STUDENTS' DIGITAL PORTFOLIO AS A TOOL FOR DEFINING GENERIC COMPETENCES

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Abstract. The materials of the article are devoted to determining the potential of using an electronic portfolio in the educational process of preparing masters of higher education as a means of forming and measuring general competencies. The authors compiled the master's profile, that was established in accordance with the general competencies of the Tuning project. The compliance of the general competencies according the Tuning project of ISTE standard has been established. The criteria of evaluation and levels of formation of general competencies are determined. The results of the students' attitude toward the use of electronic portfolios in the educational process and suggestions on the use of external experts are presented.

Keywords: Higher education, Generic competencies, E-portfolio, Reflection**.**

INTRODUCTION

Modern digital technology is a catalyst for the transformation of the world ("World Economic Forum", 2017). Recommendations of the EU for monitoring digital economy and society of 2016-2021 highlight the indicators for measuring digital skills because employment opportunity, education, leisure, involvement and participation in society - all these areas and many other aspects of society's work are transformed through the wide introduction of digital technologies ("Monitoring the Digital Economy & Society 2016-2021", 2015). As a result, digital competence - or the confident and sound use of information and communication technologies - is vital for participation in today's socio-economic life. In this regard, the problem of improving (transforming) the education system as a social institution for human

development for the training of competent specialists, taking into account the needs of the market and the current trends in the development of digital technologies, is being actualized.

According to many leading scholars opinion of the modern world, the universities that can create that knowledge economy, which will lead to the further effective development of the education system in the country, its exit from the crisis state of finding its own identity. The implementation of the problem of integration of science and education relies on the preparation of masters of higher education institutions, since it is the masters who must meet the requirements of society for the qualification of modern graduates of higher education. A graduate of a magistracy must have the necessary knowledge and skills to conduct fundamental and applied research in his subject field; the skills of individual and collective work, including through digital technologies, the ability to self-education and reflection, the study of excellence in the professional field.

The competent approach, which is defined not only as a result of higher education, but also life-long learning ("Council recommendation on Key Competencies for Lifelong Learning", 2018) ensures clarity and comparability of learning outcomes, acquired competencies and qualifications, and thus creates a solid foundation for European and world integration. The analysis and definition of the list of basic general competencies that characterize the universal skills and abilities, assessment, carried out in the framework of the project Tuning ("Tuning Educational Structures in Europe", 2008). There are also individual studies on the definition of standards for the training of specialists and the measurement of their competencies. Example, the ISTE Standards ("The International Society for Technology in Education", 2016) provide a framework for rethinking education, adapting to a constantly changing technological landscape and preparing students to enter an increasingly global economy.

The European Digital Citizens' Competence System, also known as DigComp, allows for a common approach to defining and describing key areas of digital competence of citizens, and is a global reference point at European level ("The Digital Competence Framework for citizens", 2017). At the same time, the search for ways of forming and measuring competencies of representatives of various branches, in particular education, does not lose its relevance.

In the education systems of many countries, authentic evaluation is widely used to determine the level of competence development. This type of assessment involves measuring the skills and abilities of students in terms of immersing them in a situation that is as close as possible to real professional life. One of the most widespread types of authentic assessment in Western Europe and the United States is the portfolio method (Lorenzo, Ittelson, 2005). In the university education of foreign countries, it becomes a mass character (Fitch, Peet, Glover Reed, Tolman, 2008; Hallam, & Creagh, 2010; Buyarski, Aaron, Hansen, Hollingsworth, et al., 2015), in the post-Soviet countries it is introduced

episodically (Petrenko, 2013, Morze, Varchenko-Trotsenko, 2016). However, in terms of digitization of the economy and society ("Europe 2020 strategy", 2015), first of all pay attention to the electronic portfolio as a summary of the new generation ("Digital competence", 2017). Through ePortfolio you can accumulate information about your achievements, professional and general competencies, starting university, in the future to use in job placement and career development throughout your life.

The purpose of this research: theoretically substantiate the use of an electronic portfolio as a tool for assessing the level of formation of masters' general competencies.

1. MASTER'S DEGREE IN HIGHER EDUCATION THROUGH THE PRISM OF GENERAL COMPETENCIES

Modern society propose fundamentally new demands on workers, and, accordingly, the education system, in particular, at the higher level. Nowadays employers have priority for graduates who have a certain understanding of their goals, ability to work in a team, an appropriate level of professional competence formation, and the existence of a plan for their own professional growth.

That is how future skilled workers take into account labour market demands for self-education, self-development and self-presentation competencies.

The training of a competitive specialist should be based on a competent approach based on the use of technology in teaching and learning (technology integration) ("The International Society for Technology in Education ", 2016).

According to the recommendations of the Tuning Project (Sánchez, & Ruiz, 2008), in the branch standards of higher education the two main groups of competencies are allocated: general and special (professional). The study of general competencies was one of the main tasks of the Tuning project. The results of rating received from it among graduates and employers are presented in the form of a list of groups of general competencies (Table 1). The above competencies also correlate with the ISTE standard for students, consisting of 7 components: 1) Empowered learner; 2) Digital citizen; 3) Knowledge Constructor; 4) Innovative; 5) Computational; 6) Creative Communicator; 7) Global Collaborator (http://www.iste.org/standards/for-students).

Table 1.

Compliance with the overall competencies of the Tuning project of the ISTE standard

Classification basis Tuning)	General competencies	Compliance with the ISTE standard

Instrumental (I)	I1. Ability to analyze and synthesize. Problem solving	Empowered Learner (1a); Knowledge Constructor (3d); Computational Thinker (5a, 5c); Innovative Designer (4d)
	I2. Skills of using digital technologies	Empowered Learner (1b); Digital Citizen (2d); Knowledge Constructor (3c); Innovative Designer (4b); Computational Thinker (5b); Creative Communicator (6b)
	I3. Information management skills.	Knowledge Constructor (3c, 3a); Digital Citizen (2d); Empowered Learner (1b)
	Ability to work independently	Computational Thinker (5b)
	I4. Ability to organize and plan. Ability to design and manage projects	Computational Thinker (5c); Innovative Designer (4a, 4b,4c); Knowledge Constructor (3a, 3d); Empowered Learner (1a); Global Collaborator (7c)
System (S)	S1. Ability to learn and self-improvement	Empowered Learner (1a, 1b,1c); Digital Citizen (2a); Creative Communicator (6d); Global Collaborator (7a, 7c)
	S2. Ability to apply knowledge in practice	Global Collaborator (7b,7d); Creative Communicator (6b,6d); Computational Thinker (5d); Innovative Designer (4a); Knowledge Constructor (3d); Empowered Learner (1b)
	S3. Ability to adapt to new situations. Caring for quality	Empowered Learner (1c); Digital Citizen (2c); Knowledge Constructor (3a,3b); Computational Thinker (5b, 5d); Creative Communicator (6a)
	S4. The desire to succeed in the profession	Empowered Learner (1a); Digital Citizen (2a)
	S5. Ability to lead research	Global Collaborator (7d); Computational Thinker (5a, 5b,5c,5d); Innovative Designer (4b); Knowledge Constructor (3a,3b, 3c,3d); Digital Citizen (2b)
Interpersonal (In)	In1. Work in group	Global Collaborator (7a, 7b,7c); Creative Communicator (6a, 6b,6d)
	In2. Ability to communicate with specialists in their field	Global Collaborator (7b, 7c); Creative Communicator (6a); Empowered Learner (1b)

Source: Own work

As for professional competencies, it is obvious that due to their specificity, there cannot be any generally accepted list of them. However, within the framework of various professional associations, international projects, national quality assurance agencies, a number of internationally recognized lists of specific branches / specialties (subject areas) have been developed, which can be used both for the development of national standards (in terms of normative learning outcomes and competencies), as well as in the design of educational programs by specific institutions of higher education. At the same time, the European e-Competence Framework ("European e-Competence Framework 3.0", 2014), which is recognized as a company producing services and products for ICT, as well as institutions, can be used to develop a model of professional competencies of a specialist (master's) that is correlated with the requirements of the digital economy, which use ICT in their core business.

An example of developing a model for professional competencies of managers in electronic learning management and its formation in university education is presented in the article by the authors (Morze, Glazunova & Kuzminska, 2018). We will define the master's profile in this study, which is based only on general competencies, grouped by the lines according to the directions of activity (Table 2).

Table 2.

Master's Profile

Line	General competencies	Indicator of measurement	Indicator
Scientific	I1., I2, I3, I4 S3, S4, S5 In1, In2	• Scientific conferences, seminars • Scientific projects • Scientific articles • Scientific competitions	• Quantitative (participation) • Qualitative (reviews, honors, articles, certificates)
Professional	I1, I2, I3 S1, S2, S3, S4 In2	• Professional certification • Internship • Professional experience	• Quantitative (participation) • Qualitative (reviews, honors, certificates)
Communicative	I1, I2, I4 S2, S3 In1, In2	• Mobility Programs • Social initiatives and projects	• Quantitative (participation) • Qualitative (reviews, honors)
Managerial	I1, 2I2, I4	• Data and people management	• Quantitative (participation)

S1, S2, S3, S4 In1, In2	(organization of social actions, communities, circles, etc., student self-government)	• Qualitative (reviews, honors, certificates)
	• Improvement of qualification (knowledge management)	

Source: Own work

It should be noted that the formation of general competencies takes place on the subject content and personal experience of students, that is strongly correlated with the formation of professional competencies. After all, the professional line is professionally oriented, scientific - scientific-oriented, communicative and managerial - practical-oriented. Thus, it can be argued that the proposed model also reflects the level of experience in acquiring professional competencies (qualitative indicators). This level indicates the way in which a person is able to integrate the skill or ability into his / her life (or some facet of it: academic, interpersonal, social etc.) and is able to demonstrate this ability. The essential feature of this level is the use that the person makes of the competence in a professional question.

The introduction of competence based learning requires good planning in the strategic plans for the university, which then are transferred to the plans and projects of the university's different centers, faculty institutes for acceptance and incorporation into their daily tasks (*Sánchez & Ruiz, 2008*).

When we analyze the requirements for an organization (university, faculty) we can use general offers (http://wp1087322.server-he.de/) and develop their own content. In our opinion, it is necessary for universities to consider the following components (e-Competence Framework Functional):

1. Company overview: Description of company management; Description of company organization / departments.

2. Innovation and research.

3. Business environment and business competencies: Business model and business processes, Human resources.

4. In order to measure the level of students' acquisition of competencies, criteria should be developed and appropriate methods selected.

2. PORTFOLIO AS A TOOL FOR ASSESSING THE LEVEL OF MASTERS' COMPETENCE

Modern society focuses on quality in everything, including in education. Therefore, measuring the results of a scientific and pedagogical worker and student is very important in our time. Without claiming the final solution to this problem, we propose to consider a portfolio as a pedagogical technology for forming the competence system of future specialists and a tool for evaluating individual achievements.

We understand the student portfolio (master's) as a means of demonstrating materials that allow us to determine the performance of the student's educational and scientific activities and to follow the dynamics of his achievements for a certain period of study. In our view, a portfolio can simultaneously be used as: a control device and monitoring individual achievements, a tool for evaluation and self-assessment, an alternative test form, technology for tracking learning outcomes and their dynamics, etc. In developed economies, active work has been launched to create the infrastructure necessary for the formation and use by citizens of electronic portfolios for their own development. In other words, the electronic portfolio is an organized collection of completed works presented in digital format (Batson T., 2002).

The process of developing, testing and implementing electronic portfolios can be tracked on the websites of the International Organization of the EuroPortfolio Consortium, the Inter / National Coalition for Electronic Portfolio Research, the Danish Consortium for ePortfolio. These international organizations, with the support of students, administrations of higher education institutions, are studying the impact of e-portfolio technology on the learning process and the professional development of future professionals. For example, the experience of using a portfolio to evaluate students at university is presented in the works by Omar M. Mahasneh & Odeh S. Murad (Mahasneh & Murad, 2014). The impact of the mobile portfolio (M-Portfolio) supported by the mastery learning model on student achievement and their attitudes towards using the Internet was considered by O. Ozdemir, H. Erdemci (Ozdemir & Erdemci, 2017).

Electronic portfolios do not necessarily have a web presentation. In particular, the International Association for Technology in Education ("The International Society for Technology in Education", 2016) has developed standards for e-portfolio templates for various formats. These templates can be viewed on the site of Professor Helen Barrett, one of the most famous experts in the field of electronic portfolio (Barrett H., 2016). An e-portfolio can also be placed in the LMS Moodle environment or as a separate page on the university department's website; to create a personal website or blog; to use the Mahara tool or to post on the Wiki-portal of the high school. Some universities are developing their own information systems for the portfolio (Morze, Varchenko-Trotsenko, 2016) since it is believed that the synergy of e-portfolio will create a single educational e-space -

the virtual community (virtual community, online community, online group), which can be used by all citizens without exception regardless of age. At the same time, there is also a transformation of the learning process, provided that the subjects of the educational process have a sufficient level of acquisition of digital competencies.

The researchers consider different approaches to the modelling of the structure and content, the stages of application and positioning of the portfolio. The organization of work on the conclusion of the portfolio is carried out according to the following scheme:

1. Motivation to create a portfolio. At this stage, students define the purpose of creating a portfolio for themselves and benefit those who need to get acquainted with its content. This is a prerequisite for achieving successful results in future professional activities.

2. Definition of the structure, format of submission of materials and criteria for their evaluation.

3. Planning activities for the collection, registration and preparation of presentation materials.

4. Generalization, systematization and design of a portfolio. At this stage, there is also counselling and adjusting (if necessary) the contents of the portfolio.

5. Presentation within the purpose of creating and using a portfolio.

6. Evaluation and reflection.

Regarding the structure, there are 3 to 8 sections of the portfolio of the student, among which are necessarily present: "Exhibition Portfolio" (letters, diplomas, awards, certificates, information indicating the personal training initiative: courses, training); "Work portfolio" (a collection of works showing the progress of the author in the study of the future profession); «Portfolio of reviews» (contains reviews, reviews, reports, various forms of self-assessment of own achievements)?

The composition of a portfolio depends on specific goals. In this study, we propose to consider a portfolio as one of the tools for measuring the general competencies of masters (Table 2).

The levels of the formation of general competencies correspond to the formation of indicators by criteria, which we clearly explain by means of a single circle. The quarters on which the circle is divided reflect the lines of formation (development) of the general competencies of the master: scientific, professional, communicative and managerial (Table 2). In each quarter of the ideal segmented model, we have four points that interpret the formation of the components of general master's competencies according to the criteria: motivation, activity, productive, reflexive (Figure 1). Consequently, the general master's competencies are then formed at a high level, when in each quarter is possible to distinguish four points per unit circle.
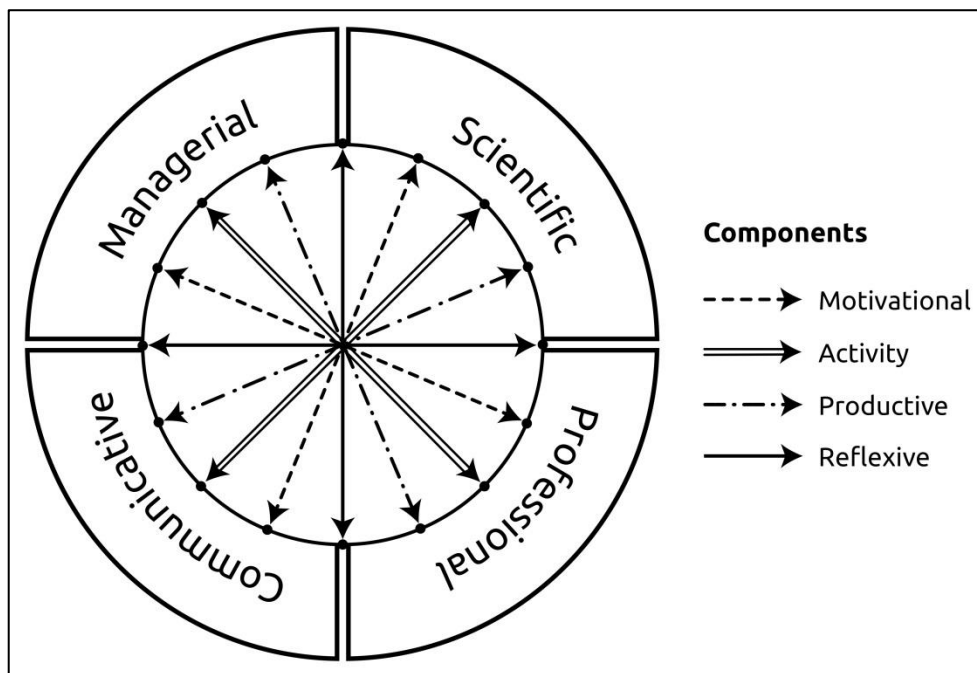
Figure 1. The ideal segmented model of general master's competencies

Source: Own work

Thus, we have identified the following levels of formation of the general master's competencies (Figure 2):

• *Awareness*, which can be marked with four points per unit circle;

• *Experience*, which can be interpreted on a single circle by eight points;

• *Mastery*, which makes it possible to mark twelve points per unit circle;

• *Expert* - the indicators of all the criteria are available, so it is possible to mark sixteen points on the unit circle, reflecting the ideal segmented structure of the master's general competence.

Interpretation of the levels according to the ideal structure and selected criteria in our study is given in figure 2.

Number of criteria (n)	$n = 16$	$\begin{cases} n \geq 12 \\ n \langle\ 16 \end{cases}$	$\begin{cases} n \geq 8 \\ n \langle\ 12 \end{cases}$	$\begin{cases} n \geq 4 \\ n \langle\ 8 \end{cases}$
Level	Expert	Mastery	Experience	Awareness

Figure 2. The ratio of levels of formation of general competencies depending on the criteria

Source: Own work

Each criterion for the formation of the general competencies of masters determines the formation of each of these lines (Table 2). According to the logic of our study, the diagnosis of the levels of formation of general competencies of the Master, we conducted according to the formula

$$GMC = 4 * (S + P + C + M) \qquad\qquad (1),$$

where GMC - general master's competencies; S - scientific line of formation (development) of general competencies; P-professional; C-communicative; M-managerial.

If competencies are formed on all lines, that is, each one corresponds to one point per unit, then GMC = 16 points; this relationship correlates with the expert level of formation of GMC. If competencies are formed partially, the formula reflects the skill level of the (the GMC is equal to 12 points), experience (the GMC is equal to 8 points) or awareness (the GMC is equal to 4 points).Note that the situation in which GMC is equal to 0 is impossible, as the future specialist in the learning process must carry out certain activities, for example, to participate in conferences, etc.

It should be noted that if a portfolio is used as an educational technology for the formation of masters' competencies, it is possible to assess the acquisition of competence under the scheme. In the case of using a portfolio as a tool for assessing the level of masters' formation, evaluation is carried out only on the effective criterion and for the assessment of the motivational, activity and reflexive criterion, it is necessary to further use the methods of questioning, interviewing and observation.

3. DISCUSSION

A survey was conducted to determine the attitude of students to using the portfolio as a tool for evaluating master's competencies. The survey was attended by 57 masters of the second year of study from two universities of Ukraine: Borys Grinchenko Kyiv University and the National University of Life and Environmental Sciences of Ukraine. These students created a portfolio in the framework of specialized training.

Research question: Does the use of portfolios influence the formation of general competencies (Table 1) and professional growth?

According to the survey, 82% of the respondents acknowledged the positive impact of portfolio use in educational practice. Detailed answers are given in Table 3.

Table 3.

Percentage distribution of answers from students from KUBG and NULES in the group of point reflecting student's attitude towards the use of portfolio in educational practice

	KUBG (31)	NULES (26)
Formation of general competencies		
I1. Ability to analyze and synthesize. Problem solving	56%	62%
I2. Skills of using digital technologies	82%	85%
I3. Information management skills. Ability to work independently	78%	75%
I4. Ability to organize and plan. Ability to design and manage projects	32%	29%
S1. Ability to learn and self-improvement	82%	79%
S2. Ability to apply knowledge in practice	54%	60%
S3. Ability to adapt to new situations. Caring for quality	78%	81%
S4. The desire to succeed in the profession	94%	92%
S5. Ability to conduct research	36%	42%
In1. Work in group	51%	46%
In2. Ability to communicate with specialists in their field	67%	78%
Educational activities and professional self-determination		
Creating a personal training trajectory	69%	76%
Motivation for self-education	71%	68%

Self-assessment of own professional competence	54%	50%
Formation of reflexive culture	56%	60%
Expert evaluation		
Self-evaluation	78%	73%
Assessment by other masters	45%	51%
Teacher evaluation	65%	68%
Assessment by employers (grantees, etc.)	88%	92%

Source: Own work

CONCLUSIONS

The emergence of the e-portfolio around the world makes radical changes in the perceptions of learning technologies. Its application makes it possible to evaluate and summarize certain achievements of the individual at different stages of study throughout his life, that is, contributes to the formation of general competencies. This advanced technology is a key element in creating a constantly learning community.

The pedagogical philosophy of the portfolio includes: put the emphasis on students' progress in educational, scientific, social activities; transfer of pedagogical accent from self-esteem evaluation. The technology of electronic portfolio helps to organize the planning of their own student's educational activities, establishing the relationship between formal and informal learning experiences, professional development and scientific intelligence, the formation of an active social position and digital citizenship. In addition, the technology of the electronic portfolio is not only an addition to the main evaluation tools for the achievements of graduate students and is characterized by an effective form of self-assessment of the results, but also contributes to strengthening the motivation to self-education, the formation of a reflective culture, directs their consciousness to the objective setting of their own professional competence.

Electronic portfolios are universal, therefore, they can be used by both students and professors and employers. Moreover, there is the possibility of using electronic portfolio systems by legal entities, such as firms, grant agencies, or international organizations**.**

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