

# Chapter 4

## Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes

**Olga Smolyaninova**

*Siberian Federal University, Russia*

**Bezyzvestnykh Ekaterina**

*Siberian Federal University, Russia*

### **ABSTRACT**

*The Chapter presents strategies for training Masters of Education students for the development of digital ecosystems in the open educational environment of Yenisei Siberia with the use of e-portfolio and Open Badges technologies through a special electronic course for students of blended learning model. The preliminary results obtained by the authors based on a Google-survey showed that students demonstrated a high level of satisfaction with learning using e-portfolio and Open Badges technologies in the multicultural digital environment of the Siberian region. This Chapter describes the experience of the School of Education, Psychology, and Sociology in use of e-portfolio technology in the evaluation of educational outcomes, reflection, professional development in the lifelong learning process of future teachers, and the introduction of Open Badges integrated with e-portfolio in the teachers' training course for Bachelor and Master's students.*

### **INTRODUCTION**

Nowadays e-portfolio is a powerful pedagogical technology for formal and informal education system in the concept of lifelong learning.

There are three key ideas of the strategy of contributing to the open ecosystems. The first is engaging students in the modern digital environment by using e-learning and MOOCs. The second is expansion and opening borders by the methodology of open recognition of the learning outcomes. It involves build-

DOI: 10.4018/978-1-7998-2314-8.ch004

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

ing trust and digital identity to empower and support students’ engagement. The third is introducing the e-portfolio and Open Badges technologies to students through the special course in Master’s curriculum.

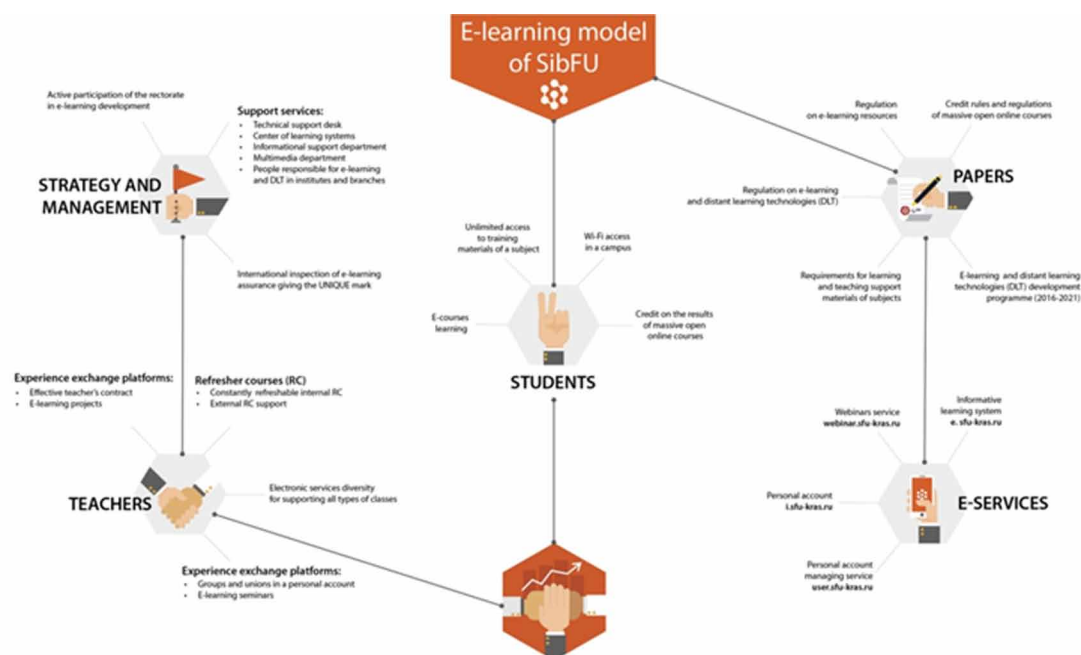
Siberian Federal University is a modern Centre of Excellence in innovation and technology. Development of digital learning environment is a priority for the University. E-portfolio is a vital component of it. It is represented by the resources:

- e-courses in the LMS Moodle [ <https://e.sfu-kras.ru/login/index.php> ]
- personal students’ e-portfolios [ <https://i.sfu-kras.ru> ];
- massive open online courses (MOOCs);
- students’ personal profiles [ <https://i.sfu-kras.ru> ];
- webinars and video conferences service [ <https://webinar.sfu-kras.ru> ].

The scheme presents the current e-learning model of SibFU. It includes the actors of teaching-learning process, supported by e-services and connected by various strategies of online communication, assessment and feedback. Professors, implementing the e-courses, get financial bonus from the University administration (Figure 1).

E-portfolio is a powerful pedagogical technology for formal and informal education in the concept of lifelong learning. It is particularly important in the training of our students - future teachers, since the teaching profession requires permanent reflection, personal and professional development.

*Figure 1. E-learning model of SibFU*  
Source: <http://edu.sfu-kras.ru/elearning?page=3>.



## ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

### **BACKGROUND**

Electronic portfolio allows students to demonstrate competency as well as academic and professional achievements in an open educational space. The relevance of the e-portfolio technology use is associated with implementation of the principles of competence approach reflected in the academic standards of higher education. The possibility of formative evaluation of educational outcomes of students, with the transformation of the educational process, the transition from control by the organization to self-control by the student, the development of electronic information educational environment are applied (Barrett, 2005; Sweet, 1993, Smolyaninova 2014; 2016).

Individual e-portfolio helps not only to increase the internal motivation of students, fixing deficiencies and problems in their educational program mastering, but also allows to fix personal educational interests, to reflect on educational activities, to analyze their results. The e-portfolio provides multi-dimensional evidence of individual experiences and achievements in lifelong learning, as well as their subsequent integration outside the academic space.

Approaches to the definition of the concept of “e-portfolio” and its main models are described in the works of Barrett (2007), Polat (2007), Siemens (2007), Zubizarreta (2004), Smolyaninova (2011, 2016), etc.

Hwang (2014), when considering the didactic properties of e-portfolio, indicates its importance for the development of competencies and personal development of students.

Shroff, Deneen, Lim (2014) argue that students by accumulating and demonstrating artifacts in individual e-portfolios design their trajectory of personal and professional development, enhance critical thinking, self-esteem and learning skills. The key concepts underlying this are based on the results of research on Developing and Reflective electronic portfolios (Giannandrea, 2006, Ross & Graham, 2006, Smolyaninova 2009, 2011), formative evaluation (William, 2011, Marsh, 2009), self-regulatory learning (Zimmermann, 2001, Pečjak in Košir, 2002), Philosophy of Open recognition of the learning outcomes in lifelong learning, based on Bologna Open Recognition Declaration (Presant 2017, Ravet 2017).

The conceptual reasons for using e-portfolio in higher education are presented in the works Ittelson (2001), Jafari and Kaufman (2006), Ravet (2015), Jan (2016), and Riedingen (2012). The researchers point out the strategic importance of keeping a grip on graduates with a ‘sticky’ e-portfolio service teachers and institutions have interests in and expectations of the continuity of e-portfolio practice in the workplace. Ravet (2015) claim that these expectations are not always exclusively pragmatic, and may also be influenced by more altruistic notions of the benefits such practices can bring. E-portfolio supports the skills needed in the 21st century, such as critical thinking (Bowell in Kamp, 2002), teamwork and communication skills (Rupnik & Celin 2013), and creativity (Seelig, 2012).

### **MAIN FOCUS OF THE CHAPTER**

#### **Issues, Controversies, Problems**

The analysis of the problem development of using the electronic portfolio in the system of evaluation of educational outcomes of students in the context of lifelong learning revealed the following contradictions:

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

- between the building of new educational goals in higher education of the Russian Federation and the lack of development of appropriate modern authentic digital assessment tools that reflect the educational results of students;
- between the assessment process for an educational institution and an assessment for a student aimed at individual educational outcomes;
- between the recognition of the e-portfolio potential for personal and professional development of a teacher and the lack of scientific and theoretical grounds for the use of e-portfolio in the training of undergraduates majoring in Education.

The contradictions define the scientific scope and allow to formulate a research problem, including the disparity between high methodological and didactic potential of e-portfolio and the effectiveness of its use for assessing learning outcomes of bachelors and masters majoring in Education.

The analysis of psychological and pedagogical sources, which is based on competence, activity theory, practice-oriented approaches, as well as monitoring websites of Russian educational institutions of higher education allowed to classify e-portfolios used in modern universities (table 1).

We present the main didactic functions of the electronic portfolio of a future teacher in the context of assessing personal and professional achievements in lifelong learning:

- *individualization and differentiation* of the learning process (the choice of methods, techniques, pace of learning, taking into account the individual characteristics of students, the level of development of their abilities to learn; grouping on the basis of certain features for individual training; the ability to build individual educational trajectories per module, per semester or for the entire period of training);
- *evaluation, mutual evaluation and self-evaluation* for the final and intermediate marks for modules and / or discipline, including the state final certification; to adjust the individual educational path;
- *development of skills of independent education* for improvement of teaching organization, strengthening motivation to learning, increase of individualization of training and productivity of self-training of students;
- *personification of educational outcomes* on modules and / or discipline for realization of continuous self-reflection and self-development, formation of need for independent interpretation of own learning experience and self-training, ability to the independent problems resolution in educational process.

The main didactic features of the future teacher electronic portfolio include the following: interactivity, multimedia, non-linearity, publicity, integrativity.

**Interactivity of e-portfolio** allows to create conditions in which students act as active participants of educational process, are included in cognitive and communicative activity. A teacher directs the students' work to achieve the objectives of a class and serves as an assistant in online and offline modes, building a dialogue with students by means of e-portfolio.

When considering the properties of electronic educational resources (Mandrik, Kazachenok, 2013), the researchers note that the development of new educational technologies expand student's opportunities in independent (extracurricular) education and development of a creative component in the activities of the teacher in the classroom. Transition from declarative to discussion training formats in work of a

## Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes

Table 1. Classification of e-portfolios used in teacher training system

Subject of classification	Types of e-portfolio
1. According to actors	<i>individual (personal) e-portfolio</i> is created and filled with content by a student
	group (team) e-portfolio both educators and employers create and fill with material, for example, they include reviews and features from the field practical training of students; include the results of a team performance (for example, participants in professional contests or competitions)
2. According to the outcomes	<i>practice-oriented e-portfolio</i> demonstrates the professional achievements of the student, the level of development of his professional culture, can also include the achievements of creative and research activities
	<i>problem-research e-portfolio</i> is focused on the formulation of the problem and subsequent development in research and practical activities of the student, includes evaluation components and elements of reflection
	<i>thematic e-portfolio</i> is aimed at presenting educational outcomes and achievements in the process of studying a topic, section, module or subject
3. According to the goals	<i>e-portfolio of achievements</i> is focused on the presentation and evaluation of educational and professional, sports, social, cultural, creative, research achievements of a student
	<i>e-portfolio of personal growth</i> provides an opportunity to design an individual educational trajectory of the student, its implementation, evaluation and adjustment in the process of training at the University
	<i>e-portfolio-collector</i> contains scanned publications, lists of recommended sources and resources, various materials required for research and practical work
	<i>project e-portfolio</i> reflects the idea, stages of implementation, content, main performers and a manager, results and performance indicators of educational, research, interdisciplinary project
	<i>e-portfolio of professional development (career growth)</i> demonstrates and allows assessment/certification of professional activity of a student, his professional competencies, is a tool of professional development and career growth, monitoring achievements for the implementation and adjustment of individual professional development trajectory
4. According to the longitude	<i>semester/ course e-portfolios</i> are created and filled with content for a certain time depending on the goals and objectives, including within one or more disciplines
	<i>attestation e-portfolio</i> is a mandatory evaluation component of the graduate educational program of higher education in the form of public defense of the individual e-portfolio of a student; aimed at demonstrating the educational program outcomes and competencies
5. According to the education level	<i>Bachelor's e-portfolio</i> is created and filled during the period of study at the undergraduate level
	<i>Master's e-portfolio</i> of the is created and filled during the period of study in the master's degree, can include significant achievements of the previous stage of training
	<i>e-portfolio of a post-graduate student</i> is created and filled during the period of study in graduate school, includes the results of research, project and training activities, contains materials and significant artifacts of the previous stages of training
6. According to the materials and achievements artifacts	<i>personal e-portfolio</i> is designed to present personal information about a student, includes storage, accumulation and demonstration of educational, scientific, social, sports achievements of a student, as well as academic results
	<i>e-portfolio of achievements</i> is focused on fixing and demonstration on various types of activity: educational, scientific, project, cultural and creative, public, sports, also includes achievements in additional non-formal education; provides information on the student's progress, completed coursework and final qualifying paper, academic mobility within the country or at the international level, indicating the disciplines studied. In addition, the e-portfolio of achievements allows to include studied MOOC's and passed refresher courses with mandatory supporting certificates
	<i>e-portfolio of reviews</i> includes evaluation characteristics of the student's attitude to various activities, which are presented by different participants of the educational process: teachers, classmates, additional education staff, administration, etc., as well as self-analysis of activities and its results
	<i>e-portfolio of documents</i> allows to accumulate and save evidence of one's own achievements in learning, artifacts of formal and non-formal education
	<i>e-portfolio of works</i> demonstrates various works on different types of activity, allows to assess educational outcomes and achievements of educational and creative work, to define the orientation of interests of a student
7. According to the structure	<i>homogenous e-portfolio</i> consists of a single section to present information about the works and achievements of the same format, for example, certificates for academic achievements only)
	<i>complex e-portfolio</i> presents the contents of several sections on various activities, for example, sections: documents; educational, sports, social achievements; reviews and feedback", etc.

continued on following page

## ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

*Table 1. Continued*

Subject of classification	Types of e-portfolio
8. According to the organization administration	<i>corporate e-portfolio</i> is a component of the organizational services available for viewing to staff and students only; the University administration by the Department of Computerization of the University (e.g. e-portfolio of achievements called "My SibFU" of Siberian Federal University)
	<i>internal structural e-portfolio</i> plays a significant resource on the official websites of individual institutions, access to viewing materials can be performed with additional authorization; the structure and content of e-portfolio depends on the areas of training and educational profiles; the administrator of the website of the Institute moderates it (for example, an individual e-portfolio of students of School of Education, Psychology and Sociology, Siberian Federal University); contributes to the improvement of ICT competence of students
	<i>external structural e-portfolio</i> is created with the help of external electronic platforms and portals, access to it is by the link placed in the individual e-portfolio published on the website of departments or University (for example, links to individual e-portfolios created by Word Press); contributes to the improvement of students' ICT competence
9. According to the form of assessment	<i>reflexive e-portfolio</i> contributes to the development of skills and abilities of independent thinking, allows to analyze the available materials of e-portfolio and own experience, design and adjust individual educational trajectories (contains sections "My life experience", "My significant educational achievement", "General reflection", "Reflection on the subject", "Career plans", "Educational and professional work", "Expectations and results of the practice session", etc.)
	<i>rating e-portfolio</i> determines the rating of a student among other students or other groups, including application for increased state academic scholarships, allows a student to evaluate professional achievements, build a personal and creative trajectory of success
	<i>competence e-portfolio</i> mainly allows to implement the competence approach, to accumulate and demonstrate achievements confirming competencies and to assess the level of development of significant competencies
10. According to the integration to international educational environment	<i>national e-portfolio</i> contains published information in English, can include a language e-portfolio, allows students to integrate into the international educational space, contributes to the effectiveness of the implementation of international academic and professional mobility
	<i>language e-portfolio</i> presents published information in the students' mother tongue, but may contain individual components in other languages (for example, a list of recommended educational resources or links to sources used)

teacher and transfer of the bigger part of traditional classroom to the extracurricular (independent) part of learning.

According To Klarin (2002), interactive learning is based on the participants' own experience, their direct involvement in the mastered area, where the teacher does not give ready knowledge, but encourages the participants to self – search, thus his task is to create conditions for their initiative. Dewey (1938) noted that active and positive learning experiences influence students continuing lifelong learning.

The didactic potential of e-portfolio interactivity is connected with the need of the various actors of the educational process to use available instruments for communication.

E-portfolio interactivity involves integrating different technologies in education in different contexts to support learners in different ways (Linger; In: Chaudhuri, Cabau (eds.), 2017). Price and Kirkwood (2014) identified the following relevant forms and means of ICT in higher education:

- blended learning / e-learning / hybrid courses;
- audio / podcasts;
- video resources / lectures / games;
- multimedia tools;
- virtual laboratory / field work;
- blogs;
- collaborative tools / wikis;
- online forums / conferences / forums;
- electronic portfolio;
- online course;
- electronic voting system / personal response and assistive technology.

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

Barrett (2007) in describing the theoretical foundations of learning, interaction and cooperation of various participants in the educational process using the e-portfolio notes:

- common functions of e-portfolio and social networks, including search and exchange of information;
- difference between e-portfolio and social networks in their focus on evidence-based learning.

In his research, Linger (2017) proved the importance of instant feedback for students when using e-portfolio in the learning process. The interactivity of e-portfolio allows students to understand first of all whether they are effectively studying the material or performing the tasks assigned. A teacher should take into account the didactic capabilities of mobile devices in the classroom or extracurricular work of students, when evaluating and analyzing artifacts in individual e-portfolios (Linger, 2017).

It should be noted that when studying the interactivity of e-portfolio, the researchers note using Google Forms to send anonymous feedback, fixation of reflection on intermediate or final learning outcomes for personal and professional development of students. The results of this feedback are placed in a group or individual electronic portfolio and become a subject for discussion in the implementation of various tasks (Linger, 2017).

We support the point of view of the researchers (Rogers, 2002; Winter, 1997; Klarin, 2000; Kulikova, 2014) in the use of the didactic potential of e-portfolio as interactivity and learning based on the digital framework of education, that paramount for the teacher becomes the role “facilitator” who organizes, directs and adjusts the cognitive activity of students on the basis of optimal, pedagogically appropriate by the digital framework of education.

Another significant didactic property of e-portfolio is **multimedia (multimodality)**.

Electronic portfolio has the features of multi-media. It can include animations, audio and video clips published on the Internet and created by students themselves, presentations, images, photos, links to profiles in social networks, author blogs, Internet forums, cloud services.

It should be noted that in modern studies one of the actual properties of e-portfolio along with multimedia is ‘multimodality’. The authors attribute the importance of this to the active development of digital and mobile technologies that have made changes in the ways and forms of communication and interaction of various participants in the educational process (Lirola, 2018; Lemke; in Gee & Handford (Eds.) 2012; Livingstone, 2008).

‘Multimodality’ refers to the integrated use of different modes of communication (Lirola, 2018). T. Van Leeuwen; in Hart & Cap (Eds.) (2014) define multimodality as the integrated use of various semiotic resources (e.g. language, image, sound, music) in texts and communicative events.

The use of the e-portfolio multimodality in teaching allows to establish interaction between participants of the educational process. Multimodality is used by various means of communication: the Internet, advertising, television, social networks and others. Multimodality of e-portfolio allows to use various ways of communication in educational process promoting increase of students’ motivation and their inclusion in training due to dynamism and creative approach.

Multimodality of e-portfolio is connected with the need to implement a process of continuous formative assessment of educational outcomes and development of competencies of students using various methods of communication and feedback (Lirola, 2018). When starting and further developing an individual e-portfolio, it is necessary to consider the main competencies and goals formulated before the evaluation procedure.

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

We share the point of researchers that it is possible to increase the level of students' competencies development by means of e-portfolio while creating the following organizational, pedagogical and methodological conditions:

- to use different methods of evaluation, including mutual evaluation and self-evaluation for active inclusion of students in the educational process;
- to provide teachers with detailed up-to-date information about the current educational activities of students, their individual educational progress;
- to integrate e-portfolio into the learning process and digital educational environment;
- to develop and implement a methodological system of support for teachers and students on the use of e-portfolio;
- to choose tasks for students in accordance with the main objectives of training and planned competencies;
- to determine the criteria for assessing the level of competence of students;
- to perform continuous reflection and self-reflection of students, to justify the choice of tasks in order to achieve the planned educational results;
- to apply the acquired skills and competencies in various activities, in the design of individual educational trajectories (Smolyaninova, 2016; Lirola, 2012, 2018).

The researchers have developed guidelines for the use of multimodal properties of students' e-portfolios with the support of Mahara application resources. When describing the multimodal reflective portfolio of students studying English, the Georgia Institute of Technology describes the following purposes of its use:

- accumulation and documentation of the results obtained during the training period, corresponding to the objectives and goals of the educational course, demonstrating the acquired competencies;
- continuous reflection on intermediate learning outcomes for their further successful implementation in professional activities.

When describing the methodological aspect of using e-portfolio in teachers training we note the following significant functions:

- *diagnostic (assessing)* - reflects the aspects of intended personal and professional development of the student;
- *controlling (corrective)* - allows to take into account the features of educational and cognitive activity of students, the level of their professional learning, educational needs and professional interests, to determine and adjust educational deficits;
- *evaluation* - provides an opportunity to receive feedback from the participants of the educational process, to assess individual educational results and personal achievements for the design of individual educational paths, the formation and development of competencies;
- *organizational* - provides development of goal-setting, planning, designing and forecasting of professional activity skills, personal and professional growth, ability to self-organization;
- *operational* - takes into account individual skills in the course actions, the ability to self-development in the activities in the digital educational environment;



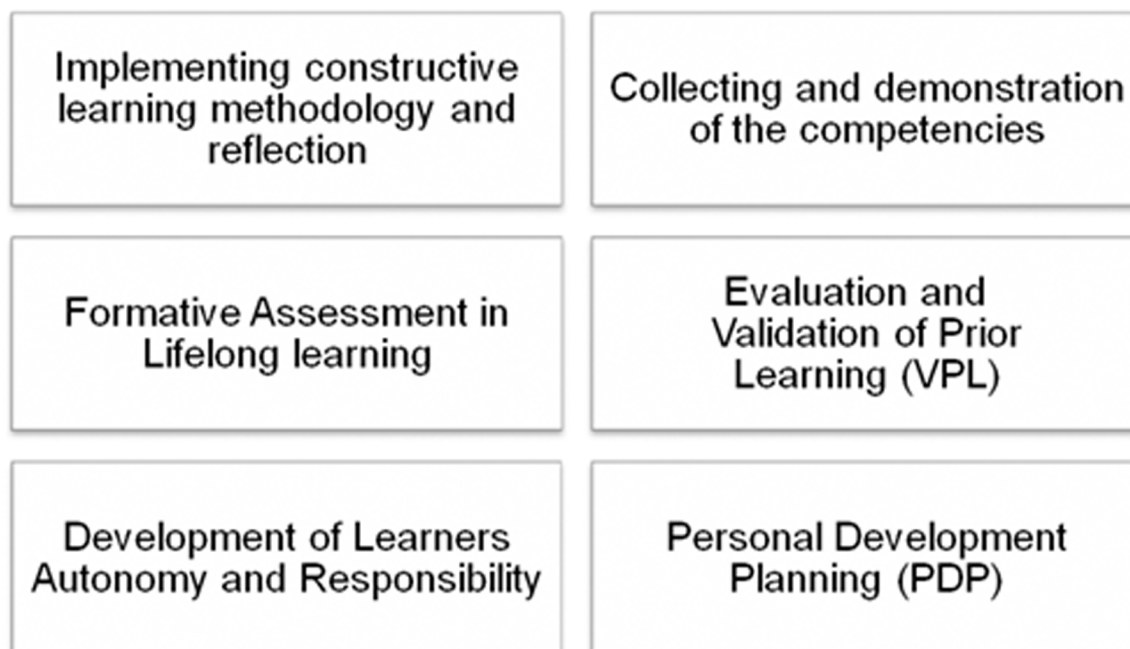
**Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes**

*Table 2. E-portfolios: didactical properties and methodological functions*

Didactic qualities of e-portfolio	Description of methodological characteristics of e-portfolio
<i>Interactivity</i>	Changing the teachers and students interaction mode (from the role of ‘Speaker’ to Converter and Facilitator); 24/7 implementation of productive feedback between the educational process actors; support for continuous reflection and self-reflection of students
<i>Multimedia (multimodality)</i>	Using multimedia components of different formats in an individual e-portfolio: images, videos, audio files and / or links, announcements or blog / forum posts, recorded speeches, presentations (PowerPoint / Prezi), screenshots, podcasts, scripts, handouts, brochures, posters, websites, wikis, Twitter/YouTube channels, Google docs, PDFs, author streams.
<i>Publicity</i>	Realization of teacher’s activity and pedagogical creativity; providing detailed actual information on current educational activity of students, their individual educational progress to teachers; development and use of methodical system of support of teachers and students on use of e-portfolio.
<i>Nonlinearity</i>	Expansion of the content and making adjustments by the participants of the educational process: the author of the e-portfolio, other students, teachers, parents, experts, employers. This didactic property creates conditions for the implementation of gradual creation of a group electronic portfolio.
<i>Integrativity</i>	Using educational and methodological support and electronic educational resources in students training. Establishing links between the structural elements of the electronic portfolio of students and the subjects of the educational process at different levels: content, technology and organization

- *motivational* – formation and increase of the level of educational and professional motivation, students’ interest in research work, extracurricular (social, cultural, creative, sports) activities; development of their ability to self-determination;
- *reflexive* – develops the skills of the self-assessment of educational outcomes, including the formation of personal criteria and indicators for subsequent adjustment; allows to determine the in-

*Figure 2. Pedagogical meaning of the e-portfolio use*



### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

consistencies of the results with the goal, the reasons of that, flexibly adapt to changing conditions (the Georgia Institute of Technology, 2017).

To implement the didactic benefits of multimodality, the e-portfolio must include mandatory multimodal elements: images, videos, audio files and / or links, suggestions or blog/forum posts, recorded speeches, presentations (PowerPoint / Prezi), screenshots, podcasts, scripts, handouts, brochures, posters, websites, wikis, blogs, Twitter/YouTube channels, Google documents, PDFs, author streams (the Georgia Institute of Technology, 2017).

Multimodal elements of e-portfolio are artifacts of students' learning activities and confirmation of their effective interaction with participants of the educational process, successfully integrated with text files. The results of analysis of the didactic properties and methodological functions of the electronic portfolio are presented in Table 2.

Among traditional pedagogical meanings of e-portfolio use there is also implementing constructive learning methodology and reflection, evaluation and validation of prior learning (VPL), personal development planning (PDP), formative assessment in lifelong learning, development of learners autonomy and responsibility, collecting and demonstration of the competencies, we can point out absolutely new e-portfolio values for Russian education reality: it is the open recognition of non-formal educational outcomes and development of open ecosystems (Figure 2).

In the current context of higher education, e-portfolio is considered as a component of the holistic University concept, being a means of a change in the interaction between the subjects of the educational process (Smolyaninova, 2014).

We observed a shift of significance of assessment means – from teacher's evaluating formal knowledge to student's self-assessment, continuous educational reflection; between ways of interaction: from the transmission of knowledge to the interactive mode, continuous dialogue and joint activities.

Among the issues of multi-dimensional evaluation of educational outcomes of Bachelors and Masters by means of e-portfolio, we can point out the need to create the following conditions:

1. to form a unified state educational concept of using e-portfolio at all forms and levels of education and consistent systematic control of its implementation;
2. to develop regulatory documents that allow to present e-portfolio artifacts as an entrance exam for admission to Master's/ postgraduate of Education;
3. to use e-portfolio in the educational process throughout the period of training Bachelors, Masters and postgraduates at University and beyond;
4. to develop the concept and organizational and pedagogical conditions for validation of formal and significant non-formal educational results of undergraduates: professional, educational and personal;
5. to create an open system of using interactive e-portfolio tools by all participants of the educational process.

In this study we consider more details of complex assessment of educational outcomes, such as the involvement of e-portfolio in lifelong learning inside and outside University, updating and storage of important formal and informal educational outcomes and the use of interactive e-portfolio by the actors of education.

The e-portfolio technology at School of Education, Psychology and Sociology of Siberian Federal University has been implemented for more than 10 years by now. Figure 4 shows the timeline history

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

of the portfolio integration in the future teachers' training. In the years 2007 - 2009 it was implemented at the level of Bachelor's and Master's degree students. From 2010 to 2012 it was the expansion of the boundaries and e-portfolio became a popular tool for professional and personal development. For the last two years e-portfolio is being a tool for evaluation of intercultural competencies. We are piloting a new platform for the creation of e-portfolio in a practice-oriented approach of training. Since 2016 the e-portfolio technology has been used in the preparation of tutors using different models of blended learning. In 2017 we are assessing the results of students' informal learning in the international student's summer school "Intercultural Mediation in Education" and starting the use of the Open Badges technology in Master's program for open recognition. In the School of Education, Psychology and Sociology, Siberian Federal University this technologies are implemented in the paradigm of lifelong learning. Students create personal E-portfolio on their 1st year and fill it with materials within 4 years of study. Further they develop their portfolio in Master's for 2 years, and for 3 years in graduate schools.

Otherwise undergraduates start developing their teacher's professional portfolio. In addition, e-portfolio is used as a tool for effective passing of accreditation procedures of educational programs, the development of e-learning and assessment of educational outcomes.

Currently, the main purposes of using e-portfolio at SibFU are:

1. e-portfolio is an important part of the SibFU e-learning strategy.
2. It is the technology for personal and professional development of competences in lifelong learning.
3. It is aimed at presentation and open recognition of lifelong learning outcomes.

Students and professors of SibFU use e-portfolio for:

*Figure 3. Section "Achievements" of a future teacher on the webpage of the corporate service "My SibFU"*



### *Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes*

- presentation of students, Masters, postgraduates achievements;
- mobility programs for students and staff;
- presentation of professors’ scientific and professional achievements;
- teaching training: facilitation, tutoring, coaching.

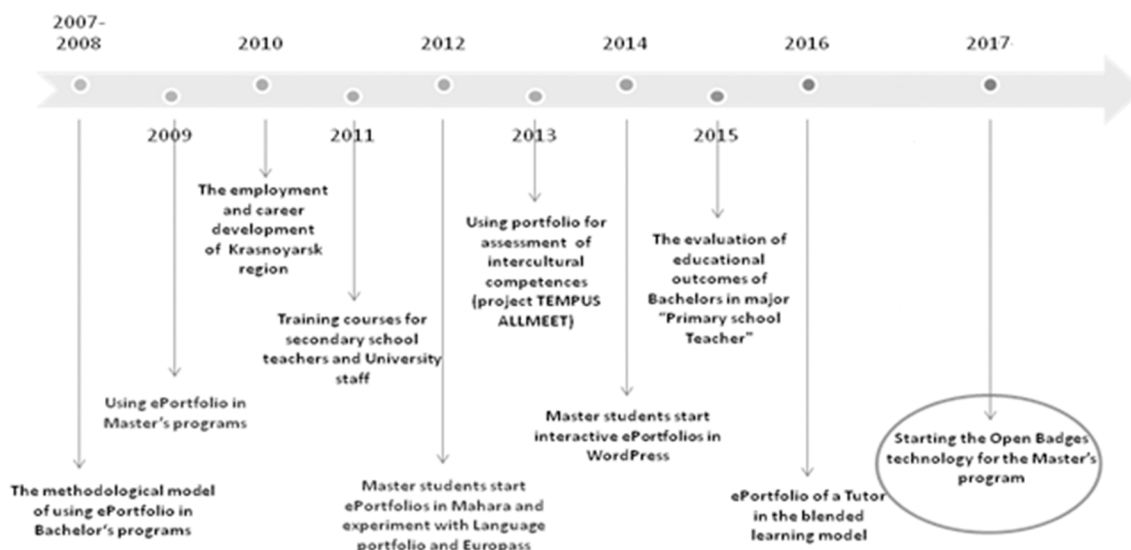
If earlier portfolio was created only by the students and teachers of our institute, it is now compulsory for all students of Siberian Federal University. In 2017 SibFU developed the regulation for the electronic portfolio for all students. It defines the rules to fill portfolio with artifacts of teaching, research and creative achievements for students of all majors. The environment was defined in which portfolios are created and stored: an electronic system “My SibFU”. The main sections to fill out are the following: achievements; project activities; publications; language portfolio. In addition, e-portfolio allows to meet the requirements for the personal data protection. For example, an e-portfolio author can close the access to certain sections or subsections. Due to the fact that the e-portfolio of students is one of the components of universities digital environment, access is possible only for registered users of the corporate network. An example is the information about the achievements of employees and students, located on the corporate resource “My SibFU”. Figure 3 shows the section “Achievements” of the future teacher on the corporate service “My SibFU”.

It builds digital identity inside the University and provides new opportunities for mobility and scientific projects.

Besides training Courses in Bachelor’s and Master’s Curricula, we implement e-portfolio as a part of the final state exams, as a resource of the lifelong learning e-platform. We organize e-portfolios competition among students annually. At the final state exams e-portfolio is used for demonstration and assessment of competencies. When studying English, students create Language passport in the Europass CV form.

Siberian Federal University has a long experience of using e-portfolio technology in the constructive learning paradigm.

*Figure 4. The experience of using e-portfolio technology in the constructive learning paradigm*



### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

*Figure 5. Examples of Open Badges designed by Master's students in the e-learning course "E-portfolio and open recognition of achievements in lifelong learning"*



About the e-portfolio technology we can say that it is quite traditional and understandable educational technology for Russian students and teachers. But the Open Badges technology is unknown, not understandable and not popular among teachers and educators either in schools or at University, neither in Russia, nor in CIS countries. We have conducted a small survey. The results are the following: 78% of students 95% of teachers said they do not know what the Open Badges are. Those who had heard anything about this technology noted unclear understanding of how it's possible to use in teaching learning process. But 60% of all respondents support the idea of open recognition of formal and informal outcomes. We started to introduce Open badges technology in educational process in 2017–18 academic years (Figure 4).

Within the framework of the discipline, with the support of the e-learning course "E-portfolio and open recognition of achievements in lifelong learning", the Masters students developed a structure, described competencies and criteria for their assessment, created visual images of electronic mini-diplomas – Open Badges for various courses and real social projects. Examples of some of them are shown in Figure 5.

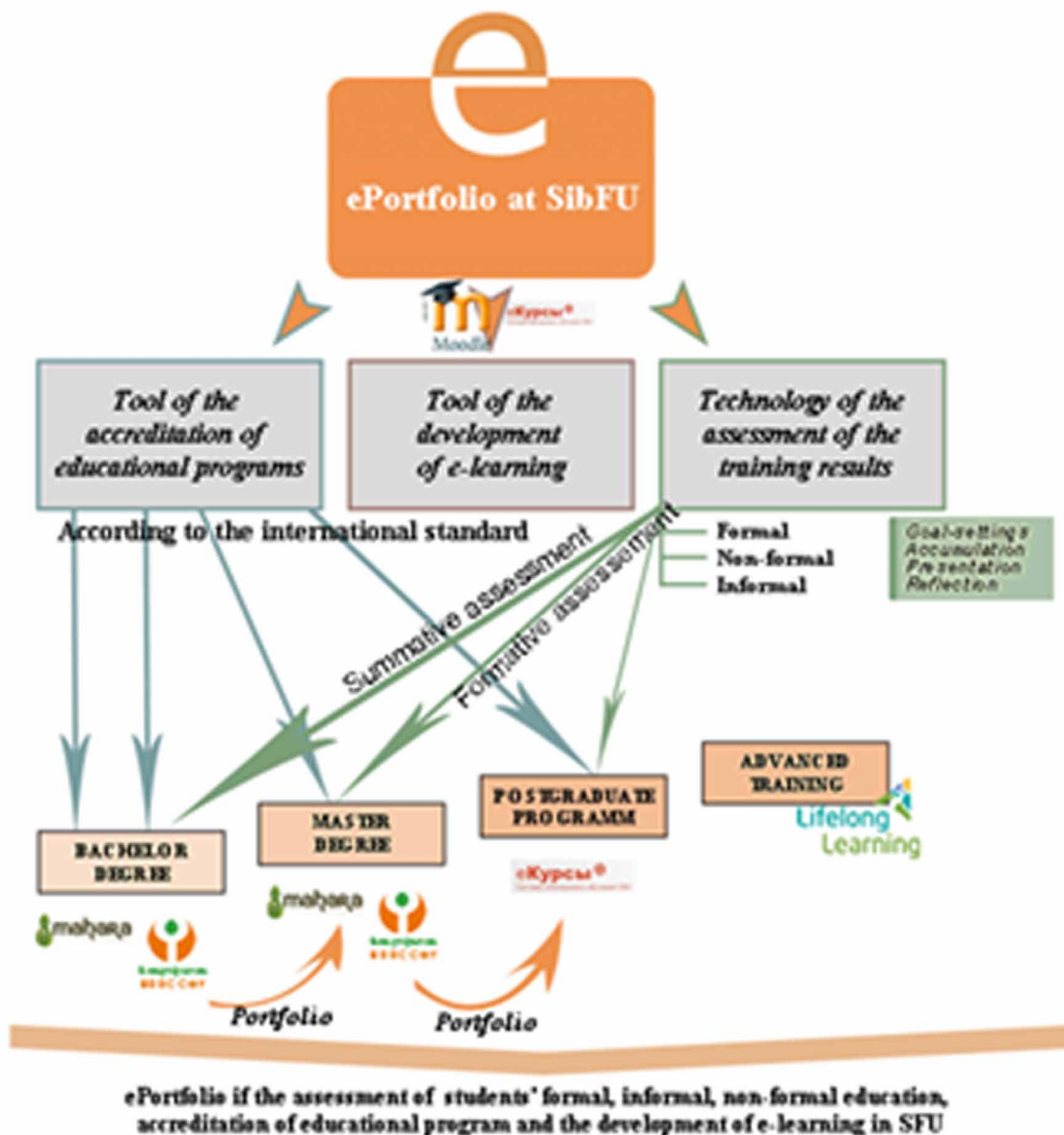
Recruiting bachelors within the new educational paradigm of the open evaluation of the both formal and informal education learning outcomes was accomplished in the event-related environment of the international summer school.

As products of learning on student summer school Intercultural Mediation in Education, participants published reflective essays, projects, certificates, letters of appreciation, reports on School cultural and educational events in their e-portfolios. In the summer school we had multi-dimensional evaluation, especially deliberated for the assessment of competency that was formed during the School. We assessed cognitive, emotional and behavioral components. We used validated questionnaires, made the incoming survey, evaluated project competencies; monitored the scale of emotional feedback on School events daily. The results of the use of e-portfolio and Open Badges technologies presented in the series of monographs entitled Practices of Lifelong Learning in Training Future Teachers: Multicultural Context.

Based on our experience, it requires specific steps for implementation and dissemination of the ideology of the open recognition of the educational outcomes and the Open Badges in Russia. Among them: communication and demonstration of benefits, a discussion of the risks, training and retraining teachers, support from employers and from the Ministry of Education and Science of the Russian Federation.

**Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes**

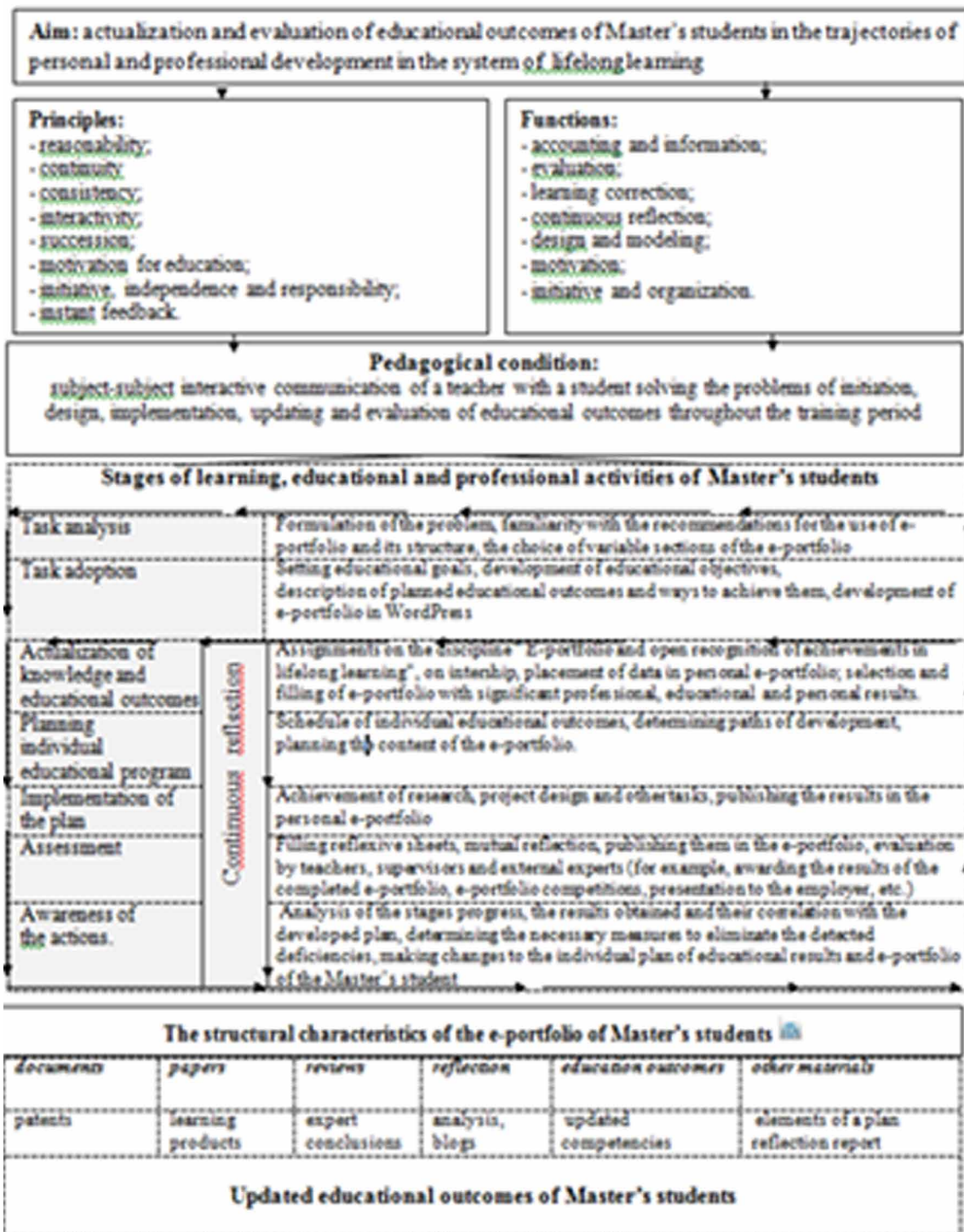
Figure 6. Using the e-portfolio at Siberian Federal University to evaluate the results of formal, informal and non-formal education



School of Education, Psychology and Sociology, Siberian Federal University was the first ideologist of the strategy of open recognition of the educational outcomes and Open Badges technology in Russian education system by presentations and dissimulation the strategy of open recognition at various conferences for the professional pedagogical community.

**Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes**

Figure 7. Model of E-portfolio of the Master's student majoring in Education, focused on the assessment of educational outcomes of students



## *Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes*

### **SOLUTION AND RECOMENDATIONS**

On the basis of theoretical and pedagogical research, we developed a model of using the e-portfolio at Siberian Federal University to assess the outcomes of formal, informal and non-formal education of Bachelors, Masters, postgraduates and advanced training (figure 6).

At the next stage of the study, a model of e-portfolio of the Master's student of majoring in Teacher Education was developed and tested. It is focused on assessing the educational outcomes of students and their further employment. The model diagram is shown below in Figure 7.

We have developed this model taking into account the improvement of assessment of students' educational outcomes:

- actualization of the student's self-assessment of the process and results of their work, as well as mutual assessment between students;
- strive for formative assessment;
- collection of educational outcomes at the University and beyond for a long time;
- supposing the basic educational activities are training and cooperation;
- interactivity in communication between participants of educational process;
- strengthening the stimulating and differentiating role of evaluation;
- creation of personal training conditions and design of individual educational program.

To design the structure of the electronic portfolio, focused on the evaluation of educational outcomes of Master's students, we used: systematic, activity theory, competence, personal-oriented, procedural-effective approaches.

The content of the model is based on the following principles: reasonability, continuity and consistency, interactivity, succession, motivation for education, initiative, independence and responsibility, instant feedback.

The analysis of acceptance and demand for e-portfolio and Open Badges showed that e-portfolio is popular in the Russian education practice. Unfortunately, Open Recognition is a rather controversial issue for the professional pedagogical community of Russia. The technology of Open Badges is not well-known and not popular among both students and teachers. Only 1% of professors and 5% of students are familiar to it. It is connected with the Russian conservatism and teacher's stereotypes of "insularity", "protection", "borders". According to the survey, there are the stereotypes in Russian people's comprehension. Open Badges are associated with Komsomol, Pioneers, Military organizations, Sport rank badges, Computer games tokens and army medals.

What are we doing to make changes? The new course e-portfolio and Open Recognition Technologies in Lifelong Learning in the Master's curriculum for 80 students was designed to overcome these barriers. The course is given in blended learning. During classroom activities, we use interactive pedagogical technologies: discussions, project activities, business games and data modeling. During group work students discuss models and criteria of competencies assessments. They create the group project of some activity or event and its outcomes assessment. They present the project in the class and discuss the Open Badges graphics, describe the issuer and recipient. Further they work individually in the Moodle e-course [<https://e.sfu-kras.ru/course/view.php?id=13761>].

The course consists of four modules.







## ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***



*Figure 8. Outline of the course e-portfolio and Open Recognition Technologies in Lifelong Learning*

---

Направление подготовки : 44.04.01 Педагогическое образование  
Магистерская программа: 44.04.01.06 Менеджмент образовательных инноваций  
Год набора : 2017

-  **Объявления**
-  Рабочая программа дисциплины \_Е-портфолио и открытое признание личностных и профессиональных достижений в течение всей жизни
-  Фонд оценочных средств по дисциплине \_Е-портфолио и открытое признание личностных и профессиональных достижений в течение всей жизни
-  Методические рекомендации по созданию индивидуального Open Badges


Автор-разработчик О.Г. Смолянинова

-  Требования к зачету \_Е-портфолио и открытое признание личностных и профессиональных достижений
-  Выписка из заседания кафедры на реализацию УМО

---


20 ноября - 27 ноября

**МОДУЛЬ 1.**  
**Методология открытого образования. Технология открытого оценивания.**

-  Введение к курсу



Автор презентации: О.Г. Смолянинова

**Аудиторная работа**

-  Лекция №1. Методология открытого образования и открытого оценивания

Автор презентации: О.Г. Смолянинова

**Внеаудиторная работа**

-  Задание № 1. Создание Learning Agenda. Самооценка "мягких" компетенций
-  Задание № 2. Описание платформы открытого образования

Module 1. Methodology of open education. Open assessment technology.

Module 2. Open technologies and open education standards. Validation of Prior Learning (VPL) technology.

Module 3. Methodology and technology of Open Badges in education and career.

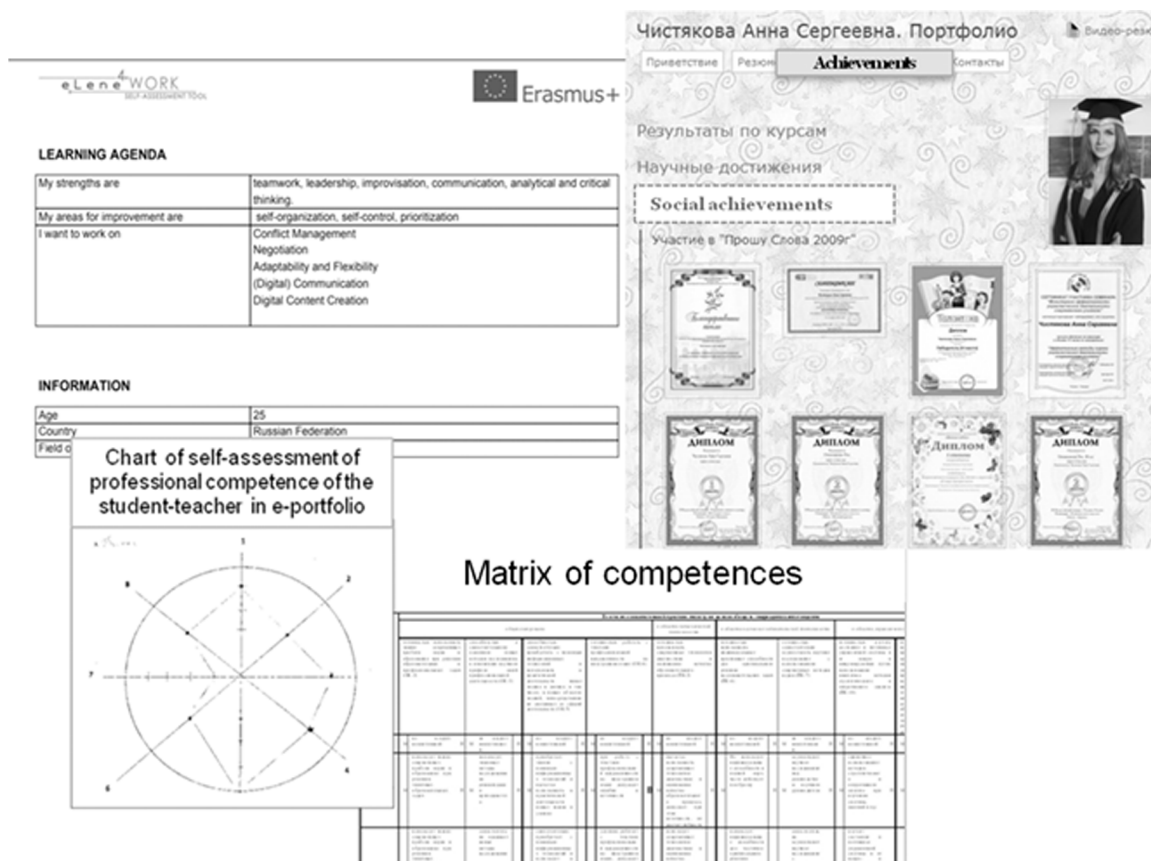
Module 4. e-portfolio and Digital Identity. A screenshot of the E-portfolio and Open Recognition Technologies in Lifelong Learning e-learning course is shown in Figure 8.

The types of activity of students in the training are the following:

1. Graphic design of the Open Badges and assessment models.
2. Learning Agenda created by means of self-assessment tool [<http://sa.elene4work.eu/selfassessment.php>]. Self-evaluation of soft competencies.
3. Filling in the content of an individual e-portfolio.
4. Upgrade of the innovator-teacher's digital competence.
5. Using social media (Google, YouTube) and e-learning courses (Moodle).

**Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes**

Figure 9. An example of a student’s portfolio artifacts



The methodology and training materials were presented in the e-learning course. The outcomes were published in the individual e-portfolios and later students tested them during the teaching internship. Figure 9 shows students’ published achievements in individual e-portfolios.

The methodology of achievements recognition is innovative for the Russian education system. Only in the last decade, Russian educational institutions switched to the open comprehensive expert evaluation thanks to ICT technologies and the competence paradigm. When studying Open Badges as a part of our course, undergraduates began by discussing the ways to measure competencies, independent evaluation and recognition of educational outcomes of not only formal, but non-formal education. Teaching methods used were small group discussion, business games, case-study. Students designed learning situations, educational outcomes, competencies, indicators of their assessment, target groups of Open Badges recipients and issuers and graphic design of Open Badges. The projects were discussed at seminars, and the Open Badges drafts were demonstrated in the student’s portfolios. For their projects, students took not only educational but social, arts, sports, volunteer topics.

## *Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes*

### **FUTURE RESEARCH DIRECTIONS**

Having analyzed the world experience of using e-portfolio in the educational environment of universities, we have identified the main pedagogical conditions for its effective use in assessing the educational outcomes of Bachelor's and Master's students majoring in Education. It is possible by means of development of the model and structure of the e-portfolio, focused on evaluation, justification of the Bachelors and Masters outcomes in the framework of competence approach and lifelong learning, testing and implementation of interactive e-portfolio in the educational process and accompanied by its recommendations for use in the University.

The structure of the model includes aim, structural, content and outcomes components. The e-portfolio, designed and used taking into account the proposed model, provides an opportunity for long-term and multilateral monitoring of the educational outcomes of the Master's student in the University and beyond.

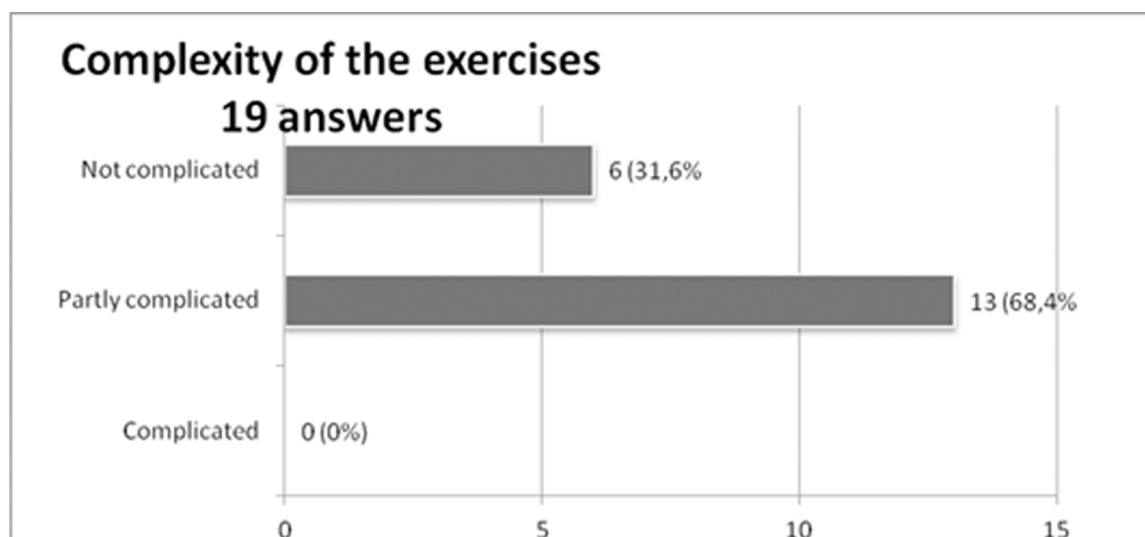
This scientific and methodological experience can be circulated in the digital framework of education for the other majors and profiles of training. It is aimed at development of students' electronic portfolio used for e-learning and distance educational technologies in the development of information and educational environment of universities.

The obtained scientific results of the use of the electronic portfolio can be used by students of universities, teachers, authors of textbooks and teaching manuals, as well as teachers, tutors, advanced training teachers as well as for the design of variable parts of educational programs of Bachelor's and Master's programs.

### **CONCLUSION**

The topicality of scientific, theoretical and methodological grounds for the use of electronic portfolio and Open Badges in assessing educational outcomes of undergraduates is due to the need for lifelong

*Figure 10. Students' feedback on the content of the course*



**Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes**

Figure 11. Students' feedback on the course

Comments:	
1	"Excellent feedback, interesting resources, meaningful tasks".
2	"Comfortable conditions for creative self-expression".
3	"Creativity, discussions, collaboration and teamwork".
4	"Positive and emotional educational environment".
5	"New information. Interesting course tasks. A lot of skills can be applied in our professional activities"
Recommendations:	
1	Increased number of hours for project design.
2	Video tutorials on the development of individual Open Badges

learning, taking into account the basic requirements of academic and professional standards and the open labor market.

These requirements reflect the need to change the content and style of interaction between the participants of the education process and affect the assessment in the information educational environment of the University for the effective integration of teachers in the global educational environment.

In assessing the educational outcomes of undergraduates, the priority areas are: continuity of reflection and learning in various formats, updating and demonstration of educational results and achievements online, providing feedback to improve the learning process.

Modern means of assessing the results of personal and professional development of undergraduates are electronic portfolio and Open Badges, which allows you to update, accumulate and demonstrate significant results of educational and extracurricular activities of undergraduates throughout the period of study at the University and beyond, and focused on the exchange of learning experiences, providing continuous communication between the participants of education process.

As a reflection, the Master's students filled in an online evaluation forms on the Google Docs. More than 60% of Masters noted that the tasks are of average complexity. This confirms that they are ready to Open Recognition and using Open Badges (Figure 10).

Students gave some comments and recommendations after the course. They were satisfied with the interactivity, emotional, creative and open cooperation during the learning process. Students noted the issue of the Open Badges developed as the evaluation of professional activity to be a significant event (Figure 11).

For dissemination of the open recognition methodology (in Russia and regions) at first a digital ecosystem of open badges within a Federal University should be created.

The Open Recognition Ecosystems, implemented in the educational process, should reflect the stages of training and development of soft and professional competencies of students in lifelong learning.

It can be interesting and useful to students for the following reasons:

- personal social value;
- digital identity;

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

- increased employment opportunities;
- academic mobility.

Creating an open space for sharing educational content and recognition is a key factor in promoting social integration of students in the open ecosystem Yenisei Siberia.

### **ACKNOWLEDGMENT**

*The research is supported by the Russian Foundation for Basic Research (RFBR). No 19-013-00528 «The study of mediation practices in the field of education for harmonization of interethnic relations in a multicultural environment».*

### **REFERENCES**

- Barrett, H. C. (2005). *White Paper: Researching Electronic Portfolios and Learner Engagement*. Retrieved from: <http://electronicportfolios.org/reflect/whitepaper.pdf>
- Barrett, H. C. (2007). Researching electronic portfolios and learner engagement: The Reflect Initiative. *Journal of Adolescent & Adult Literacy*, 50(6). pp. 436–449.
- Bowell, T., & Kemp, G. (2002). *Critical Thinking. A Concise Guide*. London, UK: Routledge.
- Clarín, M. V. (2000). Interactive learning—a tool for mastering new experience. *Pedagogy*. (No. 7. - pp. 12-18).
- Clarín, M. V. (2002). *Corporate training from A to Z*. Moscow, Russia: Delo.
- Clarke, S. (2008). *Active Learning through Formative Assessment*. London, UK: Hodder Education.
- Dewey, J. (1938). *Experience and education*. New York, NY: Macmillan.
- E-learning model of SibFU*. Retrieved from: <http://edu.sfu-kras.ru/elearning?page=3>
- Giannandrea, L. (2006). Different types of e-portfolios to support reflection and learning in post degree courses. In *Papers for publication at the e-portfolio 2006 International conference in Oxford - UK*. Retrieved from: <http://www.epforum.eu/proceedings/2006>
- Hwang, B. (2014). The Effects of Learning Portfolio-Based Program on Learning Competencies Perceived by Pre-Service Special Education Teachers. *Special Education Research*, 13(1). pp. 26–59.
- Ittelson, J. C. (2001). Building an E-dentity for Each Student. *EDUCAUSE Quarterly*, 24(4), 43–45.
- Jafari, A., & Kaufman, C. (2006). *Handbook of Research on E-portfolios*. IGI Global. doi:10.4018/978-1-59140-890-1
- Jan, D.-A. (2016). Bridging Open Badges and e-portfolio in a PDP ecology, One step further. *Education*.

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

Kulikova, N. Yu. (2014) *Methods of formation of readiness of the future teacher of Informatics to use interactive means of training*. (Doctoral Dissertation), Volgograd State Social Pedagogy University, Russia.

Lemke, J. L., Gee, P., & Handford, M. (Eds.). (2012) *Multimedia and discourse analysis*. In *The Routledge handbook of discourse analysis* (pp. 79–89). London, UK: Routledge.

Linger, W. S., Chaudhuri, T., & Cabau, B. (Eds.) (2017). *Finding Flow in the Classroom: A Case Study on Instructor Experiences and Likelihood of Continuing to Use Mobile Technology Tools and Gather E-Portfolio Content*. *E-Portfolios in Higher Education*. Singapore: Springer.

Livingstone, S. (2008). *Digital literacies: Tracing the implications for learners and learning*. Bristol: Economic and Social Research Council.

Mahara. (2016). *Multimodal e-portfolios of Georgia Tech students*. Retrieved from: <https://mahara.gatech.edu/>

Mandrick, P. A., & Kazachenok, V. V. (2013). *Technologies of interactivity in educational process*. Presented at International Congress on Informatics: information systems and technologies. Retrieved from: <http://elib.bsu.by/handle/123456789/52253>

Marsh, C. (2009). *School Assessment in the Holistic Way*. In V. M. T. Škraba (Ed.), *Didaktika ocenjevanja znanja: Vodenje procesa ocenjevanja za spodbujanje razvoja učenja*. Zbornik, 2, 76-82. Ljubljana: ZRSŠ.

Martínez Lirola, M. (2012). *Evaluating with a Portfolio in the European Higher Education Framework: An example from English studies* (Vol. 25, pp. 147–164). *Revista Española de Lingüística*.

Martínez Lirola, M. (2018) *Multimodal Teaching Evaluation with a portfolio in a Tertiary Education Language Classroom*, *Argentinian Journal of Applied Linguistics*, 6(1). pp. 25–43. Retrieved from: [www.faapi.org/ajal/issues/601/MartinezLirola.pdf](http://www.faapi.org/ajal/issues/601/MartinezLirola.pdf)

Pečjak, S., & Košir, K. (2002). *The themes from educational psychology*. Ljubljana: Filozofska Fakulteta.

Polat, E. S., & Bukharkina, M. Yu. (2007). *Modern pedagogical and information technologies in the education system*. Moscow, Russia: Academy.

Presant, D. (2019). *Recognize and share learning in a digital world*. Retrieved from: <https://cancred.ca/>

Price, L., & Kirkwood, A. T. (2014) *Using technology for teaching and learning in higher education: A critical review of the role of evidence in informing practice*. *Higher Education Research and Development*, 33(3). pp. 549–564.

Ravet, S. (2018). *Open Badges and Quality*. Retrieved from: <http://www.learningfutures.eu/2017/08/open-badges-and-quality/>

Riedingen, B. (n.d.). *Mining for meaning: Teaching Students how to Reflect*, In *Handbook of Research on E-portfolios* (pp. 90-102). IGI Global.

Rogers, K., & Freyberg, D. (2002). *Freedom to learn*. Moscow, Russia: Smysl.

### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

- Ross, D. A., & Gragam, G. (2006). Development of a pedagogical model for e-portfolios - the shapes of things to come? In *Papers for publication at the e-portfolio 2006 International conference in Oxford - UK* from 11 - 13. Retrieved from: <http://www.epforum.eu/proceedings/2006>
- Rupnik Vec, T., & Celin, I. (2013). Promotion, monitoring and evaluation of skills cooperation and communication. In *Psychology* (pp. 11–32).
- Seelig, T. (2012). *InGenius*. USA: Harper Collins.
- Self-assessment tool. (n.d.). Retrieved from: <http://sa.elene4work.eu/selfassessment.php>
- Shroff, R., Deneen, H. C., Lim C. P. (2014). Student Ownership of Learning Using E-portfolios for Career Development. *Journal of Information Systems Technology & Planning*, 7(18), pp. 75–90.
- Siemens, G. (2007). *E-portfolios Elearnspace*. Retrieved from: <http://www.elearnspace.org:80/Articles/e-portfolio.htm> 1.
- Smolyaninova, O. (2014) E-Portfolios in Teacher Education in Russia: Pathway From Assessment to Professional Development, In *Proceedings of 8th International Technology, Education, and Development Conference*, (pp. 6058-6064). Spain: INTED2014
- Smolyaninova, O. G. (2016) *Evaluation of the Lifelong Learning Outcomes by Means of the Electronic Portfolio: a monograph*. Krasnoyarsk: Sib.FU
- Smolyaninova, O. G., & Bezyzvetnykh, E. A. (2016). E-portfolio Technology in Evaluation of Students' Formal, Non-formal and Informal Learning, Accreditation of Educational Programs and Development of E-learning in a Federal University. In *Proc. 10th International Technology, Education, and Development Conference* (pp. 0614-0619). Valencia: INTED 16
- Smolyaninova, O. G., & Ryzhkova, T. N. (2009). New Technologies in Siberia: E-portfolio for Student Evaluation and Professional Development. In *Proc. of European Conference on e-Learning*. (pp. 540-548). Bari
- Smolyaninova, O. G., & Shilina, N. G. (2011). E-portfolio in Higher Educational Institutions of Russia. In *Proc. of Information technology interfaces*. (pp. 331-337). Cavtat.
- The Georgia Institute of Technology. (2017). *Multimodal Reflection Portfolio Instructions (2017-18)* Retrieved from: <http://blogs.iac.gatech.edu/wcppolicies/files/2017/08/Portfolio-Instructions-2017-2018-FINAL-.pdf>
- Van Leeuwen, T., Hart, C., & Cap, P. (Eds.). (2014). Critical discourse analysis and multimodality. Contemporary critical discourse studies. (pp. 281–295). London, UK: Bloomsbury Publishing.
- William, D. (2011). *Embedded Formative Assessment*. Bloomington, IN: Solution Tree Press.
- Zimnyaa, I. A. (1997). *Pedagogical psychology*. Rostov-on-don: Phoenix
- Zubizarreta, J. (2004). *The Learning Portfolio: Reflective Practice for Improving Student Learning*. Bolton: Anker.

## *Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes*

### ADDITIONAL READING

Balaban, I., Ravet, S., & Sobodić, A. (2019). E-portfolio Maturity Framework. In M. Auer & T. Tsiatsos (Eds.), *The Challenges of the Digital Transformation in Education. ICL 2018. Advances in Intelligent Systems and Computing* (Vol. 917). Cham: Springer.

Bulin-Sokolova, E. I., Obuhov, A. S., & Semenov, A. L. (2014). Emerging Teacher Education. Direction of Changes and First Practical Steps. *Psychological Science and Education*, 19(3), 207–226.

Duvekot, R. (2014). *The Power of VPL: Validation of Prior Learning as a multi-targeted approach for access to learning opportunities for all*. The Netherlands: EC-VPL. [et al.]

Kondakov, A. Shkola epokhi chetvertoi promyshlennoi revolutsii [School of the fourth industrial revolution]. Retrieved from: [https://ioe.hse.ru/data/2017/02/06/1167355033/Презентация%20АМ%20Кондакова%20\\_%20%20\(семинар%20ВШЭ\).pdf](https://ioe.hse.ru/data/2017/02/06/1167355033/Презентация%20АМ%20Кондакова%20_%20%20(семинар%20ВШЭ).pdf).

Kullaslahti, J., Ruhalahti, S., & Brauer, S. (2019). Professional development of digital competences: Standardised frameworks supporting evolving digital badging practices. *Journal of Sib. Fed. Univ. Humanities & Soc. sci.*, 12(2), 175–186.

Nowakowski, S., & Bernard, G. (2019). From digital humanities to a renewed approach to digital learning and teaching. *Journal of Sib. Fed. Univ. Humanities & Soc. sci.*, 12(9), 1682–1693.

Paniukova, S. V. (2014). Ispol'zovanie tekhnologii portfolio v obrazovatel'nom protsesse [The use of portfolio technology in the education process], in *Vestnik obrazovaniia Rossii* (vol.2, p. 66).

Pinskaia, M. A. (2007). Portfolio kak instrument otsenivaniia obrazovatel'nykh dostizhenii uchashchegosia v usloviakh profil'nogo obucheniia [Portfolio as a tool for assessing student's educational achievements in the profile training], (Doctoral dissertation 13.00.01, 24 p.) Moscow

Smolyaninova, O. G. (2014). E-portfolios in teacher education in Russia: pathway from assessment to professional development. In *Proceedings of 8th International Technology, Education and Development Conference* (pp. 6058-6064) Valencia, Spain: INTED.

Smolyaninova, O. G., & Bezyzvestnykh, E. A. (2019). Implementing teachers' training technologies at a Federal University: E-portfolio, digital laboratory, PROLog module system, *In International Journal of Online Engineering*, (Vol.15 (4), pp.69–87) Retrieved from: <https://online-journals.org/index.php/i-joe/article/view/9288>

### KEY TERMS AND DEFINITIONS

**Blended Learning:** A technology based on pedagogical expedient integration of traditional (classroom) and innovative (e-learning) based on the use of didactic ICT capabilities and specially selected pedagogical technologies.

**Digital Framework of Education:** A process of providing the sphere of education with methodology and practice of development and optimal use of modern ICT tools in the educational process, focused on the implementation of their didactic advantages in health-saving conditions.



### ***Eportfolios and Open Badges for Open Recognition of Lifelong Learning Outcomes***

**e-Learning:** Organization of educational activities with the use of information contained in databases and used in the implementation of educational programs and ensuring processing of information technologies, technical means, as well as information and telecommunication networks that provide transmission of this information through communication lines, interaction of students and teachers.

**Electronic Educational Environment:** A set of electronic information resources, electronic educational resources, information technologies, telecommunications technologies, appropriate technological means to ensure the development of educational programs or modules, as well as students' communication with faculty and administrative staff and among themselves.

**Electronic Portfolio (e-Portfolio) of a Future Teacher:** A set of educational and cognitive activity outcomes of a student, designed for subsequent analysis and comprehensive assessment of personal and professional development, created using ICT tools, digital resources and services. E-portfolio artifacts (supporting materials: projects, reports, documents, reviews, evidences, products of educational and scientific activities, etc.) are created, modified and presented by the future teacher to support reflection and ensure interaction with the participants of education process.

**ICT Competence of Future Teachers:** An integrative, dynamic personal quality that determines their ability to consciously integrate ICT technologies into professional and social activities for the productive completion of professional tasks.

**Information Society:** A society characterized by a high level of information and telecommunication technologies and their intensive use by citizens, businesses and public authorities.

**Multimedia e-Portfolio:** A multifunctional learning tool that ensures functioning of the appropriate learning environment, personality-oriented and practice-oriented approaches. Electronic portfolio can include animation, audio and video clips published on the Internet and created by students themselves, presentations, images, photos, links to profiles and pages in social networks, author blogs, Internet forums, cloud services.