' achievements in digital learning.
9. Digital technologies in STEAM education.
10. Ensuring the quality of digital learning.
11. Digital content planning (digital course).
12. Basics of working with LMS.
13. Presentation of theoretical material in a digital course.
14. Methodical aspects of adaptation of digital content.
15. Formation of practical skills in digital learning.
16. Organization of student support in digital learning.
17. Active techniques in digital learning.
18. Organization of the assessment of learning outcomes.

The order of carrying out the final assessment.

The final assessment takes place according to the semester accumulation system.
The total score in points is translated according to the appropriate rating scale into HEI and ECTS scores.

LIST OF RECOMMENDED LITERATURE

Main

1. DigComp 2.0, URL: https://ec.europa.eu/jrc/en/digcomp/digital-competence-framework
2. DigComp 2.1 URL: https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/digcomp-21-digital-competence-framework-citizens-eight-proficiency-levels-and-examples-use
3. European commission. Proposal for a Council Recommendation on Key Competences for Lifelong Learning. Brussels, 17.1.2018. URL: https://ec.europa.eu/education/sites/education/files/recommendation-key-competences-lifelong-learning.pdf)
4. Кухаренко, В. М., О. В. Рибалко, and Н. Г. Сиротенко. "Дистанційне навчання: Умови застосування. Дистанційний курс: Навчальний посібник." Харків: НТУ" ХШ"," Торсінг (2002).
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6. Цифрова адженда України – 2020. Концептуальні засади (проект). URL: https://ucci.org.ua/uploads/files/58e78ee3c3922.pdf

Additional

1. C. W. Nam, “The effects of digital storytelling on student achievement, social presence, and attitude in online collaborative learning environments,” Interactive Learning Environments, vol. 25, no. 3, pp. 412-427, 28 Jan 2016
2. C. M. Dooley, T. L. Ellison, M. M. Welch, M. Allen and D. Bauer, “Digital Participatory Pedagogy: Digital Participation as a Method for Technology Integration in Curriculum,” Journal of Digital Learning in Teacher Education, vol. 32, no. 2, pp. 52-62, 2016.
3. Cruz, Rui & Sousa, Maria & Martins, J. Miguel. (2017). DIGITAL LEARNING METHODOLOGIES AND TOOLS – A LITERATURE REVIEW. 10.21125/edulearn.2017.2158.
4. E. Masterman, “Bringing Open Education Practice to a Research-intensive University: Prospects and Challenges.,” Electronic Journal of e-Learning, vol. 14, no. 1, pp. 31-42, 2016
5. H. Xu, “Faculty use of a learning object repository in higher education,” Journal of Information and Knowledge Management System, vol. 46, no. 4, pp. 469-478, 2016.
6. M. A. Camilleri and A. C. Camilleri, “Digital Learning Resources and Ubiquitous Technologies in Education,” Tech Know Learn, pp. 65-82, 8 June 2016.

7. Morze, Nataliia V., and Olena H. Hlazunova. "Моделі ефективного використання інформаційно-комунікаційних та дистанційних технологій навчання у вищому навчальному закладі." Інформаційні технології і засоби навчання 6.2 (2008).
8. S. Alhajri, “The Effectiveness of Teaching Method Used in Graphic Design Pedagogy,” Universal Journal of Educational Research, vol. 4, no. 2, pp. 422-425, 2016.
9. T. R. Liyanagunawardena, K. Lundgvist and S. A. Williams, “Who are with us: MOOC learners on a Future Learn course,” British Journal of Educational Technology, vol. 46, no. 3, pp. 557-569, 2015.