ICT-based Learning Personalization Affordance in the Context of Implementation of Constructionist Learning Activities

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Abstract. How to enable students to create a personalized learning environment? What are the criteria of evaluation of the ICT-based learning process personalization affordance? These questions are answered by conducting multiple case study research of the innovative ICT-based learning process in iTEC (Innovative Technologies for Engaging Classrooms) project in Lithuania. Analysis of the research data led to discernment of evaluation criteria of personalization affordance and creation of a framework for the ICT-based learning personalization affordance, comprised of the following three groups of evaluation criteria: (I) 'extremely important' criteria, (II) 'essential' criteria, (III) 'important' criteria. Students, who performed various constructionist ICT-based learning activities as part of innovative learning scenarios, evaluated these according to the 'extremely important' criteria. A majority of students have agreed that the proposed learning activities enable them to feel more confident and engaged into the learning process. The framework for ICT-based learning personalization affordance should help other teachers enable personalized learning in daily practice.

Keywords: personalization affordance, ICT-based learning process, constructionist learning activities, evaluation framework.

1. Why Personalization Affordance?

1.1. *Relevance of Personalization Affordance Research*

Many authors emphasise the growing importance of personalization process in the educational systems of the modern world (McRae, 2010; Campbell *et al.*, 2007; Järvelä, 2006;

Bentley and Miller, 2006; Underwood *et. al.*, 2009; Miliband, 2006). P. McRae (2010) gives priority to personalization, 'where governments, teachers, parents and school communities are exploring visions of an education system that would embody increased flexibility (curricular and otherwise), innovation (technologies and pedagogy) and more individualized and self-directed approaches to student learning'. Novel approaches are often inspired by the social constructivist (Vygotsky, 1978) and constructionist (Papert, 1993) theoretical perception of the learning process. Pedagogical innovations take the forms of increased students' active role in construction of learning resources, learning environment and even more learning processes. These trends provide a good basis for consideration and deeper investigation of learning personalization process affordances enabling a learner to create his/her personal learning.

The systematic review of publications on personalization was carried out using the Web of Science citation information database, covering 5 international databases:

   (a) Science Citation Index Expanded (SCI-EXPANDED);
   (b) Social Sciences Citation Index (SSCI);
   (c) Arts & Humanities Citation Index (A&HCI);
   (d) Conference Proceedings Citation Index-Science (CPCI-S);
   (e) Conference Proceedings Citation Index-Social Science & Humanities (CPCI-SSH).

The search was based on the following key words: Personalized Learning Criteria, Personalized Learning Features, Personalized Learning Framework, Personalized Learning in School, Fostering Personalized Learning and Personalized Learning Affordance. Relevant publications were sorted from the array of options by the following two criteria identified from the research topic: first is the ICT-based learning personalization process in School, the second – Features and Criteria of Personalization Affordance. Only three publications out of 171 detected by the mentioned key words matched the selection criteria, as they were in line with the research on the ICT-based learning personalization affordance in school. Search was restricted to publications written in English and published between 2009 and 2014. Table 1 presents the search results.

Table 1

Publications search results in the *Web of Science*

Search key words	*Web of science* search categories by fields of science	Publications found, N
Personalized learning features	Computer science theory methods / Education educational research	68
Fostering personalized learning	Education educational research / Education scientific disciplines / Computer science interdisciplinary applications / Computer science theory methods	15
Personalized learning affordance	Education educational research	3
Personalized learning in school	Education educational research / Computer science interdisciplinary applications / Education scientific disciplines / Computer science theory methods	85
Total number of publications		**171**

The review has shown that the concept of personalization is widely used and differently defined. P. McRae also notes that this is 'an ambiguous and often broadly defined notion that has been hotly contested in the United Kingdom over the past several years' (McRae, 2010). Ambiguity can be traced in the e-learning personalization research, where the concepts and processes of personalization and individualization are assimilated, when learning is simply adjusted, adapted to various needs of a learner (Keller and Sherman, 1974; Kurilovas, *et al.*, 2011; Popescu, 2009). In this review as well as in other documents (Bentley and Miller, 2006; Underwood et. all, 2009; Miliband, 2006), the role of a learner is highlighted in the personalization process, and personalized learning is considered within the context of learning approach. The article deals with the personalization process with the key objective of discerning its essential features in order to provide school teachers with ICT-based learning personalization framework.

1.2. *What is Personalization?*

Personalization affordance is understood as the innovation of educational process, increasing possibilities for personalized learning practice. A well-known example of personalization in the web is creation of a profile in a social network: selection of a nickname, avatar, colour, templates design, etc. Using a variety of technologies to create learning activities or resources, a student can select objects, colours and design templates, on the basis of which personalized learning activities and new resources are constructed.

The article is based on S. Järvelä's approach, who suggests that 'when thinking about personalising learning, care must be taken to remain realistic in terms of the individual's ability to be a competent, adaptive, active, goal-oriented and motivated learner. It is also important to take into account the scope of the social and collaborative processes of learning communities' (Järvelä, 2006). S. Järvelä has reviewed research evidence and clarified key questions relating to personalization. She examines the 'power of personalised learning system along seven critical dimensions:

1. Development of key skills which are often domain-specific.
2. Levelling the educational playing field through guidance for improvement of students' learning skills and motivation.
3. Encouragement of learning through a 'motivational scaffolding'.
4. Collaboration in knowledge-building.
5. Development of new models of assessment.
6. Use of technology as a personal cognitive and social tool.
7. Teachers' new role in better integration of education within the learning society' (Järvelä, 2006).

These dimensions show that the power of the personalized learning system is of great importance due to a student's interaction with his/her learning environment, for instance, the processes of cooperation, social cognition in the community, the 'motivational scaffolding' processes. ICT-based learning personalization affordance is particu-

larly closely related with the student's engagement in the development of personalized learning environment and content, as technology also provides many opportunities for creative activities.

M. Johnson and K. Puplampu (2008) depicted the impact of the child's immediate environment applying U. Bronfenbrenner's model of the Ecological Systems Theory that considers a human to be a system. Bronfenbrenner has distinguished four ecosystems, namely, microsystem, mesosystem, exosystem and macrosystem, while from an ecological perspective, 'development is defined as the person's evolving conception of the ecological environment, and his/her relation to it, as well as the person's growing capacity to discover, sustain, or alter its properties' (Bronfenbrenner, 1979). M. Johnson and K. Puplampu note 'continuously increasing complexity and availability of childhood technology', and 'propose the ecological techno-subsystem, a dimension of the microsystem'(Johnson and Puplampu, 2008).

They have illustrated in Fig. 1, that 'the techno-subsystem includes child interaction with both living (e.g., peers) and non-living (e.g., hardware) elements of communication, information, and recreation technologies in immediate or direct environments. From an ecological perspective, the techno-subsystem mediates bidirectional interaction between the child and the microsystem' (Johnson and Puplampu, 2008). To balance this interaction, students' constructive engagement in not only adaptation, but also in change of the learning environment becomes an important assumption for the personalized learning affordance.
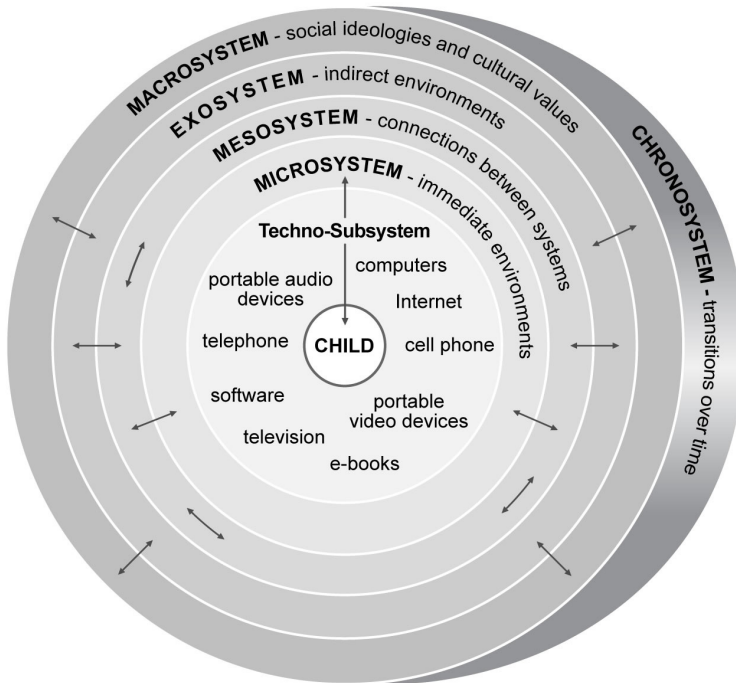

Fig. 1. Ecological Techno-Subsystem.

1.3. *Issues of Personalized Leaning Affordance*

One of the aspects of personalization problem is that, despite its relevance for schools, the majority of authors focus on personalization in the field of higher education. Implementing personalized learning innovation in schools is challenging because of lower order of students' autonomy, intrinsic motivation as well as their higher dependence on teachers. Another aspect of ICT use for personalized learning purposes is prevention of internet threats while developing learning skills in school-age children. Studies conducted in neighbouring Latvia have shown that 'IT education and school education are not related. Education was divided into two fields. The one is formal education formed in school, the second – informal and private education from informational technologies' (Purēns, 2012). This trend has also been observed by M. Johnson and K. Puplampu (2008) who have noted that modern technology proposes not only activities and devices, but also a lot of information available to children, for instance, video and other digital materials. In this way, children directly adopt and use the content proposed through ICT.

In light of the situation, implementation of personalized learning in basic schools would promote development of 21st century skills and enable learners to constructively use a wide range of tools and resources to achieve relevant learning objectives. To implement personalized learning with ICT teachers could rely on the features of best practices, where ICT support personalization. Investigation and description of such best practice would lead to understanding and describing such features, which would become the criteria of personalization affordance. These would allow perceiving and evaluating the process that enables a student to personalize his/her learning.

2. Case Study of the ICT-based Learning Personalization Affordance

2.1. *Research Methodology*

The research on personalized learning features was conducted in accordance with the above-listed seven dimensions (Järvelä, 2006) and based on the assumption about student's participation while developing and creating learning environment and content. The multiple case study of the personalization practice was carried out during the iTEC project in Lithuania. iTEC (Innovative Technologies for Engaging Classrooms) project funded by European Commission's FP7 programme is largest initiative to date on the design of learning and teaching for the future classroom (2010–2014). iTEC's general aim is 'to bring about systemic change, not through radical technological advances, but through progressive adoption of innovative Learning Activities that effectively use and exploit both existing and emerging technologies in order to better equip the children of Europe for the challenges of work and society through the 21st century' (iTEC, 2010).

The research object is the ICT-based learning practice and evaluation criteria of personalization affordance. The multiple case study deals with the cases of innovative ICT-based learning practices in Lithuanian primary school grades, and basic school grades 5–8.

The research aims at discerning the key features of the best innovative ICT-based learning practice, which can be applied as the evaluation criteria of the personalization affordance.

The research tasks are: 1) to discern the most common features of the ICT-based learning personalization; 2) to conduct the ICT-based learning personalization case study analysis; 3) to develop and evaluate the criteria of the ICT-based learning personalization affordance; 4) to create the framework of the ICT-based learning personalization affordance.

Multiple case study approach was applied to achieve the aim of the research; several selected cases of the best ICT-based learning practices were investigated to examine the issue of the learning personalization affordance. The case study was conducted in two stages.

During the *first stage*, the features of cases of the best practice were considered in order to discern the evaluation criteria of the personalization affordance. The case study was carried out in the context of the Lithuanian national education implementing the iTEC project. The case study data collected through interviews with iTEC teachers and their students as well as the analysis of materials of the projects implemented by teachers and students. After the analysis of each new case study, the obtained data were, by iterations, categorized, specified and compared with each other as well as with the data and findings of other theoretical and applied research. After the analysis of the multiple case study research data, the most general features of the ICT-based learning personalization affordance were discerned.

During the *second stage* expert evaluation of the ICT-based learning features and personalization affordance features was conducted under three different methods of evaluation applied in turns. The experts were selected taking into account the procedure of the evaluation method in order to ensure the reliability of the research data. The first method, i.e. an interactive anonymous survey of experts, adjusted and evaluated the features of the best practice discerned during the case analysis and the importance of features of the personalization affordance. The second expert evaluation method, i.e. focus group, was implemented in order to specify the features of personalization affordance and to arrange them according to priority. The third method was the questionnaire survey of a group of experts conducted to revise the wording of the evaluation criteria of personalization affordance and their arrangement according to priority. Summary of the expert survey data allowed creating the framework of the ICT-based learning personalization affordance.

2.2. *Scope of the Research and Respondents*

Since September 2010, 105 Lithuanian teachers have piloted the technology-based innovative learning scenarios in their classrooms. Table 2 shows involvement of the European countries in the first four iTEC cycles and the number of classes, where each country has piloted the project scenarios (iTEC, 2010). Over 300 classes in Lithuania participated in pilots of the ICT-based learning scenarios and activities.

Table 2 shows that Lithuania is the second after Turkey among all participating countries by involvement of the schools.

Table 2

Involvement of the European countries in the iTEC project

Country	Number of classes per cycle					Total
	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	
Hungary	47	50	54	41	21	**213**
Estonia	21	30	38	30	14	**133**
France	10	25	15	21	26	**97**
Italy	12	41	14	28	17	**112**
Lithuania	84	67	70	101	44	**366**
Turkey	42	36	82	190	80	**430**
Austria	20	22	20	76	17	**155**
Belgium	10	0	84	38	9	**141**
Israel	8	18	9	39	16	**90**
Norway	12	14	23	23	12	**84**
Portugal	13	32	33	35	12	**125**
Slovakia	14	14	20	20	43	**111**
Promethean schools	4	28	32	75	30	**169**
SMART schools	21	37	39	87	28	**212**
Finland	19	0	26	56	26	**127**
Czech Republic	4	4	14	14	44	**80**
Total classes	**341**	**418**	**573**	**874**	**439**	**2645**

All science, mathematics, information technology (STEM) teachers of primary and secondary school grades 5–8 in Lithuania were invited to participate in the project and to test various scenarios and technologies. Other subject teachers (e.g., geography, history, Lithuanian and foreign languages) also engaged in iTEC and successfully applied the proposed scenarios in other subjects, such as geography, history, Lithuanian and foreign languages, and integrated several subjects while developing projects implementing the Learning Stories.

2.3. *Case Study Procedure*

The first stage of the multiple case study was aimed at discerning the features of the best practices of ICT-based learning and personalized learning. The best practice case study data included interviews with iTEC teachers and their students as well as the analysis of the developed projects. Ten Lithuanian teachers and their students, i.e. ten classes, involved in piloting the iTEC learning scenarios and activities, were interviewed. These best practice case studies of the iTEC project were carried out in 1–5 cycles from September 2011 to April 2014.

The features of the best practice were identified after the analysis of teachers and students' semi-structured interviews, as well as resources created in educational projects. During all four stages of the project, general features of the ICT-based learning practice were categorized. Personalized learning was observed at final lessons of each project,

where students or groups of students presented their products developed with certain technological tools. These included virtual library on a subject of History implemented using *Wiki*, personalized *Glogster* posters about Natural Phenomena, *Prezi* presentations about the Alphabet, educational games designed with *Scratch*, etc. These examples illustrate cases of good practice of personalization of the learning process. There was no intention to categorize these facts according to the needs of individual students or groups of students, such as learning style, age or any other, as the aim of this study was to establish the framework for personalized learning affordance rather than search for individualized learning opportunities.

The second stage of the case study was aimed at revising the features of personalization and the criteria for personalization affordance discerned by the case study of the ICT-based learning best practice. For this purpose, experts were selected from the teachers participating in the iTEC project. The experts evaluated the criteria for personalization affordance in three steps using three different methods of evaluation. In order to ensure reliability of the research data, experts for each method were selected taking into account the expert evaluation procedure.

At the initial steps of expert evaluation, a survey of experts was carried out using the interactive voting system 'Promethean'. A group of 24 experts, i.e. all Lithuanian teachers participating in the iTEC project, who had reached the final cycle of the iTEC project and created the ICT-based learning scenarios, activities and learning stories, was formed. 3 questions were given for evaluation in turns:

(1) Do you agree with these aspects of the best practice? Propose your own.
(2) To what extent each of these aspects are important in creating future classroom (i.e., how innovative is this practice)?
(3) How important is this criterion for personalized learning affordance?

The evaluation was based on the scale from 1 to 9, where 2, 4, 6, 8 were intermediate values: 1 – equally important; 3 – moderately important; 5 – essential or very important; 7 – highly important; 9 – extremely important. This interactive survey of experts allowed specifying the evaluation criteria of personalization affordance and establishing their initial order of priority based on the average values of the expert evaluation. During discussions, the criteria were revised. The results are presented in Table 3.

Table 3 shows that the lowest criterion has been evaluated at almost 5, which means 'essential or very important'; meanwhile, the highest evaluation exceeds 7, i. e. 'highly important'. High ratings imply that experts recognize all the identified criteria as very important for personalization affordance.

The second step of the expert evaluation was carried out in order to verify the results of an interactive survey. Experts were asked to revise (where necessary) and evaluate the criteria during the focus group discussion by sorting the personalization affordance criteria by priority. A group of experts created this order of priority by arranging cards with the titles of criteria starting from the most important to less important. The order of the cards was adjusted until all experts reached common decision through discussions and argumentation. Table 4 presents criteria revised by experts in descending order of priority.

Table 3

Interactive survey of experts

Evaluation criterion of the personalization affordance	Average value
Teachers-students' role change and variety (students' autonomy and leadership, distribution of roles, responsibility, etc.)	7.2
Students' motivation	6.8
Diversity of learning resources and technologies	6.4
Principal support	6.3
Teachers' motivation	6.2
Possibility to adapt to the curricula, its level and goals, to choose the subject topic, etc.	5.8
Mixed learning spaces (in school and beyond)	5.2
Variety of assessment forms, recognition as one of the evaluation methods	4.9
Growing learning community	4.8

Table 4

Criteria in descending order of priority

Order	Criterion
1	Students' motivation
2	Teachers' motivation
3	Teachers-students' role change and variety (students' autonomy and leadership in the learning process)
4	Diversity of learning resources and technologies
5	Possibility to adapt to the curricula, its level and goals, to choose the subject topic, etc.
6	Growing learning community
7	Mixed learning spaces (in school and beyond)
8	Variety of evaluation methods, recognition as one of the evaluation methods
9	Principal support

The results have revealed that, according to the experts, the ICT-based learning process personalization affordance is particularly influenced by students and teachers' motivation as well as the increasing autonomy and leadership of students. This idea supports the comments expressed during the focus group discussion about the experience of observing students' leadership and reflections about the interaction of students of all ages with the learning environment.

During the third step of the expert evaluation, revision of the wording and order of priority of the personalization affordance criteria was performed by individual experts. Of all those wishing to submit their case studies of the iTEC best practice in ICT-based learning, 11 experts were selected for the survey. The summary of individual expert evaluation data (Table 5) allowed to create the order of priority of the ICT-based learning personalization affordance criteria and to develop the framework of the ICT-based learning personalization affordance.

Table 5 suggests that the trend of prioritization of certain criteria, which emerged after implementing the first two methods of expert evaluation, has remained. Teachers and students' role changes and students' motivation are given the priority.

Table 5

Individual expert evaluation

Priority assigned to the criterion	Criteria specified by the experts and the order of priority based on their evaluation	Individual agreement between the experts on the priority of a criterion	
		Number	Percent
1	Teachers-students' role change (students' autonomy and leadership in the learning process, teacher as an advisor, facilitator and friend)	11	100
2	Students' motivation to create the learning environment, develop tools and resources	8	72.72
3	Mixed learning spaces (in school and beyond)	9	81.81
4	Diversity of learning resources and technologies	8	72.72
5	Teachers' motivation to create the learning environment, develop tools and resources	8	72.72
6	Variety of evaluation methods, self-assessment, reflection, recognition as one of the evaluation methods	8	72.72
7	Possibility to adapt to the curricula, its level and goals, to choose the subject topic, etc.	10	90.90
8	Growing learning community; communication and collaboration, information sharing among schools	8	72.72
9	Principal support	9	81.81

3. Evaluation Results of ICT-based Learning Personalization Affordance

Based on the final expert evaluation data, the framework of ICT-based learning personalization affordance has been developed to help identify and evaluate the related practices. The framework comprised of nine ICT-based learning personalization affordance evaluation criteria, which can be sorted into 3 groups according to the given priority and consistency of expert opinions, i. e. according to the number of individual experts who had the same opinion on the order of priority of a criterion.

To begin with, one of the first two criteria that were unanimously assigned to a group of '*extremely important*' criteria was 1) *Teachers-students' role change (increasing autonomy and leadership of students in the learning process, teacher as an advisor, facilitator and friend)*. This criterion was attributed with high priority according to all experts' individual opinion. The second criterion that can be assigned to '*extremely important*' criteria of the ICT-based learning personalization affordance is: 2) *Students' motivation to create the learning environment, develop tools and resources*. When applying expert evaluation methods in turns, such criteria as teachers and students' motivation have become separated, received different quantitative evaluations and have different positions in the order of priority.

The second group of '*essential*' criteria includes five criteria from the second to the seventh position in the order of priority. At least 73 percent of experts supported such order of criteria in this group: 3) *Mixed learning spaces (in school and beyond)*; 4) *Diversity of learning resources and technologies*; 5) *Teachers' motivation to create the*

learning environment, develop tools and resources; 6) *A variety of evaluation methods, self-assessment, reflection, recognition as one of the evaluation methods*. Few experts gave preference in this group of criteria to teachers' motivation, one – to the diversity of learning resources and technologies, and another – to the variety of assessment methods. However, most experts agreed on the seventh criterion in the order of priority:

7) *Possibility to adapt to the curricula, its level and goals, to choose the subject topic, etc.*

The third group of '*important*' criteria includes the following: 8) *A growing learning community; communication and collaboration, information sharing among schools*; 9) *Principal support*. More than 90 percent of experts agreed on the order of priority of these criteria.

4. Students' Expertise on Personalization Affordance of the Constructionist Learning Activities

A student survey has been aimed at evaluation of piloted ICT-based learning scenarios according to the developed personalization affordance criteria. It has been conducted to investigate the opinion among the majority of students on the ICT-based learning scenarios activity according to the criteria of being "extremely important". Two questions on implementation of the scenarios according to the first two personalization affordance criteria have been developed on the basis of the case study evaluation results and properly agreed with the iTEC project teachers and experts of the case study. The students were asked these questions on the iTEC project piloted scenario activities. The first question has been aimed at verifying the compliance of piloted scenarios activities with the first criterion, i.e. how well (in the students' view) the proposed activity enabled them to experience new roles, 'feel autonomous, as experts, authors, experience success in learning'. Another question is intended to verify the compliance of scenarios with the second criterion, namely, how well (in the students' view) the proposed activity encouraged them to learn, i.e. stimulates their learning motivation.

Students' responses evidence that all the piloted ICT-based learning activities have largely complied with the ICT-based learning personalization affordance criteria of being "extremely important", i.e. are supportive of the ICT-based learning personalisation (Fig. 2 and Fig. 3).

In their answers to the first question 'How well have these learning activities enabled you to feel autonomous, as expert, creator, experience success in learning?', majority of students either 'agreed' or 'highly agreed' to all the activities subject to evaluation. These students have accounted for the following shares: 82 % – in evaluation of activity 'Outdoor study project', 90 % – in evaluation of activity 'Designing games, objects, storytelling', 91 % – in evaluation of activity 'Digital production of an educational movie, website development, online design of other digital tools', 83 % – in evaluation of activity 'Peer creation of online repository and learning resources', 71 % – in evaluation of activity 'Our school, our environment: using technology to raise environmental awareness' (Fig. 2).

In their answers to another question "How have these learning activities encouraged you to learn?", majority of students have also "agreed" or "highly agreed" to all the presented activities. These students have accounted for the following shares: 86 % – in assessment of activity "Outdoor study project", 84 % – in assessment of activity "Designing games, objects, storytelling", 86 % – in assessment of activity "Digital production of an educational movie, website development, online design of other digital tools", 81 % – in assessment of activity "Peer creation of online repository and learning resources", 82 % – in assessment of activity "Our school, our environment: using technology to raise environmental awareness" (Fig. 3.).

The figure (Fig. 3) suggests approval of the proposed scenarios by majority of students due to positive effect of the related activity on the learning motivation.
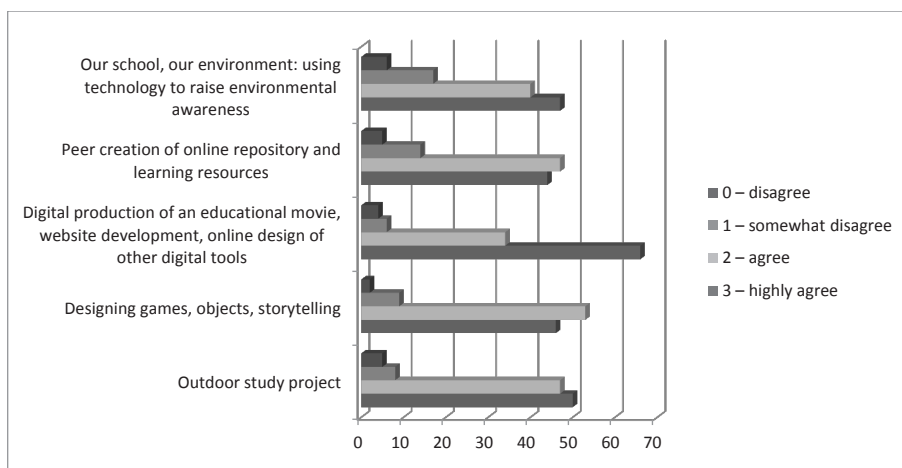

Fig. 2. Assessment of the innovative ICT-based learning activity in terms of personalization affordance according to the first criterion: teacher-students' role change.
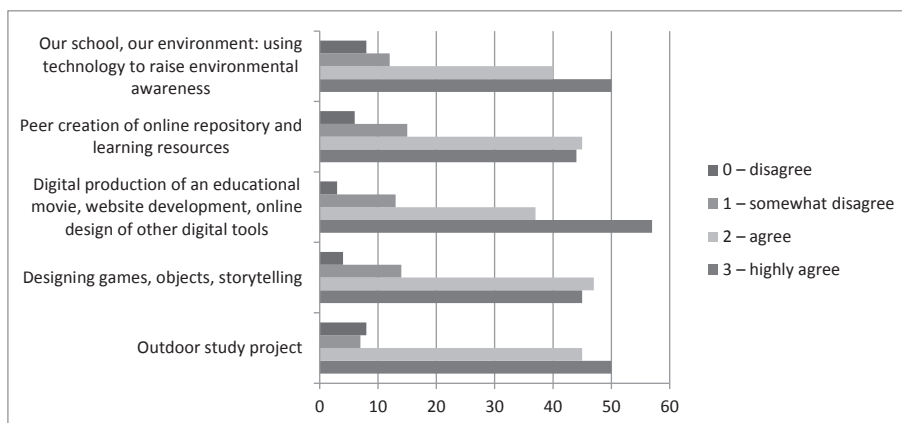

Fig. 3. Assessment of the innovative ICT-based learning activity in terms of personalization affordance according to the first criterion: students' motivation.

5. Conclusion

Based on the conducted study, *role change* can be claimed as an extremely important criterion in the development of the ICT-based learning process for the personalization affordance, as it manifests in the increasing autonomy and leadership of students in the learning process, where teachers assume the role of an advisor, facilitator and friend. Majority of the experts agreed on the leading position of this criterion, as well as the criterion *students' motivation to create the learning environment, develop tools and resources*, in the order of priority. Despite minor differences of opinions on the order of priority, experts have agreed that such criteria as '*teachers' motivation to create the learning environment, develop tools and resources, mixed learning spaces (in school and beyond), the diversity of learning resources and technologies'* are essential. In addition, such criteria as *a variety of evaluation methods, self-assessment, reflection, recognition as one of the evaluation methods* and *the opportunity to adjust the education program, its level and goals, to choose the subject topic* are also very important for personalization. Although some experts believe that the role of *the learning community* and *principals* should not be diminished, with only some of the participants rating these two criteria as very important during the discussions, the final evaluation has revealed that they can be viewed as important. These criteria finalizing the framework of ICT-based learning personalization affordance can be considered as social environmental factors, taking into account the fact that they relate not only to a student's and teacher's individual level during learning processes, but also to the school community and the wider social context. On the other hand, it is obvious that in order to make sure that the situation fully enables personalized learning, each criterion of the framework for the ICT-based learning personalization affordance should be applied as an integral part of the entire framework.

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IKT grįsto mokymosi personalizavimo įgalinimas konstrukcionistinių mokymosi veiklų diegimo kontekste

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Didėjančią personalizavimo proceso reikšmę šiuolaikinio pasaulio švietimo sistemose pažymi daugelis autorių. Vienas svarbiausių personalizavimo įgalinimo veiksnių šiuolaikinės mokymosi paradigmos kontekste, nurodomas daugelio autorių, – paties besimokančiojo vaidmens svarba, jo kuriamosios, konstrukcinės veiklos reikšmė mokymosi procesui.

Technologijoms tampant neatsiejama asmeninės mokymosi aplinkos dalimi jau vaikystėje, personalizuoto mokymosi diegimas mokykloje padeda ugdyti mokinių XXI amžiaus įgūdžius, įgalinti juos konstruktyviai naudoti gausias technologijų priemones ir išteklius. Kaip įgalinti mokinį susikurti personalizuotą mokymosi aplinką? Pagal kokius kriterijus atpažinti ir įvertinti personalizavimą įgalinantį IKT grįsto mokymosi procesą? Atsakyti į šiuos klausimus padeda IKT grįsto mokymosi inovatyvios praktikos požymių nagrinėjimas ir personalizavimo įgalinimo vertinimo kriterijų paieška. Šiam tikslui pasiekti taikytas atvejo tyrimo metodas, kai mokymosi personalizavimo įgalinimo klausimas tiriamas nagrinėjant kelis atvejus. Tai yra inovatyvios ugdymo praktikos pavyzdžiai keliose Lietuvos mokyklose ir klasėse, atrinkti vykdant iTEC projekto IKT grįsto mokymo(si) scenarijų ir veiklų pilotinius bandymus. Tyrimas leido įvertinti ir aprašyti inovatyvų mokymosi procesą personalizavimo įgalinimo požiūriu, sudarant nuoseklius ir susistemintus kriterijus. Konstrukcionizmo principais paremti inovatyvūs IKT grįsto mokymosi scenarijai ir veiklos įvertinti mokinių požiūriu ir rodo geras galimybes įgalinti mokymosi personalizavimą.

Atsižvelgus į tyrimo rezultatus nustatyti kriterijai yra esminiai, ypatingai arba labai svarbūs ir tiesiog svarbūs personalizavimo įgalinimo vertinimui ir sudaro IKT grįsto mokymosi personalizavimo įgalinimo gaires:

I grupė – „ypatingai svarbūs" du kriterijai: 1) mokytojų ir mokinių vaidmenų kaita (didėjantis mokinių savarankiškumas ir lyderystė dalyvaujant mokymosi procese, mokytojas – patarėjas, pagalbininkas ir vyresnis draugas); 2) mokinių motyvacija keičiant mokymosi aplinką, kuriant priemones ir išteklius.

II grupė – „labai svarbūs": 3) mokymosi aplinkos kaita (mokykloje ir už jos ribų); 4) mokymosi išteklių ir technologijų įvairovė ir gausa; 5) mokytojų motyvacija, keičiant mokymosi aplinką, kuriant priemones ir išteklius; 6) vertinimo ir įsivertinimo, refleksijos būdų įvairovė, pripažinimas kaip vienas vertinimo būdų; 7) galimybė pritaikyti ugdymo programą, jos lygį, tikslus, pasirinkti dalyko temą.

III grupė – „tiesiog svarbūs": 8) stiprėjanti mokymosi bendruomenė; bendravimas ir bendradarbiavimas, informacijos sklaida tarp mokyklų; 9) administracijos parama.