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MoPED: Modernization of Pedagogical Higher Education by Innovative Teaching Instruments
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HANDBOOK

TITLE OF THE COURSE: *Innovative methods, technologies and monitoring of quality of e-learning*
SPECIALITY «*013 Primary Education*», Specialization *«Management of e-learning in the Intercultural Space»*,
HIGHER EDUCATION DEGREE: *Master's level*

Developers: Nataliia Morze – Doctor of Pedagogical Sciences, Professor, Viktoriia Vember – PhD in Pedagogy, Associate Professor
Higher Education Institution: Borys Grinchenko Kyiv University
Faculty of Information Technology and Management

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Brief summary of the course: Within the course students will get acquainted with educational trends and modern innovative methods and pedagogical technologies, in particular with the features of integrated learning technologies, mobile learning, making, storytelling, PBL (project learning), problem-oriented learning, blended learning. Learning), inverted classroom (Flipped Classroom), research and cognitive learning (Inquiry Based Learning), Microlearning, BYOD - technologies for using your own gadgets, collaboration technology, virtual, mixed and augmented reality, the use of electronic learning game environments, the formation of critical thinking, formation media literacy, etc. and means for the preparation of materials for the implementation of these technologies. Students will learn to design students' learning activities in accordance with the educational goals formulated by SMART technology, taking into account the cognitive learning styles of students. Within the discipline students will get acquainted with assessment strategies using e-learning, including technologies of formative and peer assessment, features of monitoring the quality of assessment, learn to assess the formation of subject and life competencies of younger students. Training is based on research, practice-oriented and competency-based approaches, involves the formation of digital and life competencies.

Key words: Innovative technologies, educational trends, Blended Learning, Flipped Classroom, Microlearning, Inquiry Based Learning, formative assessment, peer assessment, storytelling, Microlearning

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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:

ECTS credits – 6,0

Content modules – 6, 3 of them in the 1st semester, 3 of them in the 2nd semester.

Total number of hours: 180, including 6 lecture hours, 6 hours of practical classes, 12 hours of laboratory classes, 156 hours – individual work of the students.

1.2. Characteristics of the discipline by form of study.

Form of study - external study mode

1.3. Discipline status.

Required

1.4. Prerequisites for studying the discipline.

Missing

1.5. Year of preparation, semester.

Year of preparation - 1, Semesters 1,2

1.6. Form of final control.

Test.

1.7. Learning language.

Ukrainian

1.8. Internet address of the permanent placement of educational content of the course. https://elearning.kubg.edu.ua/course/view.php?id=20052 (guest access with moped password)

1.9. Developer (s).

Nataliia Morze – Professor of Department of Computer Science and Mathematics of the Faculty of Information Technology and Management of Borys Grinchenko Kyiv University, Doctor of Pedagogical Sciences, Professor.
Viktoriia Vember – PhD in Pedagogy, Assosiate Professor of Department of Computer Science and Mathematics of the Faculty of Information Technology and Management.

1.10. Aims of the course.

The aims of the course is – is to ensure the ability of future primary school teachers to use innovative pedagogical technologies to provide quality education using e-learning; introduction of pedagogical innovations, dissemination of the best European and world pedagogical practices, introduction of monitoring results of educational activity of elementary school pupils on the basis of use of the electronic educational environment and e-learning.

The task is to form theoretical knowledge and practical skills in the field of application of innovative pedagogical technologies, monitoring the quality of e-learning and the acquisition of general and professional competencies listed below.

1.11. Program competencies that are formed in the process of studying the discipline.

Integral Competence (IC)	The ability to solve complex problems in the field of primary education and/or research and innovation, which involves a deep rethinking of existing and the creation of new holistic knowledge and/or professional practice
General Competences (GC)	**GC-2**. Ability to generate new ideas **GK-3**. Ability to work in a team **GK-4.** Ability to search and analyze information from various sources
Professional Competencies (PC)	**PC-3.** Ability to provide methodological support for educational activities in primary school **PC-4.** Ability to organize the educational process in primary school using modern, scientifically sound, traditional and innovative tools, methods, techniques, technologies **PC-5.** Ability to carry out monitoring activities in the management of primary school
Professional competencies in additional specialization (PCS)	**PCS-1.3.** Ability to solve problems in educational and professional activities with the help of computer technology

1.12. Learning outcomes of the discipline.

Program learning outcomes:

1. **PLO 1.** Act socially responsibly, implement educational reforms
2. **PLO -4.** To monitor and systematically control the quality of the educational process and the objectivity of evaluating the results of educational training of students, the work of clubs and optional courses
3. **PLO 6.** To provide assistance to teachers in mastering modern educational and alternative pedagogical technologies and methods of primary education
4. **PLO 7.** To manage the technology to organize the educational process in primary school
5.**PLO-19.** To carry out organizational and methodological activities for the organization of e-learning, use modern digital tools and resources to support the educational process; to organize training of students and advanced training of teachers with the use of modern educational and IC technologies; monitor and evaluate the quality of e-learning.

1.13. Control of students' academic achievements.

Means of diagnosing learning outcomes (current and final assessment)	Assessment for each content module includes points for the results of student learning in practical and laboratory classes, as well as during individual work.

Final assessment	Final assessment in the form of a test is carried out according to the assessment of the obtained learning outcomes of students during the course and has the following weights: Module 1 - 15 points (1 ECTS credit) Module 2 - 20 points (1 ECTS credit) Module 3 - 15 points (1 ECTS credit) Module 4 - 20 points (1 ECTS credit) Module 5 - 15 points (1 ECTS credit) Module 6 - 15 points (1 ECTS credit) Total: 100 points
Communication and feedback	Marks and comments will be displayed in the MOODLE rating log. The "MOODLE" Forum resource for questions and answers allows participants to have asynchronous discussions. The messenger of the MOODLE system will allow to realize instant communication with students. The use of corporate mail of each teacher and student provides an additional opportunity for communication.
Mark On The Scale Of The Institution Of Higher Educational	**Score — Rating Value — Evaluation Value** **90 – 100 — A — excellent** **80 – 89 — B — very good** **70 – 79 — C — good** **60 – 69 — D — satisfactory** **50 – 59 — E — satisfactory** **26 – 49 — FX — unsatisfactory with the possibility of re-assessment** **0-25 — F — unsatisfactorily with compulsory repeated study of the course**

2. CONTENT AND STRUCTURE OF THE COURSE

2.1. Module 1. Digital transformation of the education

2.1.1. Topic 1. Digital transformation of education. Educational trends, innovative methods and technologies in education

2.1.2. Aims and expected learning outcomes.

Aims: to acquaint future primary school teachers with the features of digital transformation of education, to analyze educational trends, innovative pedagogical methods and technologies to ensure quality education using e-learning; develop skills in the use of ICT for information retrieval and processing, as well as for communication in the learning process.

Learning Outcomes:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-

2) development of skills of search, processing and analysis of information from various sources (GC-4)

3) preparation of future teachers for the organization of the educational process in primary school with the use of modern, scientifically sound, traditional and innovative tools, methods, techniques, technologies (PC-4)

4) training of future teachers to act socially responsibly, to implement educational reforms (PLO-1)

5) the formation of students' ability to master the technology of organizing the educational process in primary school (PLO-7)

2.1.3. Criteria and forms of evaluation of learning outcomes on the topic.

Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle, virtual boards, services for creating knowledge maps;
- *peer evaluation* of the results of practical work according to the criteria provided by the teacher;
- *availability of a certificate and progress* of the MOOC course when performing independent work;
- *final assessment* by the teacher based on the results of the tasks.

The total maximum result for the content module is 15%, or 15 points, in particular the following intermediate points for the activities within the module with the subsequent introduction of the coefficient (coefficient 15/36):

Type of task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Lecture №1	1	Ability to carry out a deep rethinking of existing and creation of new holistic knowledge and/or professional practice	1 point - the presence and active work of the student at the lecture
Practical lesson №1	10	Ability to work in a team	*High level* - the student shows leadership skills in

			communication with team members, takes an active part in the tasks *Intermediate level* - the student is ready to cooperate and communicate with team members, performs some tasks *Low level* - the student needs motivation from other team members, performs a small number of tasks
		Ability to search the Internet and summarize the search results of information about innovative methods and technologies that meet educational trends	*High level* - the student quickly finds relevant information on the Internet, planned a common knowledge map containing 7-10 innovative methods and technologies *Intermediate level* - the student does not quickly find relevant information on the Internet, planned a common knowledge map containing 4-6 innovative methods and technologies *Low level* - the student slowly finds relevant information on the Internet, planned a common knowledge map containing 1-3 innovative methods and technologies
		Ability to use ICT to present created knowledge maps, information exchange and discussion	*High level* - the student participates significantly in the creation of a collective knowledge map, publishes the created knowledge map from his group on a common virtual board; comments on the virtual board knowledge maps created by other groups *Intermediate level* - the student is taking part in creating a collective knowledge map; comments on the virtual board knowledge maps created by other groups *Low level* - the student is insufficiently involved in creating a collective knowledge map; does not comment on knowledge boards created by

			other groups on the virtual board

Individual work №1	20	Ability to organize the introduction of innovative technologies in the educational process of secondary education	*High level* - the presence of a certificate of completion of the relevant MOOC, the progress of the course in the range from 90% to 100% *Intermediate level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 75% to 89% *Low level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 61% to 74%
Individual work №2	5	Ability to monitor and systematically control the quality of the educational process and the objectivity of assessing the results of educational training of students	4-5 points - performed an objective peer review of the work of all these students, according to the criteria provided by the teacher, provided justification for these assessments 1-3 points - performed an objective peer review of students' work, according to the criteria provided by the teacher, depending on the number of evaluated works, but no justification for these assessments

2.1.4. Digital tools.

E-learning course (ENC) on the Moodle platform, virtual boards (including Padlet, Trello, etc.), knowledge mapping services (MindMeister, Bubble.us, etc.), forums in LMS Moodle for communication and formative assessment.

2.1.5. Інноваційні технології навчання.

Групова робота з використанням карт знань, віртуальних дошок; групова робота з визначення цілей навчання за SMART технологією, добір методів та цифрових інструментів навчання за методикою TPACK; навчання за допомогою МВОК; пірінгова взаємодія студентів, зокрема пірінгове оцінювання.

2.1.5. Innovative learning technologies.

Group work with the use of knowledge maps, virtual boards; group work to determine learning goals for SMART technology, selection of methods and digital

learning tools according to the TPACK method; training with the help of MOOC; peer interaction of students, in particular peer evaluation.

2.1.6. Lecture 1.

Topic: The fourth industrial revolution and the digital transformation of education

Aims: to acquaint students with the concept of the fourth industrial revolution and the peculiarities of the digital transformation of education, to form an idea of the four levels of change in pedagogical practice; to analyze modern educational trends, innovative methods and technologies in education and their features; to acquaint with technologies of definition of the purposes of training on SMART technology and selection of methods and digital tools of training on TPACK model.

Lecture plan:

1. The fourth industrial revolution and the digital transformation of education.
2. Four levels of change in pedagogical practice using digital transformation (DT).
3. The concept of educational eco-system. Educational trends, innovative methods and technologies in education.
3.1. STEAM education.
3.2. Competence approach.
3.3. Technologies of inclusive education.
3.3. Practice-oriented learning aimed at specific results.
4. Defining learning goals for SMART technology.
5. Selection of methods and digital teaching tools according to the model Technological, Pedagogical And Content Knowledge (TPACK).

2.1.7. Practical class 1.

Topic. Educational trends, innovative methods and technologies in education

Aim: to analyze modern educational trends, innovative methods and technologies in education and their features; to form students' abilities to work in a team, to generate new ideas; develop the ability to search, process and analyze information from various sources.

Types of student activities:

Work in groups using Internet search, services for creating knowledge maps, virtual boards.

Instructions for students:

1. Students are grouped to study the characteristics of modern educational trends indicated by the teacher. Each group explores one educational trend.

2. To the studied educational trend, group members select appropriate innovative methods and technologies and indicate their features, to do this, create a knowledge map using one of the services to create knowledge maps of their choice.

3. The created map of knowledge is placed by each group on the common virtual board specified by the teacher. Students comment on knowledge maps created by other groups.

2.1.8. Tasks for Individual work of the students.

Individual work №1. Implementation of innovations in schools: taking the course https://courses.prometheus.org.ua/courses/course-v1:MIT+LIIS101+2018T3/about and obtaining a certificate

Independent work №2. Peering evaluation of the performed practical work according to the criteria provided by the teacher.

2.2. Module 2. Innovative pedagogical technologies.

2.2.1. Theme 2. Blended learning

2.2.2. **Aims and expected learning outcomes.**

Aims: to form the concept of blended learning, to form an idea of updating the roles of participants in the learning process, to learn to plan classes on the technology of blended learning, to use different areas of innovative classroom during different stages of the lesson.

Expected results:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-2)

2) development of search skills and analysis of information from various sources (GC-4)

3) preparation of future teachers for the organization of the educational process in primary school with the use of blended learning (PC-4)

4) the formation of students' ability to master the technology of blended learning for the organization of the educational process (PLO-7)

2.2.3. Criteria and forms of evaluation of learning outcomes on the topic.

Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle;
- *peer evaluation* of the results of laboratory work according to the criteria provided by the teacher;
- *final assessment* by the teacher based on the results of the tasks.

The following intermediate points are provided for activities within the topic with the further introduction of the coefficient:

Type of task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Laboratory class №1	10	Ability to work in a team, adhere to the time allotted for tasks at each of the stations of rotation	*High level* - the student takes an active part in team work, generates new ideas, listens to the ideas of others, quickly completes tasks and monitors time *Intermediate level* - the student is ready to cooperate with the team, listens to the ideas of other team members, offers ideas for their improvement, listens to the ideas of others and takes them into account, performs the task at a moderate speed *Low level* - the student needs the motivation of other team members, performs a minimum number of tasks,

			performs tasks slowly
Individual work №3	5	Ability to use digital resources to process the submitted material and digital tools for feedback	*High level* - the student got acquainted with all provided digital materials: videos, presentations, text materials; gave complete and accurate answers to the questions asked in the feedback forum *Intermediate level* - the student got acquainted with most of the provided digital materials: videos, presentations, text materials; gave partial answers to the questions asked in the feedback forum *Low level* - the student got acquainted with some provided digital materials: videos, presentations, text materials; gave inaccurate answers to the questions asked in the feedback forum
		Ability to summarize the processed materials, give their own examples of the use of blended learning technology	*High level* - the student fully and logically teaches generalized materials about different ways of using blended learning technology, gives a successful example of the organization of classes using rotation stations *Intermediate level* - the student partially and with somewhat disturbed logic of teaching provides generalized materials on different ways of using blended learning technology, gives a brief description of his own example of organizing classes using rotation stations *Low level* - the student incompletely and with the broken logic of teaching submits generalized materials about different ways of using blended learning technology, own example of organization of classes with the use of rotation stations is missing
Individual work №4	5	Ability to monitor and systematically control the quality of the educational process and the objectivity of assessing the results of educational	4-5 points - performed an objective peer review of the work of all these students, according to the criteria provided by the teacher, provided justification for these assessments 1-3 points - performed an objective peer review of students' work, according to the criteria provided by

		training of students	the teacher, depending on the number of evaluated works, but no justification for these assessments

2.2.4. Digital tools.

Moodle e-learning course (ENC), training videos, forums in LMS Moodle for communication and formative assessment

2.2.5. Innovative learning technologies.

Work on the technology of the flipped classroom, the use of rotation stations in the process of Face-To-Face stage of the flipped classroom, the organization of group work, peer interaction of students, in particular peer evaluation.

2.2.6. Laboratory class 1.

Topic. Blended learning.

Purpose: to acquaint students with the concept and features of blended learning, to form an idea of updating the roles of participants in the learning process, to teach to plan classes in an innovative classroom using rotation stations, to develop creativity and ability to generate new ideas.

Lesson plan.

I. Pre-Phase.

1. The concept of Blended Learning.
2. Collaborative learning.
3. Updating the roles of participants in the educational process.
4. Classification of organizational forms of blended learning.
5. Features of different models of blended learning.
6. The method of Flipped Learning.

II. Face-to-Face Phase

Performing tasks in groups in the innovation class using rotation stations.

III. Post Phase

Prepare a report on different ways of using blended learning technology, give examples of organizing classes using rotation stations in an innovative classroom.

2.2.7. Tasks for individual students work.

Individual work №3. Execution of Pre-Phase tasks in the process of inverted learning in preparation for laboratory lesson №1 and Post-Phase after its implementation.

Individual work №4. Peering evaluation of the performed laboratory work according to the criteria provided by the teacher.

2.2.8. **Theme 3. Mobile learning**

2.1.9. Aims and expected learning outcomes.

Aims: to form the concept of mobile learning, to acquaint with pedagogical technologies that can be implemented in the framework of mobile learning, to develop media literacy of students, to teach to use tools for the implementation of mobile learning.

Expected outcomes:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-2)
2) development searching skills and analyzing information from various sources (GC-4)
3) preparation of future teachers for the organization of the educational process in primary school with the use of mobile learning (PC-4)
4) training of future teachers to solve problems in educational and professional activities with the help of mobile devices and digital tools for the implementation of mobile learning (PCS-1.3)
5) formation of students' ability to own mobile learning technology for the organization of the educational process (PLO-7)

2.2.10. Criteria and forms of evaluation of learning outcomes on the topic.
Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle, online services that can be used on mobile devices;
- *peer evaluation* of the results of practical work according to the criteria provided by the teacher;
- *availability of a certificate and progress* of the MOOC course when performing independent work;
- *final assessment* by the teacher based on the results of the tasks.

The following intermediate points are provided for activities within the topic with the subsequent introduction of the coefficient:

Type of task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Laboratory class №2	10	Ability to use technologies and tools for the implementation of mobile learning	*High level* - the student is familiar with 3-5 technologies of mobile learning and is able to use them in their own professional activities *Intermediate level* - the student is acquainted with 2-3 technologies of mobile learning, but can be insecure in their own professional activities *Low level* - the student is acquainted with 1-2 technologies of mobile training, but cannot use them in own professional activity
Individual work №5	20	Ability to develop media literacy and use modern mobile devices and digital technologies taking into account the requirements of digital security	*High level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 90% to 100% *Intermediate level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 75% to 89% *Low level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 61%

			to 74%
Individual work №6	5	Ability to monitor and systematically control the quality of the educational process and the objectivity of evaluating the results of educational training of students	4-5 points - performed an objective peer review of the work of all students, according to the criteria provided by the teacher, provided justification for these assessments 1-3 points - performed an objective peer review of students' work, according to the criteria provided by the teacher, depending on the number of evaluated works, but no justification for these assessments

The total maximum result for the content module is 20%, or 20 points (coefficient 20/55).

2.2.11. Digital tools.

E-learning course on the Moodle platform, educational videos, e-learning game environments, online services that can be used on mobile devices, forums in LMS Moodle for communication and formative assessment

2.2.12. Innovative learning technologies.

Work with the electronic interactive panel with use of mobile devices of students, mobile learning, training by means of MOOC; peer interaction of students, in particular peer evaluation.

2.2.13. Laboratory class 2.

Theme. Mobile learning

Aims: to form the concept of mobile learning, to acquaint with pedagogical technologies that can be implemented in mobile learning, to learn to use technologies and tools for the implementation of mobile learning.

Types of student activities:

Work in an innovative classroom with an electronic learning panel using students' mobile devices.

Instructions for students:

1. Get acquainted with the features of mobile learning, technologies that can be implemented in mobile learning: BYOD (Bring Your Own Device) - technology for using your own devices; Microlearning - technologies for using short videos; gamification - learning through play, the use of e-learning game environments.
2. Using your own mobile devices and e-learning panel to perform the task specified by the teacher.

2.2.14. Tasks for students individual work.

Individual work №5. Media literacy for educators: taking the course and obtaining a certificate

https://courses.prometheus.org.ua/courses/course-v1:CZ+MEDIA101+2018T3/about

Individual work №6. Peering evaluation of the performed laboratory work according to the criteria provided by the teacher.

2.3. Module 3. Research and cognitive approach in teaching natural sciences

2.3.1. Theme 4. STEAM-education and ways of its implementation in primary school. Modern technologies for the implementation of research and cognitive approach.

2.3.2. Aims and expected learning outcomes.

Aims: to acquaint students with the features of technologies for the implementation of research and cognitive learning, to form an idea of integrated learning, IBL, PBL technologies, ways to develop entrepreneurial, research and critical thinking, ways to use virtual, mixed and augmented reality technologies.

Expected outcomes:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-2)

2) development searching skills, processing and analysis of information from various sources (GC-4)

3) preparation of future teachers for the organization of the educational process in primary school with the use of technologies for the implementation of research and cognitive approach to teaching science (PC-4)

4) training of future teachers to act socially responsibly, to implement educational reforms (PLO-1)

5) formation of students' ability to own technologies for the implementation of research and cognitive approach to teaching science (PLO-7)

2.3.3. Criteria and forms of evaluation of learning outcomes on the topic.

Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle;
- *peer evaluation* of the results of practical work according to the criteria provided by the teacher;
- *availability of a certificate* and progress of the MOOC course when performing independent work;
- *final assessment* by the teacher based on the results of the tasks.

The following intermediate points are provided for activities within the topic with the subsequent introduction of the coefficient:

Type of task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Lecture №2	1	Ability to carry out a deep rethinking of existing and creation of new holistic knowledge and/or professional practice	1 point - the presence and active work of the student at the lecture
Individual work №7	20	Ability to use modern technologies for the development of critical thinking	*High level* - the presence of a certificate of completion of the relevant MOOC, course progress in the range from 90%

			to 100% *Intermediate level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 75% to 89% *Low level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 61% to 74%

2.3.4. Digital tools.

E-learning course (ENC) on the Moodle platform, educational videos, Go-Lab ecosystem (Go-Lab portal, Graasp environment), Phet.Coorado portal, forums in LMS Moodle for communication and formative assessment

2.3.5. Innovative learning technologies.

Work with the electronic interactive panel, use of virtual laboratories, use of technology of research and cognitive training (IBL); training with the help of MVOK.

2.3.6. Lecture 2.

Theme. STEAM-education and ways of its implementation in primary school. Modern technologies for the implementation of the research approach

Aims: to form students' ideas about learning models based on different educational technologies, to acquaint students with the features of technologies for research and cognitive learning, to form ideas about integrated learning, IBL, PBL technologies, ways to use virtual, mixed and augmented reality technologies; develop critical thinking.

Lecture plan.

1. Fundamentals of STEM education.
2. Features of active learning. Changing the space and methods of educational work.
3. Skills in organizing scientific processes. Development of entrepreneurial and research, critical thinking.
4. Integrated learning.
5. Project method (PBL - Project based learning), problem-oriented learning, research and cognitive learning (IBL - Inquiry Based Learning).
6. Virtual, mixed and augmented reality.

2.3.7. Tasks for individual students work.

Individual work №7. Critical thinking for educators: taking the course and obtaining a certificate.

https://courses.prometheus.org.ua/courses/course-v1:CZ+CTFT101+2017T3/about

2.3.8. Theme 5. Technology of Inquiry Based Learning (IBL)

2.3.9. Aims and expected learning outcomes.

Aims: to form the concept of technology of Inquiry Based Learning (IBL - Inquiry Based Learning), to form an idea of the stages of research that form the research learning cycle, to learn to use digital tools to organize a lesson on Inquiry Based Learning technology (IBL).

Expected outcomes:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-2)

2) development of skills of search, processing and analysis of information from various sources (GC-4)

3) preparation of future teachers for the organization of the educational process in primary school using IBL technology (PC-4)

4) preparation of future teachers to solve problems in educational and professional activities with the help of digital tools for organizing a lesson on the technology of research and cognitive learning (IBL) (PCS-1.3)

5) training of future teachers to act socially responsibly, to implement educational reforms (PLO-1)

6) formation of students' ability to master IBL technology using digital tools to support it in teaching science (PLO-7)

2.3.10. Criteria and forms of evaluation of learning outcomes on the topic.

Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle;
- *peer evaluation* of the results of practical work according to the criteria provided by the teacher;
- *final assessment* by the teacher based on the results of the tasks.

The following intermediate points are provided for activities within the topic with the subsequent introduction of the coefficient:

Type of the task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Laboratory class №3	10	Ability to work in a team	*High level* - the student shows leadership skills in communication with team members, takes an active part in the tasks *Intermediate level* - the student is ready to cooperate and communicate with team members, performs some tasks *Low level* - the student needs motivation from other team

			members, performs a small number of tasks
		Ability to analyze and organize stages to create a research cycle	*High level* - the student quickly and reasonably finds and organizes the relevant stages of the research cycle *Intermediate level* - the student is uncertain in finding and organizing the relevant stages of the research cycle *Low level* - the student can not independently organize the stages of the research cycle, performs tasks only after the arguments of colleagues in the group
		Ability to use ICT for information exchange and discussion	*High level* - the student photographs the created model of the research cycle, publishes from his group photos of the model of the research cycle on a common virtual board; comments on the virtual board models of research cycles created by other groups *Intermediate level* - the student participates mediocrely in the publication on a joint virtual board (or photographs the created model of the research cycle, or publishes from his group photos of the model of the research cycle on a joint virtual board); comments on the virtual board models of research cycles created by other groups *Low level* - the student is insufficiently involved in creating a publication on the virtual board; does not comment on the virtual board models of research cycles created by other groups
Individual work №8	5	Ability to use digital resources to process the submitted material and digital tools for feedback	*High level* - the student got acquainted with all provided digital materials: videos, presentations, text materials; gave complete and accurate answers to the questions asked in the feedback forum *Intermediate level* - the student got acquainted with most of the provided digital materials: videos,

			presentations, text materials; gave partial answers to the questions asked in the feedback forum *Low level* - the student got acquainted with some provided digital materials: videos, presentations, text materials; gave inaccurate answers to the questions asked in the feedback forum
	Ability to create your own research learning spaces (ILS - Inquiry Learning Spaces) and make changes to them	*High level* - the student creates his own research learning space as a duplicate of existing spaces in the GoLab ecosystem, makes design changes to existing applications (Apps) to improve content or structure ILS, complements it with additional applications (Apps) *Intermediate level* - the student creates his / her own research learning space as a duplicate of the available spaces in the GoLab ecosystem, makes constructive changes to the existing applications (Apps) to improve the content or structure of ILS, but does not supplement it with additional applications (Apps) *Low level* - the student creates his own research learning space as a duplicate of the available spaces in the GoLab ecosystem, but does not make any changes to it	
Individual work №9	5	Ability to monitor and systematically control the quality of the	1-3 points - performed an objective peer review of students' work, according to the criteria provided

		educational process and the objectivity of evaluating the results of educational training of students 4-5 points - performed an objective peer review of the work of all students, according to the criteria provided by the teacher, provided justification for these assessments	by the teacher, depending on the number of evaluated works, but no justification for these assessments

The total maximum result for the content module is 15%, or 15 points (coefficient 15/40).

2.3.11. Digital tools.

E-learning course on the Moodle platform, Go-Lab ecosystem (Go-Lab portal, Graasp environment), Phet.Coorado portal, virtual board, LMS Moodle forums for communication and formative assessment

2.3.12. Innovative learning technologies.

Work in groups, pair work, peer evaluation of students; work on the technology of the inverted class, the use of rotation stations in the process of Face-To-Face stage of the inverted class, peer interaction of students, in particular peer evaluation

2.3.14. Laboratory class 3.

Theme. Technology of Inquiry Based Learning (IBL)

Aims: to form the concept of technology of Inquiry Based Learning (IBL - Inquiry Based Learning) and ideas about its features, to form an idea of the stages of research that form the research learning cycle, to learn to use digital tools to organize lessons on Inquiry Based Learning technology (IBL) ; to develop research thinking.

Lesson plan.

I. Pre-Phase.

1. Features of Inquiry Based Learning (IBL - Inquiry Based Learning).
2. Stages of research that form the research training cycle.
3. Different models of the research training cycle.
4. ICT tools for organizing a lesson on the technology of Inquiry Based Learning (IBL).

II. Face-to-Face Phase

1. Group work on the analysis and presentation of its results on a virtual board
2. Pair work on ILS analysis
3. Individual work on creating and making changes to ILS

III. Post Phase

1. Creation of Inquiry learning spaces (ILS - Inquiry Learning Spaces).

2.3.15. Tasks for individual students work.

Individual work №8. Performing Pre-Phase tasks in preparation for laboratory class №3 and Post-Phase in the process of inverted learning.

Individual work №9. Peering evaluation of the performed laboratory work according to the criteria provided by the teacher.

2.4. Module 4. Monitoring and evaluation of e-learning quality

2.4.1. Theme 6. Modern technologies and evaluation methods.

2.4.2. Aims and expected learning outcomes.

Aims: to form an idea of the problem of quality of electronic assessment and technology of assessment of learning outcomes; learn to use modern assessment methods, testing systems, design test tasks; learn to use formative and peer evaluation, in particular with the help of tools for teamwork.

Expected outcomes:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-2)

2) development of searching skills, processing and analysis of information from various sources (GC-4)

3) preparation of future teachers for the organization of the educational process in primary school with the use of modern, scientifically sound, traditional and innovative tools, methods, techniques, assessment technologies (PC-4)

4) formation of the ability to carry out monitoring activities in the management of primary school and assess the quality of e-learning (PC-5, PLO-19)

5) preparation of future teachers to solve problems in educational and professional activities with the help of computer equipment and digital tools for the organization of assessment (PCS-1.3)

6) training of future teachers to act socially responsibly, to implement educational reforms (PLO-1)

7) formation of students' ability to master modern assessment technologies (PLO-7)

2.4.3. Criteria and forms of evaluation of learning outcomes on the topic.

Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle, Google-documents, online services for formative assessment;
- *peer evaluation* of the results of practical work according to the criteria provided by the teacher;
- *availability of a certificate* and progress of the MOOC course, performing individual work;
- *final* assessment by the teacher based on the results of the tasks.

The total maximum result for the content module is 20%, or 20 points, in particular such intermediate points for the types of activities within the module with the subsequent introduction of the coefficient (coefficient 20/55).

Type of task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Lecture №3	1	Ability to carry out a deep rethinking of existing and creation of new	1 point - the presence and active work of the student at the lecture

		holistic knowledge and/or professional practice	
Practical class №2	10	Ability to identify digital tools for the implementation of formative assessment	*High level* - the student provides a detailed description of the features of the use of three digital resources for formative assessment and a reference to the created task for formative assessment using one of the selected resources *Intermediate level* - the student gives a brief description of the features of the use of three digital resources for formative assessment and a link to the created appropriate task for formative assessment using one of the selected resources *Low level* - the student gives a brief description of the features of the use of three digital resources for formative assessment, but the task for formative assessment with one of the selected resources is missing
Laboratory class №4	10	Ability to use the resource Seminar for automation of peer evaluation	*High level* - the system is sent a submission of work in accordance with the task, that meets the evaluation criteria, and evaluated the work of students proposed by the system, evaluations for each criterion are justified *Intermediate level* - a submission of work was sent to the system in accordance with the task, which partially meets the evaluation criteria, and the evaluated works of students proposed by the system, evaluations for each criterion are not substantiated *Low level* - a submission of work was sent to the system in accordance with the task, which partially meets the evaluation criteria, the work of students proposed by the system is not evaluated
Individual work №10	20	Ability to organize the educational process in primary school using modern, scientifically grounded,	*High level* - availability of a certificate of MOOC, course progress in ranging from 90% to 100% *Intermediate level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 75% to 89% *Low level* - availability of a certificate of

		traditional and innovative tools, methods, techniques, technologies, taking into account the concept of "New Ukrainian School"	completion of the relevant MOOC, course progress in the range from 61% to 74%
Individual work №11	5	Ability to monitor and systematically control the quality of the educational process and the objectivity of assessing the results of students educational training	4-5 points - performed an objective peer review of the work of all these students, according to the criteria provided by the teacher, provided justification for these assessments 1-3 points - performed an objective peer review of students' work, according to the criteria provided by the teacher, depending on the number of evaluated works, but no justification for these assessments

2.4.4. Digital tools.

E-learning course on the Moodle platform, Google documents, online services for formative assessment (including LearningApps, AnswerGarden, Kahoot, Mentimeter, etc.), forums in LMS Moodle for communication and formative assessment

2.4.5. Innovative learning technologies.

Group work - performing tasks in joint Google-documents, peer-to-peer interaction with communication through the forum, peer-to-peer evaluation of completed tasks; training with the help of MOOC.

2.4.6. Lecture 3.

Theme. Modern technologies and evaluation methods

Aims: to form an idea of the problem of quality electronic assessment; technology of learning outcomes assessment; to form an idea of quality indicators: educational activity of the teacher, quality of educational materials, conformity of the chosen tools to the set goals and objectives of teaching; learn to use modern assessment methods, testing systems, design test tasks; learn to use formative and peer evaluation.

Plan.

1. The problem of e-learning quality.
2. Development of approaches to quality and quality assessment models.
3. Technologies for assessing learning outcomes.
4. Analysis of criteria for assessing the quality of e-learning.
5. Quality indicators: educational activity of the teacher, quality of educational materials, conformity of the chosen tools to the set purposes and tasks of training.
6. Quality criteria.
7. Evaluation methods. Methods of evaluating the organization of e-learning.

8. Testing systems, use of tests for different types of control, design of test tasks.
9. Validity of knowledge assessment systems.
10. Formative assessment and means of its implementation.
11. Peer interaction and peer evaluation.
12. Use of means of collective work (blogs, wikis, etc.) in the educational process.

2.4.7. Practical class 2.

Theme. Formative assessment and means of its implementation.

Aims: to form the concept of formative assessment and its differences from other types of assessment; analyze formative assessment strategies; to acquaint students with digital tools for formative assessment; learn to perform formative assessment using digital tools.

Types of student activities:

Analysis of formative assessment strategies, digital tools for formative assessment, creation of a task for formative assessment with the help of one of the digital resources of your choice.

Instructions for students:

1. Analyze formative assessment strategies and digital tools for formative assessment in primary school, including LearningApps.org, Google Forms, Kahoot.com, Answergarden.ch, mentimeter.com, onlinetestpad.com, quizlet.com, www.studystack.com and others.
2. Choose three digital resources for formative assessment that you plan to use in your professional activity, explore the features of their use and describe them on the forum. Create a learning task for formative assessment using one of the selected services and post a link to it on the forum.
3. Indicate the names of the three selected digital resources for formative assessment according to the link provided by the teacher.

2.4.8. Laboratory class 4.

Theme. Peer interaction and peer evaluation.

Aims: to form the concept of peer interaction and peer evaluation, to form an idea of the need for teachers to develop clear evaluation criteria for quality peer evaluation, to analyze digital tools to support peer evaluation, to learn to use the resource Workshop in LMS Moodle to automate evaluation.

Types of student activities:

Working with an e-learning course using the Seminar resource and its various stages, including presenting work and evaluating the work of other students.

Instructions for students:

1. Get acquainted with the features of the Seminar resource in LMS Moodle and its capabilities for automating peer evaluation. Identify the actions that the student and teacher can see at each stage of this resource.
2. Analyze digital resources that can be used to organize peer review and prepare a document with the results of the analysis, which is supported by screenshots of resources or examples of the use of these resources.
3. Send the created document at the stage of submission of the Seminar resource.
4. After the transition to the stage of Evaluation of works to evaluate the work provided by the system according to the specified criteria and to substantiate own estimations.

2.4.9. Tasks for individual students work.

Individual work №10. New Ukrainian school for primary school teachers: taking the course and obtaining a certificate

https://courses.ed-era.com/courses/course-v1:MON-EDERA-OSVITORIA+ST101+st101/about

Individual work №11. Peering evaluation of the performed practical work according to the criteria provided by the teacher.

2.5. **Module 5. Openness and accessibility of education.**

2.5.1. Theme 7. Non-formal education and distance learning.

2.5.2. Aims and expected learning outcomes.

Aims: to acquaint students with the features of non-formal education and distance learning; learn to use mass open online courses to enhance skills and the social media community to share experiences.

Expected outcomes:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-2)

2) development of skills of search, processing and analysis of information from various sources (GC-4)

3) the formation of the ability of future teachers to provide methodological support for educational activities in primary school (PC-3)

4) training of future teachers to act socially responsibly, to implement educational reforms, to assist pedagogical workers in mastering modern educational and alternative pedagogical technologies and methods of primary education (PLO-1, PLO-6)

5) training of future teachers to organize student training and teacher training with the use of modern educational and IC technologies, including non-formal education and distance learning (PLO-19)

2.5.3. Criteria and forms of evaluation of learning outcomes on the topic.

Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle;
- *peer evaluation* of the results of practical work according to the criteria provided by the teacher;
- *availability of a certificate* and progress of the MOOC course when performing independent work;
- *final assessment* by the teacher based on the results of the tasks.

The total maximum result for the content module is 15%, or 15 points, in particular the following intermediate points for the activities within the module with the subsequent introduction of the coefficient (coefficient 15/35):

Type of task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Practical class №3	10	Ability to analyze platforms for mass open online courses and learning communities and present the results of the analysis	*High level* - the student provides at least three links to MOOC with arguments for their choice and at least two addresses of learning communities in social media, creates a poster accordingly to requirements using infographics

			Intermediate level - the student provides at least three links to MOOC with arguments of their choice and at least two addresses of educational communities in social media, creates a poster using infographics, but not all requirements are met Low level - the student gives at least three links to MOOC, but does not justify their choice, and at least two addresses of educational communities in social media, the poster with the results of the analysis is missing
Individual work №12	20	Ability to carry out organizational and methodological activities for the organization of e-learning, use modern digital tools and resources to support the educational process	*High level* - the presence of a certificate of completion of the relevant MOOC, course progress in the range from 90% to 100% *Intermediate level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 75% to 89% *Low level* - availability of a certificate of completion of the relevant MOOC, course progress in the range from 61% to 74%
Individual work №13	5	and Ability to monitor systematically control the quality of the educational process and the objectivity of evaluating the results of educational training of students	4-5 points - performed an objective peer review of the work of all these students, according to the criteria provided by the teacher, provided justification for these assessments 1-3 points - performed an objective peer review of students' work, according to the criteria provided by the teacher, depending on the number of evaluated works, but no justification for these assessments

2.5.4. Digital tools.

E-learning course on the Moodle platform, resources for non-formal education, use of the forum in LMS Moodle for communication and formative assessment, Google-forms for organizing and conducting surveys of peers.

2.5.5. Innovative learning technologies.

Non-formal learning, including learning with the help of MOOC and educational communities on social media; peer interaction, in particular peer evaluation.

2.5.6. Practical class 3.

Theme. Non-formal education and distance learning

Aims: to acquaint students with the features of non-formal education and distance learning; learn to use mass open online courses to improve skills and social media community to share experiences

Types of student activities:

Analysis of platforms for hosting mass open online courses (MOOC), creating a survey in Google-forms, communication in the forum, passing surveys created by peers, summarizing and creating a poster using infographics.

Instructions for students:

1. Familiarize yourself with MOOC placement platforms, as well as social media learning communities.

2. Choose 3 (or more) courses you plan to enroll in and justify your choice. Choose at least 2 learning communities on social media that you think are worth subscribing to for professional growth.

3. Using Google Forms, create a questionnaire and invite your classmates to answer by posting a link to the survey in the forum.

4. Create a poster where you can use infographics to present: the benefits of non-formal learning, your suggestions for choosing courses and learning communities on social media, and the results of a group survey.

2.5.7. Tasks for individual students work.

Individual work №12. Digital communications in the global space: taking the course and obtaining a certificate https://courses.prometheus.org.ua/courses/course-v1:Prometheus+ITArts101+2017T1/about

Individual work №13. Peering evaluation of the performed practical work according to the criteria provided by the teacher.

2.6. **Module 6. Collective project.**

2.6.1. Theme 8. Collective project

2.6.2. Aims and expected learning outcomes.

Aims: to acquaint students with the features of project technology and stages of project implementation; learn to use digital resources to work together and build a portfolio.

Expected outcomes:

1) formation of students' ability to work in a team, generate new ideas (GC-3, GC-2)

2) development of searching skills, processing and analysis information from various sources (GC-4)

3) formation of the ability of future teachers to provide methodological support for educational activities in primary school (PC-3)

4) training of future teachers to act socially responsibly, to implement educational reforms, to assist pedagogical workers in mastering modern educational and alternative pedagogical technologies and methods of primary education (PLO-1, PLO-6)

5) formation of students' ability to master the technology of organizing the educational process in primary school (PLO-7)

6) training of future teachers to carry out organizational and methodological activities for the organization of e-learning, to use modern digital tools and resources to support the educational process; organize student training and teacher training using modern educational and IC technologies, including non-formal education and distance learning (PLO-19)

2.6.3. Criteria and forms of evaluation of learning outcomes on the topic.

Forms of assessment of learning outcomes:

- *formative assessment* using forums in LMS Moodle, Google-presentations;
- *project presentation* and joint evaluation by the teacher and students.

The total maximum result for the content module is 15%, or 15 points, in particular the following intermediate points for activities within the module with the subsequent introduction of the coefficient (coefficient 15/25):

Type of task	**Maximum points**	**Evaluation criteria**	**Quantitative and/or qualitative characteristics**
Laboratory class №5	10	Ability to work in a team	*High level* - the student takes an active part in the team, shows leadership qualities for the sharing of responsibilities for project tasks, generates new ideas, supports other team members, listens to the ideas of others and takes them to attention *Intermediate level* - the student is ready to cooperate with the team, listens to the ideas of other team members, offers ideas for their improvement, listens to the ideas of others and takes them into account *Low level* - the student needs the motivation of other team members, performs a minimum number of project tasks
		Ability to comply with the requirements for the structure and design of the project	*High level* - all the components provided by the project, available in the presentation, performed qualitatively and fully, the presentation is designed with ergonomic requirements *Intermediate level* - most of the components provided by the project task are available in the presentation, some are incomplete, the presentation is made

			according ergonomic requirements *Low level* - the presentation does not contain all the necessary components of the project, some of them are incomplete, ergonomic requirements for creating a presentation are not met
Laboratory class №6	10	Ability to present the results of the completed project	*High level* - the student confidently and argumentatively presents the results of the completed project, answers questions *Intermediate level* - the student is not confident enough to present the results of the project, to answer the questions delegated to other team members *Low level* - the student does not show a desire to present the results of the project, delegates it to other team members, answers questions and delegates to other team members
Individual work №14	5	Ability to analyze services to present a project portfolio	*High level* - the student confidently and argumentatively presents the results of the completed project, answers questions *Intermediate level* - the student is not confident enough to present the results of the project, to answer the questions delegated to other team members *Low level* - the student does not show a desire to present the results of the project, delegates it to other team members, answers questions and delegates to other team members Independent work №14 5 Ability to analyze services to present a project portfolio *High level* - provided at least 5 services that can be used to present a project portfolio; all services are selected correctly *Intermediate level* - 3-4 services are submitted that can be used to present the project portfolio; or more services are provided, but not all of them can be used for this purpose *Low level* - 1-2 services are submitted that can be used to present the project portfolio; or more services are provided, but not all of them can be used for this purpose

2.6.4. **Digital tools.**

E-learning course on the Moodle platform, Google-disk, Google-presentations, forum for communication, services for creating infographics, services for creating knowledge maps, services for creating videos and animated videos, etc.

2.6.5. Innovative learning technologies.

Project activity (PBL), portfolio, group work, peer-to-peer interaction.

2.6.7. Laboratory class 5.

Theme. Collective project.

Aims: to form the concept of the project method, ideas about the classification of projects and stages of project implementation; provide recommendations on the peculiarities of the implementation of collective projects

Types of student activities:

Working in groups using Internet search, digital resources for collaboration, including Google Drive, Google presentations, project tasks include the use of services for creating infographics, services for creating knowledge maps, services for creating videos and animated videos, and more.

Instructions for students:

1. Divide into groups of 3-4 people.
2. Within the formed groups, distribute the tasks for which each member of the group will be responsible.
3. Create a presentation (you can use Google presentations to work together) that will display the results of the following tasks:

a) analysis of the ICT policy of the educational institution at the moment: the availability of hardware and software, the readiness of the administration and teachers to implement ICT in the educational process. The results should be presented in the form of an infographic or a mind map created using the appropriate services of your choice.

b) prepare surveys for teachers or parents of students to identify requests and readiness to implement new technologies. Prepare the survey electronically using one of the services of your choice.

c) formulate a hypothesis, which, in your opinion, will be the results of surveys.

d) according to the hypothesis, plan the measures that need to be taken to improve the state of ICT implementation in the selected educational institution.

e) suggest ways of professional development for teachers of educational institutions, in particular through non-formal education: a set of MOOCs that it is desirable for teachers to master, as well as other educational resources. Justify your suggestions.

f) develop your own e-learning resource (video, animation, etc.) to improve the skills of teachers in one of the topics of your choice. Add a link to the created resource to the presentation.

4. In the created presentation on the title page, indicate all the authors who are part of the group of project developers, and send it to the system for review.

2.6.8. Laboratory class 6.

Theme. Presentation of the collective project.

Aims: to develop initiative, ability to work in a team, ability to act socially responsibly.

Plan.

Presentation of collective projects performed in the process of laboratory class №5.

2.6.9. Tasks for individual students work.

Individual work №14. Analysis of services for the presentation of the project portfolio

3. List of recommended literature (including electronic resources).

1. The main:

Information and communication technology in education : monograph / ed. Badarcha Dendeva – M. : IITO UNESCO, 2013. — 320 p.

V. M. Kukharenko et al., Theory and practice of blended learning: monograph. Kharkiv, Ukraine:]Misdruk", NTU "KHPI", 2016. – 284p.

1. **Extra:**

Ivanuk I. V. Educational policy: teach. guidances / I. V. Ivanuk. – K. : Taxon, 2006. – 226 p.

2. **Others:**

National strategy for the development of education in Ukraine until 2021. - [Electronic resource]. - Access mode: http://zakon4.rada.gov.ua/laws/show/344/2013.

UNESCO Recommendations on Mobile Learning Policy. - [Electronic resource]. - Access mode: http://iite.unesco.org/pics/publications/ru/files/3214738.pdf

Possibilities of information and communication technologies in preschool education (Analytical review). - [Electronic resource]. - Access mode: http://iite.unesco.org/pics/publications/ru/files/3214673.pdf

ICT in Primary Education. – [Electronic resource]. - Access mode: http://iite.unesco.org/pics/publications/en/files/3214691.pdf

The structure of ICT competence of teachers. UNESCO recommendations. - [Electronic resource]. - Access mode: http://iite.unesco.org/pics/publications/ru/files/3214694.pdf

Recommendations for working with open educational resources (OER) in the field of higher education. - [Electronic resource]. - Access mode: http://iite.unesco.org/pics/publications/ru/files/3214729.pdf

Intel® "Transformation of ICT policy in education". Manual. - Access mode: http://edutransform.org/wp-content/uploads/2015/04/IntelEduPolicyGuideUkraine.pdf

Riel Miller, Hanne Shapiro and Knud Erik Hilding-Hamann School's Over: Learning Spaces in Europe in 2020: An Imagining Exercise on the Future of Learning // Office for Official Publications of the European Communities. – 2008. – 94 p. – Way of access: http://ftp.jrc.es/EURdoc/JRC47412.pdf. – Title from the screen.

Johnson, L., Adams Becker, S., Estrada, V., Freeman, A. (2014). NMC Horizon Report: 2014 Higher Education Edition [Electronic resource] // New Media Consortium. – 52 p. – Way of access: http://cdn.nmc.org/media/2014-nmc-horizon-report-he-EN-SC.pdf. – Title from the screen.

Johnson, L., Adams Becker, S., Estrada, V., and Freeman, A. (2015). NMC Horizon Report: 2015 Higher Education Edition [Electronic resource] // New Media Consortium. – 56 p. – Way of access: http://cdn.nmc.org/media/2015-nmc-horizon-report-HE-EN.pdf. – Title from the screen.