С. С. Быкова, Е. А. Кувалдина, С. В. Маслова, А. Е. Криницына

Формирование IT-компетенции молодежи в системе неформального образования

Актуальность исследования обусловлена необходимостью формирования IT-компетенции у молодежных лидеров, так как именно они транслируют опыт использования интернет и цифровых технологий другим молодым людям. В рамках формального образования данной проблеме не уделяется должного внимания, соответственно, система неформального образования вправе компенсировать этот недостаток за счет реализации дополнительных программ, формирующих IT-компетенцию у молодежи.

Цель данного исследования заключается в теоретическом обосновании и экспериментальной проверке эффективности программы по формированию IT-компетенции молодежных лидеров посредством организации обучающих мероприятий в системе неформального образования.

Ведущим методом исследования явился педагогический эксперимент, в котором приняли участие 15 лидеров молодежных некоммерческих организаций из 8 европейских стран. Участники прошли предварительный отбор, который предполагал анализ их практического опыта в сфере цифровых технологий и наличие мотивации к обучению. В исследовании использовался метод анкетирования (онлайн анкеты-самооценки «Акселератор дигитальных навыков»). В основе анкеты заложены пять областей практического использования IT-компетенции: общая информационная грамотность, коммуникация, создание дигитальных продуктов, информационная безопасность, решение технических проблем. Для подтверждения достоверности данных был использован метод математической статистики (Т-критерий Вилкоксона).

Результаты педагогического эксперимента показывают, что произошли значимые изменения по показателям «Общая информационная грамотность», «Коммуникация», «Создание дигитальных продуктов» (на уровне значимости $p=0,01$), а также «Информационная безопасность» (на уровне значимости 0,05). По показателю «Решение технических проблем» – значимых изменений не произошло.

Представлен опыт реализации обучающей программы «Цифровое молодежное кафе». По завершению программы был создан блог о реализации и результатах проекта; онлайн фандрайзинговые и коммуникационные кампании, открытые вебинары о темах проекта.

Исследование доказало эффективность формирования IT-компетенции молодежных лидеров в системе неформального образования посредством реализации образовательного проекта.

Материалы данной статьи могут быть полезны для работников и лидеров молодежных организаций, а также для специалистов в сфере неформального образования молодежи.

Ключевые слова: IT-компетенция, молодежные лидеры, неформальное образование, проект, цифровая грамотность, компетенция

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Formation of ICT competences of youth in the system of non-formal education

The relevance of the study is due to the need to form competences in sphere of information and communications technology (hereinafter – ICT competences) among youth leaders, because they transfer this experience of using the Internet and digital technologies to other young people. Within the framework of formal education, this problem is not given necessary attention; accordingly, the non-formal education system has the right to compensate for this shortcoming through the implementation of additional programs that form ICT competences in young people.

The purpose of this study is to substantiate theoretically and test experimentally the effectiveness of the program for the formation of ICT competences of youth leaders through the organization of training events in the system of non-formal education.

The leading research method was a pedagogical experiment, in which 15 leaders of youth non-profit organizations from 8 European countries took part. The participants were pre-selected, which involved the analysis of practical experience in the field of digital technologies and the presence of motivation to learn. The questionnaire method was used in this study (online self-assessment tool "Digital Skills Accelerator"). The questionnaire is based on five areas of practical use of ICT competences: general information literacy, communication, digital product creation, information security, and solution of technical problems. To confirm the reliability of the data, the method of mathematical statistics (T-Wilcoxon test) was used.

The results of the pedagogical experiment show that significant changes have occurred in terms of the indicators "General information literacy", "Communication", "Creation of digital products" (at the significance level $p = 0.01$), as well as "Information security" (at the significance level 0.05). There were no significant changes in the indicator "Solving technical problems".

The article presents the experience of implementing the training program for the Digital youth cafe: online tools for communication and fundraising strategies in the youth field. During this project, a blog on the implementation and results of the project; online fundraising and communication campaigns, open webinars on project topics were created.

This study proved the effectiveness of the formation of ICT competences of youth leaders in the system of non-formal education through the implementation of an educational project.

The materials of this article can be useful for workers and leaders of youth organizations, as well as for specialists in the field of non-formal education of youth.

Keywords: ICT competences, youth leaders, non-formal education, project, digital literacy, competence

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Introduction

The Internet and Information and Communication Technologies (ICT) are seriously changing the process of socio-psychological development of young people. According to the Global Digital Research, conducted in 2018, more than half of the world's population uses the Internet, mobile communication tools and social networks [22]. Organization for Economic Co-operation and Development (OECD) recognized the priority of young people's ICT competences development [20].

Within this paper the concept of ICT competence is understood according to the Council of Europe vision: it is confident use and critical understanding of ICT for work, leisure and communication [3]. This competence includes such basic skills as: use of ICT to receive, evaluate, store, produce and exchange of information [17], as well as communication and participation in the Internet communities [9].

The relevance of this paper is based on the existing contradiction between the need to develop ICT competences of young people and the lack of formal training of these competences for youth workers and leaders who closely interact with youth [8]. This contradiction can be resolved by organizing educational activities within the non-formal education system [16]. In this regard, the purpose of this paper is theoretically substantiate and experimentally verify effectiveness of the non-formal educational training program aimed at leaders of youth associations ICT competence development.

Materials and methods

In order to achieve the mentioned above purpose the following methods were used:

1) The analysis and synthesis of normative documents, psychological and pedagogical researches devoted to the studied problem. This analysis allowed to determine the essence and content of ICT competence and highlight varied forms and methods of work on ICT competence development.

2) The pedagogical experiment consisted of ascertaining, forming and control stages. Fifteen youth workers from Spain, Poland, Slovakia, Hungary, Russia, Armenia, Belarus and Ukraine took part in this experiment aimed at development of their ICT competences necessary for implementation of online communication and fundraising campaigns. One experimental group took part in this study as soon as the youth leaders had to go through the qualifying stages before the project was implemented. These stages were aimed to analyze the applicants' practical experience and the presence of their study motivation.

To assess the results of the pedagogical experiment, the questionnaire was used. The survey was conducted using the Online self-assessment tool "Digital Skills Accelerator". This online questionnaire was developed by several European Universities and Education Centers with the support of the European Commission and standardized in 2017.

The questionnaire is based on five areas of practical use of ICT competencies. The content of the questions for each area included the following items: general information literacy – browsing, searching, filtering data, information and digital content, evaluating data, information and digital content, managing data, information and digital content; communication – interacting through digital technologies, sharing through digital technologies, engaging in citizenship through digital technologies, collaborating through

digital technologies, netiquette, managing digital identity; digital product creation – developing content, integrating and re-elaborating digital content, copyright and licenses, programming; Information Security – protecting devices, protecting personal data and privacy, protecting health and well-being, protecting the environment; solving technical problems – solving technical problems, identifying needs and technological responses, creatively using digital technology, identifying digital competence gaps.

The formedness level of each area of practical use of ICT competencies was assessed on a 6-point scale.

To determine the reliability of the obtained quantitative data, the method of mathematical statistics was used – the T-Wilcoxon test.

The experiment was conducted by the Spanish NGO Foundation iWith.org from December 2017 to July 2018.

Results

The analysis of policy documents and psychological and pedagogical researches on the studied problem gave reason to draw the following conclusions. The competence is understood as a set of knowledge, skills, and positive attitude aimed at resolving certain problems [3]. The modern person should have eight key competences that he/she needs for his/her own self-realization and development of personal success in the information society. Key competences include: communication in mother tongue; communication in foreign languages; learning to learn; mathematical competence and basic competencies in science and technology; digital (ICT) competence; social and civic competencies; sense of initiative and entrepreneurship; cultural awareness and expression [17].

Taking into consideration the importance of ICT competence development the DigComp working group was created under the European Commission, which proposed to consider this competence in relation to five directions (components) of its practical use:

- 1) general information literacy: knowledge, skills and attitudes related to the search, processing and management of information and databases;
- 2) communication: knowledge, skills and attitudes in implementation of communication and interaction through information and digital technologies;
- 3) creation of digital products: knowledge, skills and attitudes necessary to create digital information content;
- 4) information security: knowledge, skills and attitudes needed to protect data and its ethical and safe use;
- 5) solving technical problems: knowledge, skills, and attitudes necessary to solve technical problems when using ICT, as well as the ability to create new ones [22].

Many researchers from different countries turn to the study of the problem of young people's ICT competence development [11]. I.A. Zimnaya defines ICT competence as a key competence that is associated with the human activity and manifests itself in all its forms. It includes receiving, processing, issuing information; transformation of information (reading, taking notes); use of mass media, multimedia technologies, computer literacy; mastery of electronic and Internet technologies [24]. Young people are principal users of ICT: the proportion of users weekly working at the computer of European youth aged from 16 to 24 is 92% [13]. Due to this fact, our pedagogical experiment was developed for young people.

The youth is a special group of people aged 14-30 [18] often is named as Google generation [18]. In 2008, London University College published out a list of characteristics of Google generation's Internet behavior, among them are [21] modern young people are more interested in studying visual material (photos, videos) than reading texts; 2) young people of the Google generation tend to information plagiarism than their own production of information: young people have a strong tendency to the behavior of "copy-paste" and mixing information without its critical reflection; 3) the Google generation does not have developed information searching skills, often the search comes down to just "surfing the Internet".

These characteristics of working with information are the result of insufficient development of ICT competence of young people, which necessitates the creation of educational projects in the system of non-formal education [19]. The lack of educational activities focused on ICT competence development is also confirmed by the studies of the OECD. According to it, 44% of the population of the European Union have a low level of ICT competence and 19% do not demonstrate this competence at all [2]. However, nowadays ICT knowledge and skills are becoming the main components of human capital, which in the post-industrial era is a catalyst for socio-economic development and improving the country's competitiveness [23]. Taking into consideration the requirements of the modern information society, young people for their successful socialization and beginning of the labour activity should demonstrate a wide range of ICT knowledge, skills and attitudes forming their ICT competence.

There are a variety of modern researches on students' ICT competence development that underlines the importance of non-formal education for this purpose. According to O.M. Makhalina, V.N. Makhalin everyone can take advantage of additional professional education and massive online training [15]. An internship abroad is another form of training organization. R. Elliott, X. Luo in their research prove the effectiveness of using integrated cooperation with foreign students in the process of forming intercultural IT competencies [7]. It is also important to underline that young people's ICT competence should be developed combining formal and non-formal educational activities, taking into account the principle of the continuity of education [10].

Within this paper we mainly are focused on non-formal educational approaches towards young people's ICT competence development, that can be implemented by youth NGOs within a wide range of educational events conducted by youth workers and leaders. In this context youth leaders can be defined as young people with specific powers in youth organizations, networks or other youth structures [16]. However, in order for youth leaders to be able to help their peers to acquire ICT competence, it is necessary to provide them with a set of educational events where youth leaders themselves can improve this competence. This paper describes the pedagogical experiment that was implemented within the non-formal educational activity "Digital youth cafe: online tools for communication and fundraising strategies in the youth field" aimed at development of youth leaders' ICT competence in the field of online communication.

1 The ascertaining stage of the experiment

The project "Digital youth cafe", initiated by Spanish NGO Foundation iWith.org, was aimed at development of ICT competences of leaders of youth associations necessary for implementation of online communication and fundraising campaigns in the field of youth work. The project received financial support from the Erasmus Plus educational program

of the European Commission [6]. The project went through the following stages: initiation, planning, implementation and closing.

At the stage of initiation of the project, the analysis of the problem of ICT competences acquisition was carried out and the previous work experience on it was studied. At this stage the specialists of the Foundation iWith.org formulated the project objectives, generated ideas on the project programme, identified the project partners and as a consequence developed the project concept note. At the project planning stage distribution of responsibilities between project partners; identification of project risks; planification of the project activities, budget and measures for its monitoring and evaluation were carried out. In addition to that, the project partners developed the official application form for participation in the Erasmus Plus Call. Once the project received financial support from the European Commission, the project team started to roll out the planned educational activities. In addition to that, at the project implementation stage, coordination of project work and resources; solving current issues and conflict situations took place. At the stage of the project closing, assessment of the final results in accordance with the project objectives was done. Together with that the assessment of the impact of the project on partner organizations; assessment of the management process and financial management; writing a final report were carried out.

In order to participate in this project, youth leaders went through two stages of the selection process. At the first stage, potential participants answered the questions identifying a level of their ICT skills. The tool for conducting this diagnostic was an online questionnaire “Digital Skills Accelerator”, based on self-assessment [8]. This tool was developed by several European Universities and educational centers with the support of the European Commission. The content of the questionnaire is based on the ICT competence model proposed by the European Commission's working group on the development of ICT competences of European Union citizens. This model includes five directions (components) of practical use of ICT competences: general information literacy, communication, creation of digital products, information security and solving technical problems. The level of development of the components of ICT competence was evaluated using a 6-point scale.

In addition to “Digital Skills Accelerator” tool, potential project participants also had to describe their youth work experience and their motivation to participate in the training project activities. Participants who were chosen after the first stage of the selection process were invited to an online interview, conducted by the project team, where their experience in organizing communication and fundraising online campaigns was discussed. That was done in order to determine participants’ level of their ICT competences and form a homogeneous group of participants. As part of the interview, participants were asked to complete a series of practical exercises.

2. The forming stage of the experiment

As part of the forming stage of the study, the training program was implemented that included the planned educational activities of the Digital Youth Cafe project. The main objectives of the educational programme were to teach to use and critically interpret information and communication technologies for work, leisure and communication, as well as to apply ICT technologies when organizing more effective functioning of youth associations and organizations with a special focus on conducting communication and fundraising campaigns. The educational Program of the training is presented in Table 1.

Table 1**Programme of the training “Digital youth CAFE”**

Topic	Introduction	Communication Strategy	Content	Crowdfunding	Follow up activities
10:00 11:30	Team building activities	What do we communicate? Tangible and intangible results of youth projects	Cultural programme	Google grants for NGOs	Presentation of the results of the Laboratory of Crowdfunding
11:30	Coffee break				
12:00 13:30	Team building activities Presentation of the Programme	Social media marketing	Communication through text	Crowdfunding (theory)	Working on the programme of the webinars
13:30	Lunch time				
15:30 17:00	Modern Communication: characteristics and challenges.	Tools for strategic communication: Hootsuite and Google Analytics	Free visualization tools, infographics	Crowdfunding (best practices) Laboratory of Crowdfunding	Working on the project blog
17:00	Coffee break				
17:30 18:30	Communication Strategy: aims and targets	Best practices of mobile Apps created by NGOs around the world	Free visualization tools	Laboratory of Crowdfunding	Closing of the programme – evaluation
18:30	Reflection groups				

Training sessions in the framework of the “Digital youth cafe” training Programme were united by the following logic – at first, participants got acquainted with the goals and objectives of the session, then, using various methodological techniques and leading by the trainers, were learning the necessary aspects of ICT use, and at the end of the session, had a chance to apply new knowledge into practical cases.

Considering that the main goal of the project was development of youth leaders’ ICT competences that can be applied into the practical youth work, one of the key mechanisms of the project results assessment was development of specific digital products by the project participants. Among them are communication and fundraising campaigns, digital visual materials (infographics, pictures, posts, short videos content etc.). Evaluation and assessment of the developed digital products was carried out by external experts mainly specialists in online communication and fundraising taking into account the project focus. Experts gave very positive feedback on the participants’ learning results. First of all, they noted the competent setting of goals for organising online campaigns, and secondly, the fact that project participants used a wide range of online tools to achieve these goals.

Among the results of the training implementation are the following ones:

- the blog about implementation of the project and project results [5];
- online fundraising and communication campaigns (participants created 5 fundraising and communication campaigns), two of which were aimed at solving environmental problems, and the other three - at various aspects of social integration of migrants in the European Community;
- two open webinars on the progress and results of the project (held during the implementation of the project). The topics of the webinars reflected the main theme of the project: “Digital tools for communication of youth non-profit organizations”, “Basic principles and tools for creating fundraising campaigns”.
- the program of the training “Digital youth CAFE”.

3. The control stage of the experiment

After finishing the training program and the project activities the leaders of the youth associations, participated in the training, answered again on the online questionnaire "Digital Skills Accelerator" to find out the level of development of their ICT competences. Figure 1 presents a comparative diagram of the results of their answers received during the diagnostic before the training (diagnostics 1) and control questionnaire after the training (diagnostics 2).

Figure 1 Diagram of the level of ICT competence development of leaders of youth organizations

The comparison of the results of the both diagnostics shows that the level of development of youth leaders' ICT competence was increased. Development of ICT competence in two directions, which are communication and general information literacy, was the most effective. This fact can be explained by the thematic focus of the training program: digital tools for communication and fundraising campaigns. Less significant changes in the development of ICT competence were in "solving technical problems", since work in this direction was not fully represented in the training program.

To verify the reliability of the obtained quantitative data, the method of mathematical statistics was used – the T-Wilcoxon criterion when revealing the shear intensity in the sign values for 2 dependent samples (Table 2). Temp is equal to the sum of the ranks of atypical shifts. Tcr corresponds to tabular values determined by the number of participants whose results gave a shift.

Table 2

Quantitative data

	T _{emp}	T _{cr}	
		0,05	0,01
General information literacy	0	0	0
Communication	0	0	0
Creation of digital products	0	0	0
Information security	3,5	10	5
Solving technical problems	10,5	0	0

Analyzing the location of Temp on the “axis of significance” for the indicators “General information literacy”, “Communication”, “Creation of digital products”, the value falls into the zone of significance of the studied measurements. Accordingly, we accept the H0 hypothesis which confirms the presence of an intense shift in the studied parameters. For the indicator “Information Security”, $T_{emp} = 3.5$, at critical values 10 (for significance level 0.05) and 5 (for significance level 0.01), it also falls into the zone of significant changes. For the indicator “Solving technical problems”, the obtained value $T_{cr} = 10.5$ falls into the zone of insignificance, therefore, the H0 hypothesis should be accepted, which means that the shift in the typical direction was random, so we can't talk about the intensive shift in this indicator.

Thus, using the method of mathematical statistics, it was confirmed that only in the directions "general information literacy", "communication", "creation of digital products", "information security" there were significant changes, while in the direction "solving technical problems" changes were insignificant. Accordingly, the level of formation of ICT competence increased due to a statistically verified increase in the indicators of its components.

It is also worth mentioning that two months after the project implementation, project trainers organized interviews with the participants' colleagues, representatives of youth associations. They expressed that the training had a direct impact on their organizations thanks to ICT knowledge and skills that their colleagues participated in the training applied to the practical work. Some of their answers are presented below:

- “After the training, the participant X began to use more digital technologies to create communication products for the organization: Pablo, Vimeo, Piktochart” (Spain).
- “The knowledge acquired during the training by our youth leaders allowed them to independently organize a fundraising company to raise funds for one of our charity projects” (Russia).
- “Our colleague Y after the training organized some sessions for all of us about methods and tools of rolling out a communication campaign. It helps all our team to be more professional in this field and to improve the quality of our external communication” (Hungary).
- “Our organization highly appreciates the knowledge that our colleague gained during the training. It helped us to revise our communication strategy, incorporate there more digital tools and be closer to our main target group (young people)” (Poland).

Discussions and conclusions

In times of technological progress and digital transformation in all spheres of public life, the level of ICT competency has a great importance. Digital literacy is one of the key competences of a modern young person. To be digitally competent is necessary for study, personal life and further employment of modern youth. Based on the carried out study and analysis of theoretical sources, it is worth noting that ICT competence includes the following components: search, processing of information; information conversion (reading, taking notes); use of mass media, multimedia technologies, computer literacy; mastery of electronic and knowing the Internet technologies [24].

Young people gain their digital skills in the frame of formal and non-formal educational systems. This study showed that in spite of consideration of non-formal education as additional or “second” one, non-formal educational activities can be very efficient for ICT competence development in general and in youth field in particular [1].

The analysis of the project results on the level of young people's ICT competence development clearly demonstrates that almost all the components of ICT competence, such as general communication literacy, creation of digital products and information security were developed during the project. This article examined the sphere of youth work and the training of youth leaders. One of the alternatives to such training can be events held in the field of non-formal education of youth, such as trainings, seminars, master classes [14]. The materials in this article can be useful for leaders of youth organizations, as well as for specialists in the field of non-formal education of youth who are interested in the theme of digital transformation of society in general and the digital development of youth in particular.

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