FORMATIVE AND PEER ASSESSMENT IN HIGHER EDUCATION

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Abstract: This article shows specialities and tendencies of implementation peer assessment in educational process of higher educational institutions, the authors present a comparative analysis of traditional and formative evaluation as well as the advantages and disadvantages of the introduction of methods and tools of peer assessment in universities are presented. The study presents the results of the survey on the use of technology for assessment and use of ICT tools for evaluation attended by scientific and pedagogical staff of the Borys Grinchenko Kyiv University. The authors also propose ways of using ICT tools for introduction of peer assessment in high school as well as describe resources for implementing peer evaluation, which can be created in an electronic training course based on LMS Moodle, in particular its Workshop activity .

Keywords: assessment, formative assessment, peer assessment, peer learning, ICT, higher education.

INTRODUCTION

Today's graduates of higher education institutions need to be able to cooperate, communicate and solve problems - these are the skills that are formed through social and emotional learning and which refer to the soft skills needed by a specialist in the modern labour market. Combined with traditional skills, this social and emotional skill will help students to succeed in the development of the digital economy. The modern educational system is in the stage of global world change and should prepare a person to live in an open information space, to provide lifelong learning. The situation of the inconsistency of the contents and results of training future specialists with the current requirements of the labour market, characterized as a global crisis of higher education: the system prepares people for the "outdated" economy. The field of education requires new approaches and innovative pedagogical and information and communication technologies for 21st Century Skills (Figure 1).
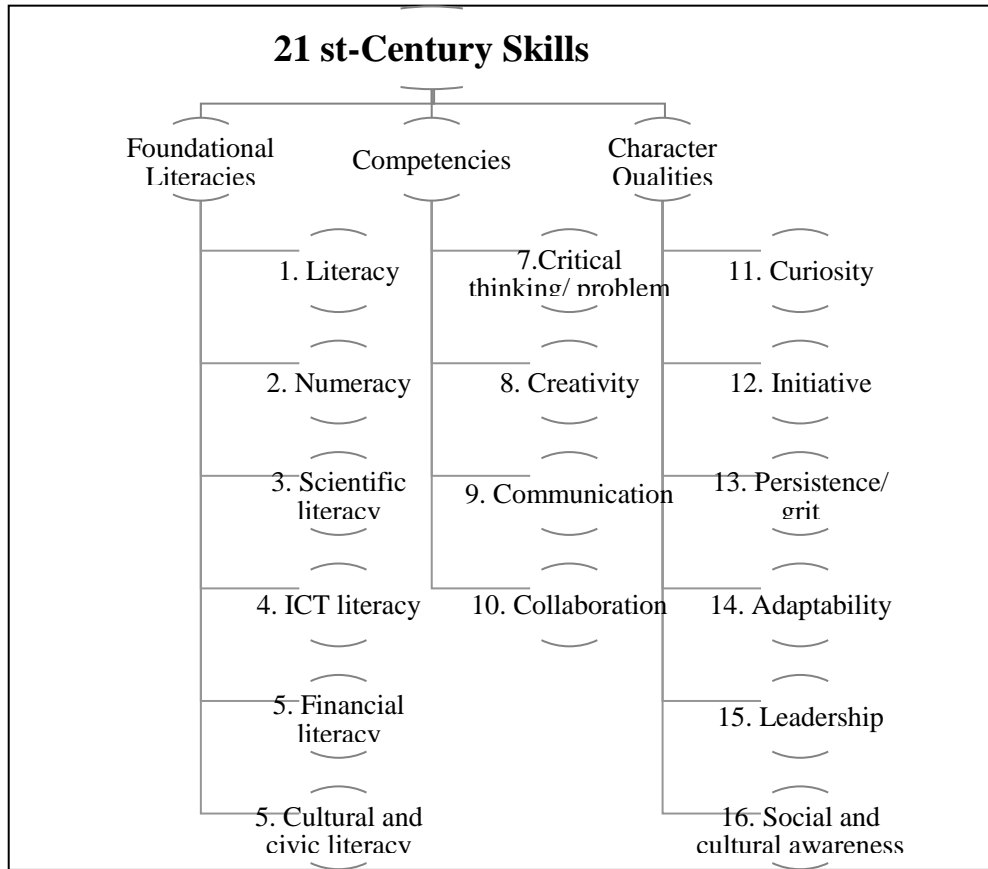
Figure 1. 21st-Century Skills

Source: World Economic Forum report New Vision for Education: Fostering Social and Emotional Learning Through Technology

At the same time, diagnostics of education is a compulsory component of the educational process, which is aimed at determining the level of achievement of the goals set and includes the control, verification, accounting, evaluation, accumulation of statistical data and their analysis, reflection, revealing the dynamics of educational changes and personal progress of the student, Redefining goals, refining educational programs, adjusting the learning process, forecasting further changes and developing the educational process. One of the components of the diagnosis of student achievements is assessment. Classical world practice is the definition of New Zealand scientist Clarence Edward Beeby, who treats evaluation as "systematic gathering and interpretation of facts, followed by the next stage - judgment of their value and appropriate planning of further actions" (Husen, 2000). In general, the assessment carries out a number of functions in the educational process: controlling, teaching, diagnostic-correcting, stimulating-motivational, developing, educational and management functions of the learning process. An analysis of the current views

of EU scientists on the assessment of students' academic achievements suggests changes in the theory and practice of this field of pedagogy in the context of emphasizing personality-oriented learning, namely the recognition of the so-called formative evaluation function, which in the scientific-pedagogical literature is interpreted as formative assessment.

With the implementation of mixed, distance learning, the appearance of a large number of massive open online courses (MOOCs), peer learning technology, which is part of peer assessment, is increasingly gaining ground. In this culture students become active participants in the learning and evaluation process by sharing responsibility in this process (Current Perspectives on Assessment). Students are not involved in sharing and developing criteria in self and peer-evaluation, reflecting on their own learning and keeping track of their performance, and utilizing feedback to refine their knowledge, Skills and behaviours. In this culture, teachers do not relinquish their obligations to students in the learning and assessment process, but work with students to help them develop strategies for learning and assessing. Teachers need to scaffold student learning by supporting them to close gap between the desired goal and their current achievement level.

The purpose of the article is to identify the features, advantages and disadvantages, methods and ICT tools for the implementation of peer evaluation in the educational process of higher education institutions.

The hypothesis is that understanding the advantages and disadvantages of traditional and peer assessment will help higher education instructors effectively combine peer evaluation, the implementation of modern ICT tools for peer evaluation support will help dismiss the teacher from routine work and organize peer-to-peer group work more qualitatively and form peer assessment and self-assessment skills.

Methods

To achieve the goal, a number of methods were applied, in particular theoretical ones: methods of systematic and comparative analysis of scientific sources, methodological literature, and special literature to find out the elaboration of the problem of implementing peer evaluation in the educational process of higher educational institutions; Synthesis and generalization for the formulation of the main provisions of the study; Empirical - expert survey, conversations with scientific and pedagogical staff. In particular, at the Borys Grinchenko Kyiv University, a survey was conducted among scientific and pedagogical staff, in which 84 participants responded. The survey, which was conducted online (https://docs.google.com/a/kubg.edu.ua/Forms/d/15wZ7IcLjQgYVZlwYD-p7Rs2kQhPAWlojDXM9z5ccojQ/edit?Ts=595bc9fe#responses), raised questions about the studied issues. The results of the survey showed that today peer assessment is used extensively in the educational process by 15.6% of the respondents, 62.3% use it in part, 22.1% do not use it. At the same time, 51.9% of respondents are ready to use peer evaluation in the educational process after a closer look at this method.

Other survey results are presented later in the article. Therefore, it is important to consider theoretical peculiarities of peer-to-peer evaluation and recommendations for its implementation in the educational process of universities.

1. THEORETICAL PECULIARITIES OF PEER-TO-PEER EVALUATION

1.1. Main purposes for assessment

The ability to conduct self-esteem, reflection, evaluate others, and work in a team refers to the skills of the 21st century, as a modern person in the knowledge economy society should learn to independently evaluate their activities, make relevant conclusions and change, and not wait for the reactions of others to control and evaluate.

The three main purposes of assessment are described as follows:

- **Assessment *for* learning** occurs when teachers use inferences about student progress to inform their teaching. (*formative*)
- **Assessment *as* learning** occurs when students reflect on and monitor their progress to inform their future learning goals. (*formative*)
- **Assessment *of* learning** occurs when teachers use evidence of student learning to make judgements on student achievement against goals and standards. (*summative*)

Assessment *for* learning integrates assessment into the learning and teaching process and establishes the teacher's role in assessment. Through assessment *for* learning teachers ascertain students' knowledge, perceptions and misconceptions and use this evidence to inform curriculum planning and teaching practice in order to support students to operate at the edge of their competence. Teachers use a range of assessment tools and teaching approaches integrating assessment in the learning and teaching process. Assessment goals are explicit and students are assisted to understand clearly what they are trying to learn and what is expected of them. Assessment is seen positively as supportive of student learning and assisting students to close the gap between their current achievement and the expected goal. Assessment *for* learning recognizes the influence that assessment has on the motivation and self- esteem of students and provides them with constructive feedback. Assessment *for* learning encourages the active involvement of students in their learning and it depends on teachers' diagnostic skills to make it work (Earl 2003).

Assessment *as* learning establishes students' roles and responsibilities in relation to their learning and assessment. It engages students in self- and peer-assessment and promotes students' confidence and self-esteem through an understanding of how they learn. Its focus on student reflection on their learning is powerful in building metacognition and an ability to plan for their own future learning goals. In

assessment *as* learning students monitor their learning and use feedback from this monitoring to make adaptations and adjustments to what they understand (Earl 2003). Earl also expresses the view that "effective assessment empowers students to ask reflective questions and consider a range of strategies for learning and acting. Over time, students move forward in their learning when they can use personal knowledge to construct meaning, have skills of self-monitoring to realize that they don't understand something, and have ways of deciding what to do next" (Earl 2003: 25). Assessment *as* learning emphasises the process of learning as it is experienced by the student.

Assessment *of* learning describes the extent to which a student has achieved the learning goals, including the *Standards* and demonstrates what the student knows and can do. Its purpose is summative and gives an "overview of previous learning" (Black 1998, p28). This is the assessment that is used to certify learning for reporting to students, the parents and the system. It takes place usually at the end of a unit, a program, a semester or a year of study. It is based on teacher moderation to ensure consistent judgment of student achievement and is supported by examples or evidence of student learning. Assessment *of* learning can be used to plan for future learning goals.

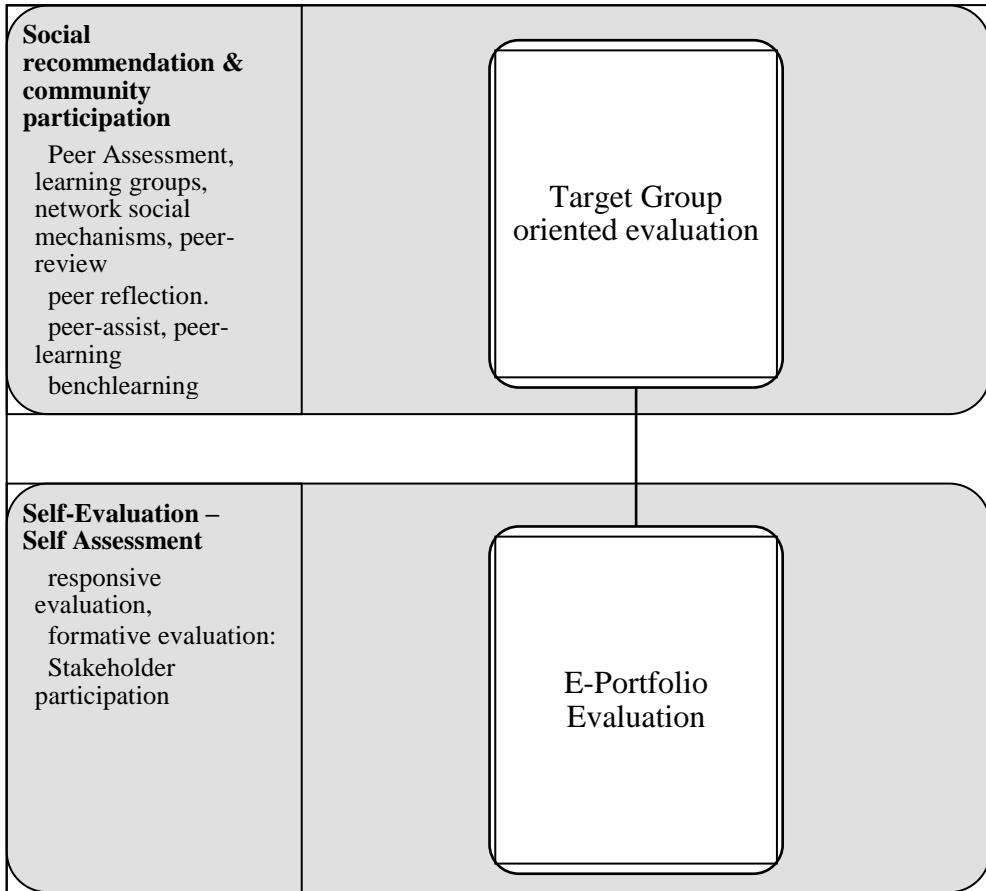## 1.2. The concept of formative evaluation

The concept of formative evaluation by different scholars is interpreted differently. In our survey, we suggested that colleagues choose the most relevant definition of molding evaluation and get the following results:

- an interactive assessment of students' progress, which enables the teacher to identify the needs of the students and adapt the learning process accordingly (Lokshina, 2009) - 57.7%;
- activity of teacher and students, which provides information that can be used as feedback for the correlation of the learning process (Black, 2000) - 38%;
- a two-way process between a teacher and a student in order to optimize the learning process (Cowie, Bell, 1999) - 28.2%;
- Assessment, which forms the knowledge of students and teachers - 23, 9%;
- Any assessment that helps the student to learn and develop (Perrenoud, 1991) - 19.7%.

Among the peculiarities of the molding evaluation according to the results of the survey, the following was preferred:
- Not only products of educational activity are evaluated but also the training process -60,6%
- Development of evaluation criteria based on the set training goals -54.9%
- Participation of the students in the assessment - 47,9%
- The process of evaluation is -35.2%
- Use of electronic tools for evaluation -26.8%
- Absence of an open comparison of results of different students -21,1%

The following methods are used for formative evaluation (Figure 2):

Social recommendation & community participation	
Peer Assessment, learning groups, network social mechanisms, peer-review	**Target Group oriented evaluation**
peer reflection.	
peer-assist, peer-learning	
benchlearning	
Self-Evaluation – Self Assessment	
responsive evaluation,	
formative evaluation:	**E-Portfolio Evaluation**
Stakeholder participation	

Figure 2. Methods of formative evaluation

Source: Own work based on Intel

Research supports the powerful role that self-assessment can play in learning (Kitsantas, Reisner, & Doster, 2004). Providing students with opportunities to assess their thinking and that of their peers gives them practice in the skills they need to become independent and self-directed learners.

Self-assessment helps students internalize the standards by which their products and performances will be judged (Wiggins, 1990). Assessments, such as rubrics, which are often used for final products, can be used by students as they work on a project to determine how their work measures up to expectations. When students participate in the development of rubrics, they also must think about what excellence looks like in the field in which the product is created. They then learn to identify the discrepancies between their thinking and the thinking of experts in the field. This practice helps students develop the skills necessary to assess their own progress.

When students assess their own thinking processes and the products they create, they are doing more than just looking for errors. They are "making explicit what is

normally implicit" (Noonan & Duncan, 2005). This is especially important when assessing mental processes, such as higher-order thinking and other 21st century skills that cannot be observed directly without careful planning.

Making self-assessment part of a daily classroom routine is critical for producing confident, independent learners, but it requires careful planning and consistency in instruction. Black and his colleagues (2003) suggest the following guidelines for successful implementation of student self-assessment:

1. The criteria for evaluating any learning achievements must be made transparent to students to enable them to have a clear overview both of the aims of their work and of what it means to complete it successfully. Such criteria may well be abstract—concrete examples should be used in modeling exercises to develop understandings.

2. Students should be taught the habits and skills of collaboration in peer feedback, both because these are of intrinsic value and because peer assessment can help develop the objectivity required for effective self-assessment.

3. Students should be encouraged to bear in mind the aims of their work and to assess their own progress to meet these aims as they proceed (pp. 52-53).

In student-centered classrooms, teachers assess students, students assess each other, and ultimately, students assess themselves. Considerable research shows that asking students to think metacognitively about their thinking and their learning results in greater achievement. Marzano (1998) found that interventions that asked students to reflect on their learning had a greater impact on student achievement than any other method. When students assess themselves honestly, they can no longer see themselves as passive recipients of knowledge and skills instruction. They are, in very important ways, responsible for their own learning, response to instruction, and engagement in meaningful learning tasks.

For students who have become accustomed to being "taught" instead of "learning," the change in classroom culture to one where students are in control of their learning can be uncomfortable. The teachers in Black's (2003) project in southern England found that their older students sometimes did not respond positively to the role they were expected to play in classrooms where formative assessment was frequent and ongoing. While following their own progress in learning can be motivating for some, for others, it can require an uncomfortable level of commitment. Teachers need to be aware of this when they begin implementing formative self-assessment. As Black and his colleagues explain, "To overcome this pattern of passive reception requires hard and sustained work."

The value of self-assessment cannot be overstated. When this kind of thinking becomes an integral part of daily classroom activities, students learn more, are more intrinsically motivated, persist in challenging tasks, and attain higher levels of confidence in their ability to learn (Kitsantas, Reiser, & Doster, 2004)

Different tools can be used for formative evaluation. Among the tools used by the study participants, the priority is given by the question of guidance (64.4%) and reflection (63%) (Figure 3):
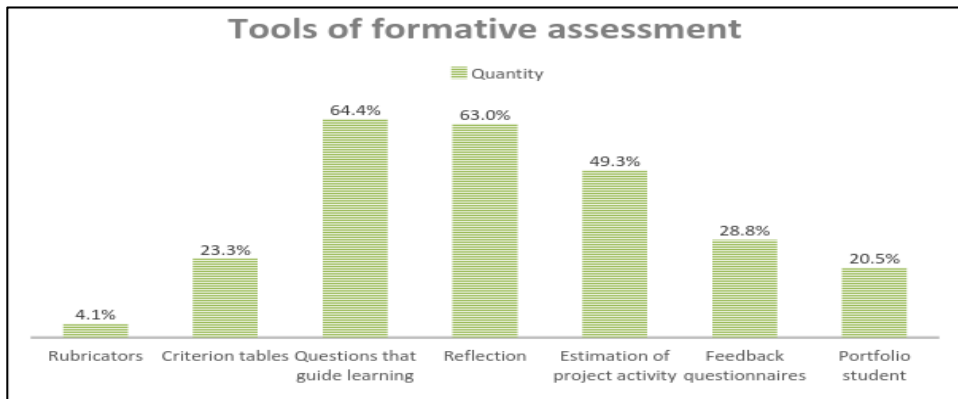
Figure 3. Tools of formative assessment.

Source: Own work

The level of learning by students of knowledge depends on the form of educational work (Figure 4). Therefore, in order to ensure the effectiveness of learning, it is envisaged to apply different forms, methods and technologies, in particular practice through action and training in cooperation.
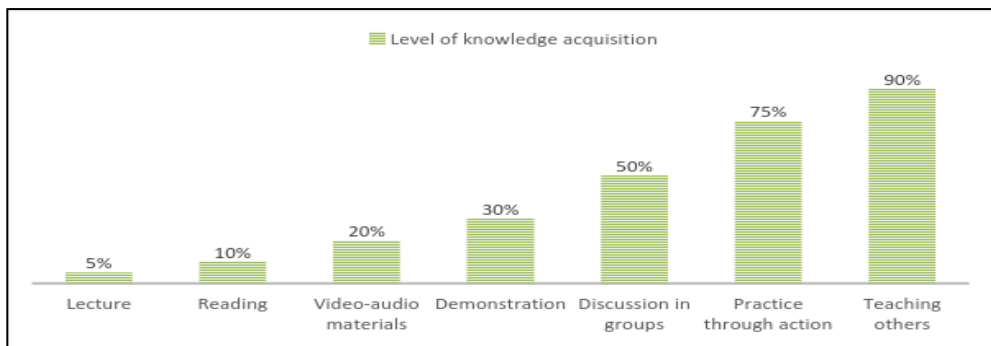
Figure 4. Dependence of the level of students' acquisition of knowledge from the form of educational work.

Source: Morze, 2003.

1.3. The features of peer training

Peer training is aimed at actively involving all its participants in the educational process. The basis of peering education is the equality of all, the pronounced subject-subject character of communication, aimed at achieving certain pedagogical goals, the solution of tasks by using the interaction, the use of the influence of each on the

network community and, on the contrary, the influence of the community on each of its members.

As additional advantages of peer training, are the following (Makoveeva, 2003):
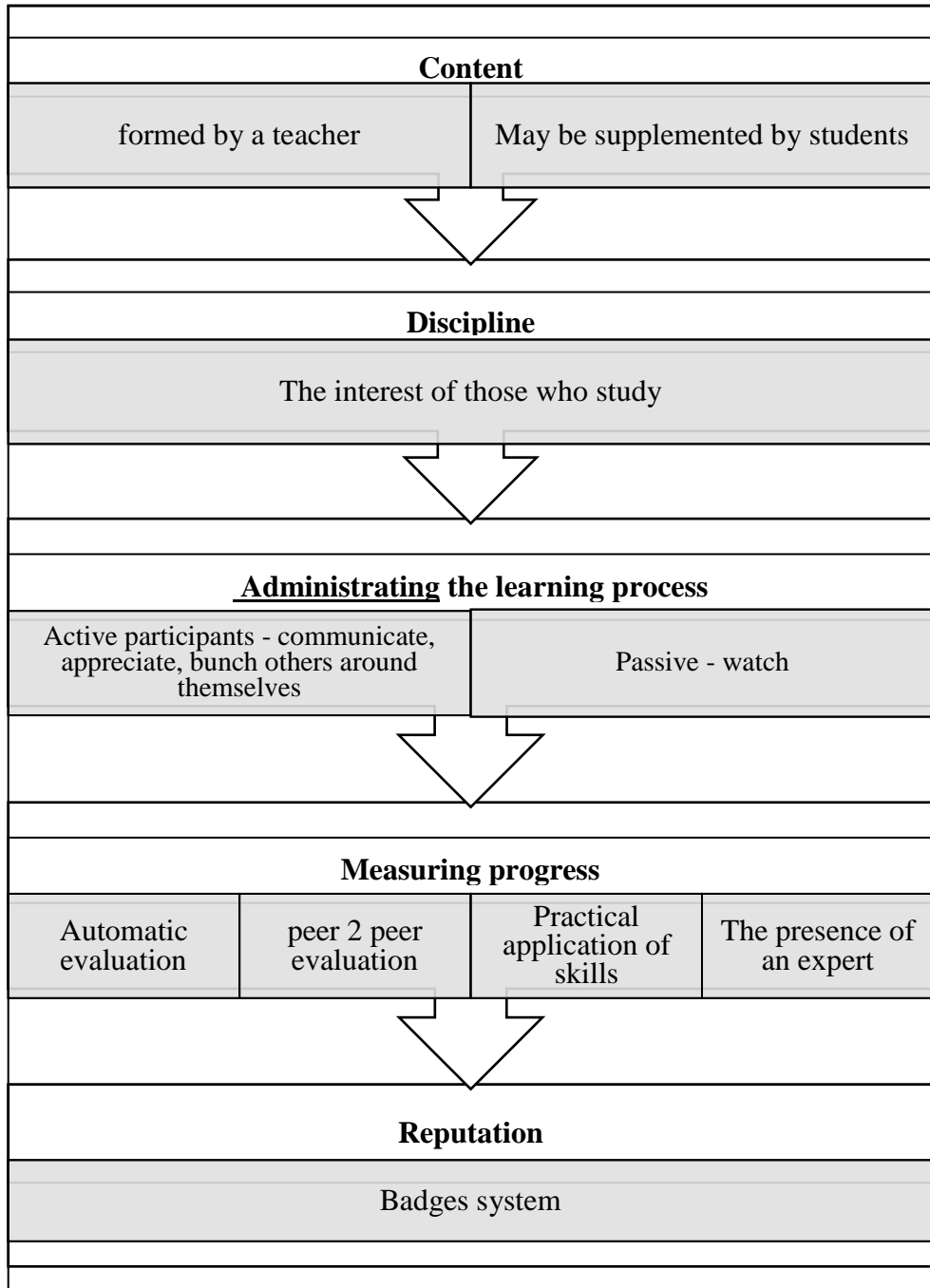
‒ adaptability of educational organizations, specialists to changing conditions, rapid reaction to changes in market conditions, new market requirements, increase of compliance with socio-economic, socio-cultural, educational needs of society;

‒ concentration of activities of participants of network interaction on their key professional, academic competences, unique processes that take place in the field of education;

‒ eliminating duplication of a number of functions by participants in network interaction;

‒ involvement in the joint academic, professional activity of competent participants possessing the necessary resource potential;

‒ increase the efficiency of mechanisms for information exchange between participants of informal network interaction, replication of best practices, innovative practices;

‒ realization of partnership relations in the process of achievement of certain results;

‒ absence of spatial, temporal restrictions;

‒ raising the level of competitiveness of participants in peer education;

‒ increase of speed, generation and transmission of specialized knowledge;

‒ high level of innovation activity, readiness and desire for change in accordance with the requirements of the changing world, increasing requirements to the level of professionalism of the teacher.

The peculiarity of peer education is that it was born precisely from those opportunities that had never been before. It is based on the Internet, technologies Web 3.0, massive digitization of various materials and a large number of open educational resources (open educational resources, OER).

An example of a successful peer education system can be Peer 2 Peer University (https://www.p2pu.org/en/) (P2PU), which operates with the support of the Chicago Public Library and aims to optimize interaction in the professional pedagogical field.

The peculiarities of peer education include: the participation of a large number of students, a minimum of interaction with the teacher, a customized communication between students, the use of peer evaluation, etc.

The components of peer training are reflected in (Figure 5):

Content

formed by a teacher	May be supplemented by students

Discipline

The interest of those who study

Administrating the learning process

Active participants - communicate, appreciate, bunch others around themselves	Passive - watch

Measuring progress

Automatic evaluation	peer 2 peer evaluation	Practical application of skills	The presence of an expert

Reputation

Badges system

Figure 5. Ingredients of peer education

Source: https://www.p2pu.org/en/

The peculiarity of peer evaluation can be attributed to: the availability of clear language criteria, the organization of students' work in pairs or groups to evaluate each other, the application of the principle of double anonymity: students do not know who they are evaluating; Students do not know who rated them.

When developing the evaluation criteria, consider that:

− the criteria are aimed at assessing the student's work (at the intermediate or final stage);

− the work of the student is evaluated according to the criteria or compared with the model proposed by the teacher, but not with the work of other students;

− criteria must be known to students in advance;

− a clear algorithm for evaluating the outcome of which a student can independently determine his level of achievement and evaluation is to be used;

− evaluation criterion is a concrete expression of educational objectives. You can only evaluate what they are taught.

1.4. The advantages and disadvantages of traditional and peer assessment

We have highlighted the advantages and disadvantages of Table 1 and Table 2 ratings, which we ranked as a percentage of our peer support as a result of a survey (https://docs.google.com/a/kubg.edu.ua/ Forms / d / 15wZ7IcLjQgYVZlwYD-p7Rs2kQhPAWlojDXM9z5ccojQ / edit? Ts = 595bc9fe # responses).

Table 1.

Advantages and disadvantages of traditional assessment

Advantages		Disadvantages	
Evaluation of work by a specialist in this subject area	68%	Possibility of biased evaluation by a teacher	69%
Verification of the level of student learning	58%	The need for a teacher to spend a significant amount of time testing and providing evaluation of work	61%
Detected and specified errors allow students to learn from their own mistakes	57%	Evaluation covers only the final result	33%
Assessment of the student's final result	53%	Students learn only from their mistakes, do not take into account the experience of others	25%

Source: Own work

Table 2.

Advantages and disadvantages of peer evaluation

Advantages		disadvantages	
Analyzing the work of others, students can identify typical errors that should be avoided	71%	May be missed and not taken into consideration the errors available in the work	78 %
Increasing the transparency of the evaluation	60%	Estimation of work by a specialist can lead to an incorrect assessment	60 %
The work of others can provide students with ideas on how to improve the quality of their own work	60%	Ability not to meet students' deadlines for implementation of stages of peer evaluation	46 %
Motivation for collaborative work of students	58%	The organization of students' work and description of evaluation criteria requires a significant amount of teacher time of	22 %
Assessing the work of other students according to the criteria provided gives the opportunity to better understand the educational material	44%		
When one work is analyzed and evaluated by several students, the final score will be unbiased	43%		
Formation of high-level thinking skills among students	36%		
The teacher spends less time checking and rating jobs	36%		

Source: Own work

Thus, the disadvantages of traditional assessment can be eliminated by using peer assessment.

2. USE OF ICT FOR IMPROVING PERSONAL EVALUATION IN THE EDUCATIONAL PROCESS OF HIGHER EDUCATIONAL INSTITUTIONS

The results of the survey showed that e-mail, automated computer tests, and work with shared documents or presentations are the most popular among the ICT tools that teachers use in the learning process (table 3).

Table 3.

Use of ICT tools in the educational process

E-mail	68.8%
Computer tests that are checked and evaluated automatically	58.4%
Working with shared documents, presentations	51.9%
Resource Task in LMS Moodle	28.6%
Online tests	22.1%
Knowledge maps	19.5%
Wiki resources	16.9%
Social Networking	16.9%
Resource Seminar in LMS Moodle	15.6%
Forums (including Forum in LMS Moodle)	14.3%
Crossword puzzles (for example, Hot Potatoes, LearningApps)	13%
Smart Notebook	9.1%
Resource Glossary in LMS Moodle	9.1%
Chats (including Chat in LMS Moodle)	5.2%

Source: Own work

However, a survey analysis showed that some resources that can be used for peer assessment are used by less than one-third of the teachers and when using them, they do not always take into account all the possibilities of such tools. In this case, the use of ICT should take into account the peculiarities of peer evaluation, one of which is the organization of pair or group work.

The means of ICT that allow students to work together include:

  − **video (and audio) conferences** – video and audio exchange with computer networks, presentation and evaluation of performances;

  − **online meetings** (for example, the resource http://www.anymeeting.com) for the joint discussion of projects;

- **forums** – an internet resource, a popular type of communication on the Internet. The forum creates themes for communication, which makes it the best for a chat. Anyone interested in certain information can conveniently and quickly view them on the forum and add their own materials. In the educational process, forums created within the framework of electronic training courses (in particular, in LMS MOODLE) can be used;

- **instant messaging** – a telecommunication service for exchanging text messages between computers or other device users through computer networks. In the educational process, messages can be used in LMS MOODLE or in the corporate Google account ;

- **chats** – a network tool for fast text messaging between users of the Internet in real time, such chats can be created as a separate resource in the electronic training course;

- **Blogs are a website** whose main content is regularly added to the recordings, images or multimedia. For blogs characterized by short records of temporary significance. The aggregate of all blogs on the Internet creates the blogosphere. Students can use blogs for reflection or project presentation, evaluation can be implemented through commentary;

- **wiki-resources** is a powerful tool for quickly creating and editing collective materials. Students can create collaborative articles, evaluate the work of others using templates, the teacher can track the history of edits and contribute to the work of each participant;

- **electronic mailing lists** – Internet service, which enables you to combine a certain number of people into a single closed distribution group;

- **"white boards"** – a tool for placing shared files on the screen "shared notebook" or "whiteboard". Software for video conferencing and data conferences often includes tools that allow the user to make a mark on the electronic board about the way he would do it on a normal wall board. The main property of this type of application is to allow more than one person to simultaneously work on the image, with the synchronization of two versions with each other almost in real time;

- **mental maps** – services or software for creating diagrams that display words, ideas, tasks, or other elements that are radially around the main word or idea;

- **social networks**– a social structure formed by individuals or organizations. It reflects the various connections between them due to various social relationships, ranging from random acquaintances to close family universities;

- **shared documents** ¬ documents that create and store in the cloud, which can be shared by several users (with different permissions - viewing, commenting, editing). All changes are fixed and can be rejected by the owner. Documents, tables, presentations, etc. can be used to work together. These materials are used on online disks (Google Drive, Sky Drive).

Separately pay attention to the resources for implementing peer evaluation, which can be created in an electronic training course based on LMS Moodle.

Resource Workshop involves collecting and analyzing students' work with a collective assessment.

Students can submit works in the form of any digital content (files) such as a document, a spreadsheet, a presentation, and can add text directly to the field on the site with the help of a built-in text editor (link to blog, document, wiki-resource etc).

The materials are evaluated using several rating criteria determined by the teacher. The process of collective evaluation and understanding of the form of this assessment can be done in advance using examples of work presented by the teacher, with reference to the example of the assessment. Students are given the opportunity to evaluate one or several works presented by group members. Materials and reviewers may be anonymous if required.

Students receive two grades at the workshop - an assessment of their material and an assessment of the evaluation of their colleagues' materials. Both grades are entered in the evaluation journal.

The seminar involves several "phases" that determine the various actions of the teacher and students. The teacher can independently "switch" the seminar in different phases, or set up automatic switching:

Setup phase ¬ In this phase, users can not take work or place jobs. Teachers can use this phase to modify the workshop settings, modify the evaluation strategy, and editing the assessment form.

Figure 6. Setup phase

Source: LMS Moodle

During this phase, the teacher determines the criteria for evaluating the works, which will further evaluate the submitted work (Figure 7).
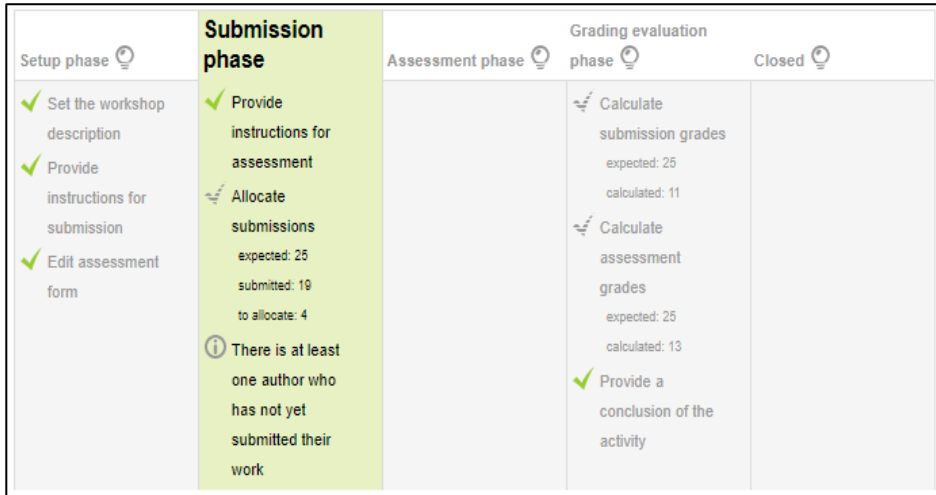
Figure 7. Setting up of evaluation criteria

Source: LMS Moodle

Submission phase – In this phase, students can submit their work (within the deadline for submission, if any). Teachers can distribute works for review by fellow students.
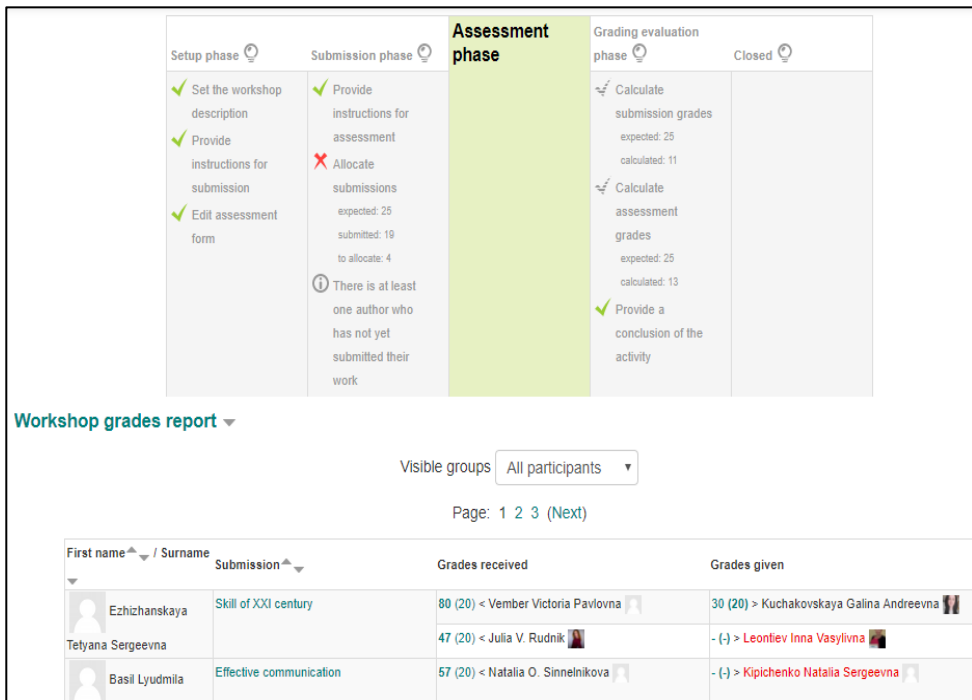
Figure 8. Submission phase

Source: LMS Moodle

Assessment phase - in this phase, reviewers can evaluate the submitted work (within the time period for evaluation, if any).

Figure 9. Assessment phase

Source: LMS Moodle

Grading evaluation phase – In this phase, users can not change their work and evaluation of the work. Teachers can use assessment tools to evaluate final evaluations and provide feedback to reviewers.
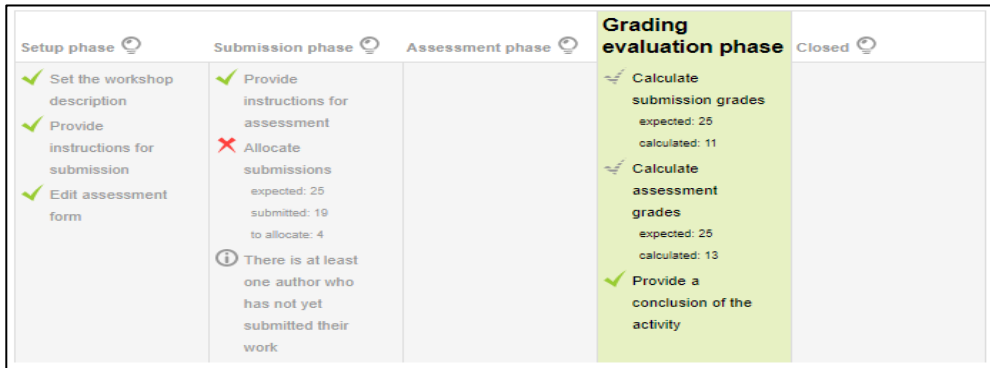

Figure 10. Grading evaluation phase

Source: LMS Moodle

The completion phase of the workshop is to save the marks received in the e-learning course log. Students will be able to view their work and assessments.

Another option is the use of peer evaluation using spreadsheets. The teacher in advance creates a joint spreadsheet, which provides a place for the presentation of the work, the name of the student, the work to be evaluated and the criteria for evaluation. An example of this method is a common table for assessment within the discipline "Innovative methods, technologies and monitoring of e-learning quality" for students in correspondence form (Figure 11).
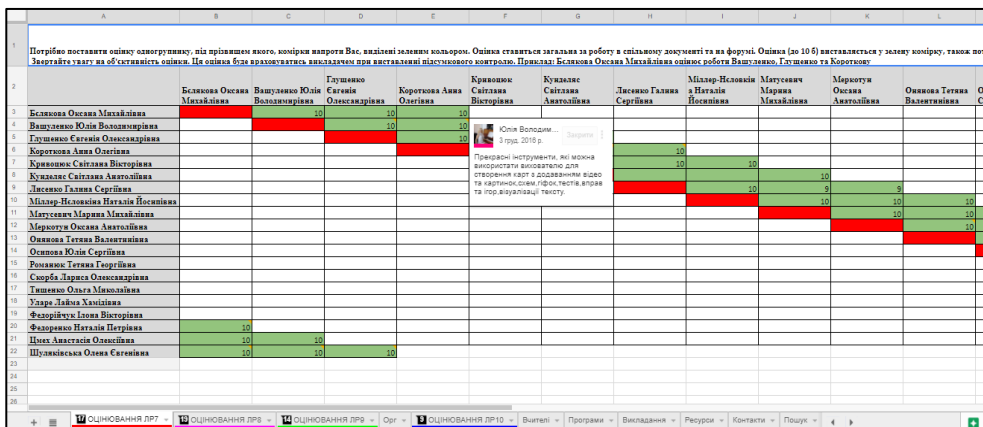

Figure 11. Joint Assessment Table

Source: Own Work

CONCLUSION

For the last decades, formative and peer assessment is actively being implemented in the world, especially in the EU, and is gaining momentum in Ukraine. Its peculiarities are assistance in the formation and development of the student's personality, which is achieved by providing effective feedback to the student, his active participation in the learning process, the constant adjustment of the educational process, student's motivation, and awareness of the responsibility for his / her own training.

The identified advantages and disadvantages of traditional and peer-to-peer evaluation suggest that the combination of traditional and peer evaluation will help to avoid the disadvantages of traditional assessment. In particular, the possibility of a teacher providing biased evaluation seen as a weak point of the traditional assessment can be solved when we use peer evaluation, which increases the transparency of the evaluation; such minuses of the traditional assessment as the evaluation of the final result, and students learn only from their mistakes, do not take into account the experience of others, are removed during peering evaluation and we have such advantages as analyzing the typical errors that should be avoided and the work of others can provide students with ideas on how to improve the quality of their own work. At the same time, it is not necessary to give up entirely the traditional assessment, because the disadvantages of peer assessment can be offset by the use of traditional assessment.

The implementation of ICT tools to support peer assessment can free the teacher from routine work, allow better organization of student and group work, and form peer assessment and self-assessment skills. The results of the conducted survey showed that 51.9% of scientific and pedagogical co-workers are ready to use peer evaluation in the educational process after more detailed acquaintance with its features. Among the wishes of the participants were the proposals on holding scientific and methodological seminars and workshops on the use of ICT tools to support peer assessment.

ACKNOWLEDGMENTS

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