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Creation of Clusters and Tools for Improving the Professional Competence of Future Educators

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Abstract: The objective of the study was to study the perceptions of student teachers and educators of an educational cluster as a tool for improving the professional competence of future educators, and to identify the cluster-related tools to be used to improve the professional competence of future educators. The project evaluation checklist for experts, a questionnaire for participants in the experiment, a semi-structured interview questionnaire to conduct with focus group respondents were used for collecting data. Data were processed using content analysis technique and SPSS Statistics v24 package. The study is quantitative, based on subjective evaluations of study participants and representatives of educational clusters, and does not aim at evaluating students' achievements. Two simulation models of the educational cluster ("Cluster Educational Initiative" and "Cluster of Educational Opportunities for Educators 2.0") and four educational activities for educators (discussion "Agglomeration of Subjects, Educational Institutions: Realities and Prospects"; online conference "Ukraine-Brussels - Sharing Experience in Education"; an educational tour to Finland for teachers, parents and managers in the field of education; the exchange of four teachers from two schools) was a key result of this study. It has been found that the creation of clusters for improving the professional competence of future educators and their professional advancement is now part of national education policy in Ukraine and in the world. The tools of this form of organization of educational activity are competence-oriented and aimed at deepening professional experience, development of competences of realization of life-long education, creation of own public image.

Keywords: *Higher pedagogical education, professional competence of future educators, educational clusters.*

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Introduction

Scientific and practical interest in cluster subject is increasing in Ukraine (Ukraine Education Cluster, 2019) and Europe (European Commission, 2019; National Research Council, 2011). Among the scientific works, studies by Kusykh (2010), Lenchuk and Vlaskin (2010), Piatnytska (2016), Chernyshova (2012) and Zvarych et al. (2019) are of interest in the context of our study, which analyzed the categorically conceptual framework, as well as economic and social nature of clusters, problems of their implementation, principles and effectiveness of their functioning, development and experience of their support by the state. However, the tools to be used by clusters for improving the professional competence of future educators remain unexplored.

Cluster types: Educational clusters

Currently, there are industrial, regional, social, innovative, educational and multi-component clusters (European Commission, 2016).

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The educational cluster, among other things, is defined in the above sources as a network “of educational institutions, scientific organizations, economic entities, authorities, located in the same territory and having horizontal and vertical ties, having appropriate legal registration and operating in the field of professional education to achieve the same goal” based on the goals of individual participants, that is, through the synergistic effect of educational agglomeration (proximity of consumer and producer of educational services, network technologies and the integration of knowledge and skills, etc.) (Mkrtychian & Belyanina, 2018; Piatnytska, 2016).

The main advantages of an educational cluster are its *multilevelness* and *multi-vectoral focus* of involvement and interaction with stakeholders in the educational process, namely: local, regional, economic, educational, strategic, cross-functional (education, professional development of educators, retraining, health care, physical culture and sports, culture, youth policy, etc.); and the basis of its organization – on a voluntary basis or on the initiative and financial support of certain institutions (Aitbayeva et al, 2016; The Partnering Initiative, 2010).

The literature review found that educational clusters are effective for solving the scientific problem of improving the professional competence of future educators (Jita & Mokhele, 2014; Nwagbara, 2015), as it will help to build an effective system that can integrate local or regional socio-economic systems, allows concentrating joint efforts of educators, students, public and private organizations through the collaboration of all stakeholders. Educational clusters proved to help high school teacher graduates surmount the deficiency of the university educational system through creating initiative-driven favorable intellectual atmosphere and highly dynamic developmental system aimed at creative self-realization as a future educator (Gamidullaeva & Vasin, 2018).

The educational cluster may eventually become an alternative to the corporate university (Postoyan, 2015; Sybirtsev, 2016), since it harmonizes the parameters of relations between economic entities and the labour market, and promotes the independence of the region (Klokar, 2017; Volga, 2015). Along with the above benefits, we have found that the problem of creating and using educational clusters as a tool to improve the professional competence of future educators is currently poorly studied.

Therefore, in view of the above, *the objective of the study* was to: (a) study the perceptions of students studying pedagogy, teachers and educators of an educational cluster as a tool for improving the professional competence of future educators; b) identify the cluster-related tools to be used to improve the professional competence of future educators.

Research Methodology

This research was exploratory and was based on studying the perception of the educational cluster as a tool to improve the professional competence of future educators, both those who were involved in their creation (students and teachers) and those who represented the target audience of the educational cluster (students and educators). The empirical part of the study included a theoretical analysis of the current tools for the fundamentalisation of the professional training of future educators in Ukraine and abroad, and the formation of public opinion among the student community of two pedagogical higher educational institutions on the urgency of introducing changes to the existing system of future educator training. In order to solve the latter task (forming public opinion), a semi-annual campaign was held called “21st Century Pedagogical Education: Searching for Priorities”, which included debates, discussion clubs, publication of articles in university newspapers, online conferences with representatives of educational institutions in Poland, the Czech Republic, Austria, Estonia, etc. The research is quantitative, based on subjective evaluations of study participants and representatives of educational clusters, and is not intended to evaluate students’ academic achievements. The study used evaluation tools and questionnaires that were developed using the SurveyMonkey cloud service.

Research Design

The experimental part of the study of the tools to be used by the cluster for improving the professional competence of future educators was carried out in two stages and lasted for the second half of 2018 and 2019 (the total of eighteen months).

This experimental project was funded in part by the International Education Policy Foundation (Czech Republic-Poland-Ukraine) and the Oktay Aliev Foundation (Ukraine).

An important component at this stage was a three-week internship of 30 third-year students studying pedagogy of the Borys Grinchenko Kyiv University (15 people) and Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University (15 people), which was implemented on the site of the educational cluster “Successful Careers Bureau” at the State Higher Education Institution “University of Management of Education” of the National Academy of Pedagogical Sciences of Ukraine (Kyiv) and the Lviv Cluster for the Development of Education and Creativity (Lviv). The purpose of the internship was to study (on the basis of shadowing) the experience of creating and supporting the activities of the educational cluster. The results of the internship were summarized at the four-party online conference aimed at consolidating and unifying the experience of creating an educational cluster.

At the next stage, these students were involved in the creation of two mock clusters with specific parameters and tasks. For the implementation of the projects in the above mentioned institutions of higher pedagogical education, two project groups were created with a total of 16 persons. The students were accompanied and advised by 17 representatives of the educational cluster “Successful Careers Bureau” and the Lviv Cluster for the Development of Education and Creativity. The participants of both project groups were trained on the basics of project management. The students developed the cluster attributes which included: name, logo, blog website, social media pages, development strategy (Mission & Vision), principles of communication with all cluster stakeholders, determined target audience, its needs and tools to work with it, educational program; developed and implemented 4 educational activities for educators, which was one of the evaluated tasks of the experiment. Let us graphically present the course of the experiment (see Figure 1).

The success of the projects was evaluated by a group of representatives of the educational cluster consisting of 17 people using a pre-designed checklist, by the participants to the experiment and by the focus group respondents.

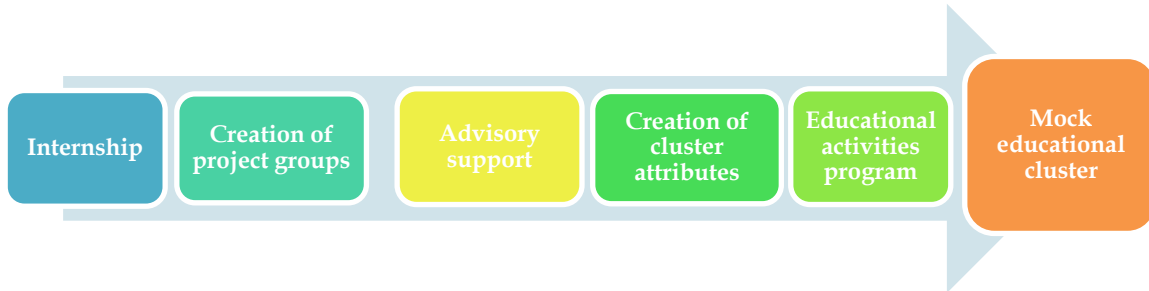


Figure 1. Course of the experiment

Let us present an abstract model of such an educational cluster (see Figure 2).

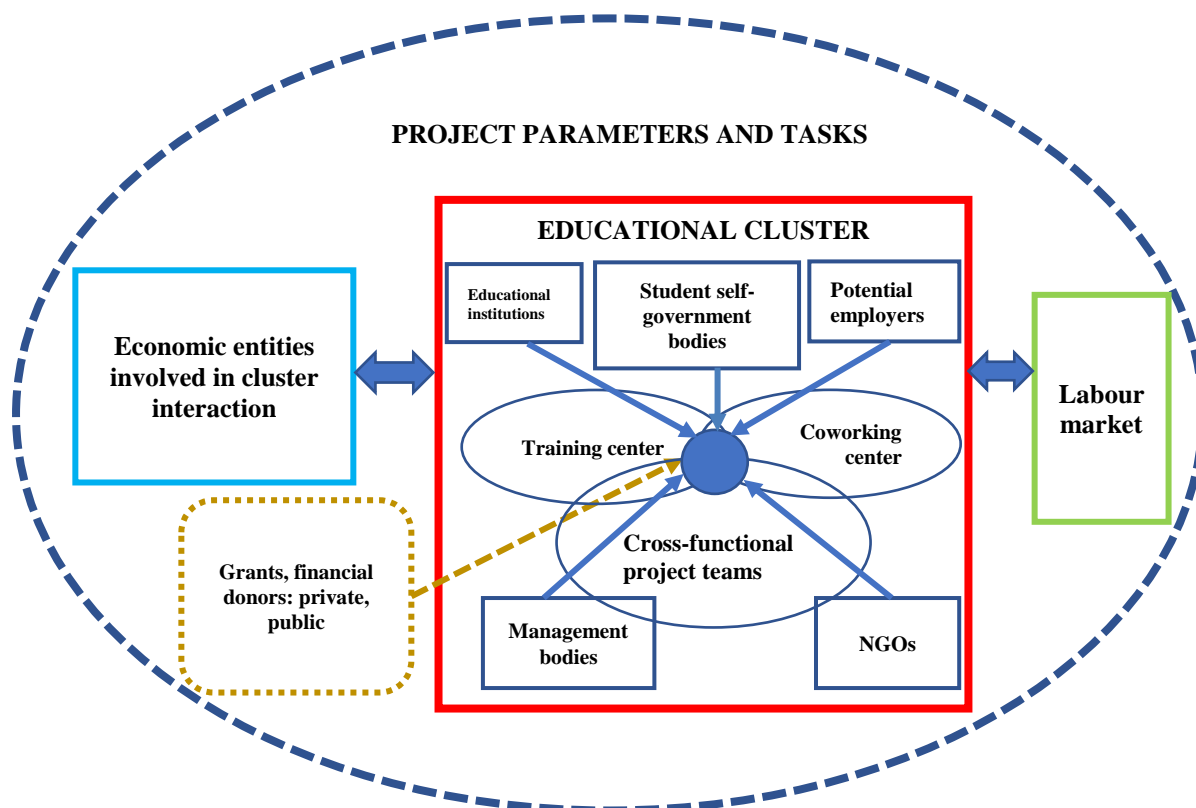


Figure 2. Abstract model of educational cluster

Sampling

The sampling for the creation of an educational cluster was based on a competitive selection process in two stages: the first was writing an essay on “21st Century Pedagogical Education: A New Look” by the third-year students, and the second was a motivational letter entitled “I Am the Change Agent”. The grant for participation in the competition was paid aforementioned three-week internship for 32 people.

Essay writing involved 734 students. After the analysis of the essay by a team of experts by the following criteria: a reasoned analysis of the potential of pedagogical professional education, providing at least three creative solutions to the problems identified by the author of the essay, 64 people were invited to participate in the next stage (motivation letter). After the activity, an interview with each of the 64 applicants was conducted and 32 persons (19 female and 13 male) were selected (nominated) for further training. The purpose of the interview was to find out the seriousness of the intention (commitment). The low homogeneity of the project teams in the academic achievements was an important prerequisite for this study.

The students for pilot educational programs for educators were randomly sampled.

The focus group was also randomly selected to answer the second research question and consisted of 12 people (6 students and 6 experts).

Tools for collecting data

A checklist of project implementation and evaluation for experts, a questionnaire for participants in the experiment (a 5-point Likert scale was used to analyze the answers), and a questionnaire to conduct a semi-structured interview with focus group respondents. Content analysis technique was used to process language-based data obtained through the questionnaires. Data were processed using IBM SPSS Statistics v24 analytical analysis package. To ensure validity and reliability of each tool above, a validity test involving expert panel was performed to define face validity, content validity, and construct validity.

Questionnaire for experiment participants

Five-point Likert scale (score from 1 (not useful at all) to 5 (very useful) or from 1 (under no circumstances) to 5 (yes, for sure) or from 1 (completely disagree) to 5 (strongly agree) was

used so that the respondents could specify their attitudes, perceptions and agreements to the aspects within the questions below.

Both questionnaires included the questions to address two research questions (dimensions) which were (A) to examine the students', teachers' and educators' perceptions of the potential of the educational cluster, and (B) to explore the cluster-related tools that can be used to enhance the professional competence of future educators.

1. (A) How useful was it for you to participate in this project?
2. (A) Do you plan to continue your work in the project in the future?
3. (A) Do you recommend that your groupmates participate in such a project?
4. (A, B) Do you consider such a project a form of teacher training in the 21st century?
5. (A, B) Do you associate your future professional activities with cluster educational models?
6. (B) What needs to be changed in order to increase the benefits of participation for the student?

Questionnaire for focus group respondents

1. (A) How much time did you spend for participation in the project?
2. (B) What were the most interesting tasks for you? (In your opinion, what were the most interesting tasks for the students?)
3. (B) Participation in what project activities enhance (helped you personally enhance) the professional competence of future educators?
4. (A, B) What problems do you think need to be overcome in order to take advantage of the cluster as a tool to increase the professional competence of future educators?
5. (A, B) Do you consider it possible to integrate this form of realization of educational activities of students studying pedagogy into the educational process of a higher education institution?

Qualitative coding technique borrowed from the book of Saldana (2013) was applied to ensure the data obtained was correctly interpreted. To measure consistency between coders, the formula provided in Miles and Huberman (1994) was utilized:

$$R = \frac{n \text{ of agreements}}{n \text{ of agreements} + \text{disagreements}}$$

Note: *R* – reliability; *n* – number.

The Pearson correlation test was used to calculate the relationships between perceptions of clusters between students and teachers, between students and educators and between teachers and educators.

Results

Two simulation models of the educational cluster (“Cluster Educational Initiative” and “Cluster of Educational Opportunities for Educators 2.0”) and four educational activities for educators (discussion “Agglomeration of Subjects, Educational Institutions: Realities and Prospects”; online conference “Ukraine-Brussels - Sharing Experience in Education”; an educational tour to Finland for teachers, parents and managers in the field of education (the exchange of four teachers from two schools) was a key result of this study.

The distribution of answers to the questions from the questionnaire for the experiment participants is given in the table below (see Table 1).

Table 1. Distribution of answers to the questions from the questionnaire for the experiment participants (*n* = 32), as a percentage (%)

#	Question	Score on a scale					<i>df</i>
		from 1 (not at all) to 5 (sure)					
		1	2	3	4	5	
1.	How useful was it for you to participate in this project?	0	0	10	81	9	2
2.	Do you plan to continue your work in the project in the future?	0	0	23	74	3	2
3.	Do you recommend that your groupmates participate in such a project?	0	0	4	45	51	1
4.	Do you consider such a project a form of teacher training in the 21 st century?	3	7	27	53	24	1
5.	Do you associate your future professional activities with cluster educational models?	17	19	22	21	21	1
6.	What needs to be changed in order to increase the benefits of participation for the student?	a) extend the duration of the project - 89% b) attract more financial resources (patrons) - 63% c) create a charity foundation - 16% d) include this project in the curriculum as a form of practical training - 97% e) provide the project with the better technical facilities - 92%					3

The results of processing the answers of the focus group respondents to the questionnaire:

Question 1. 72% of respondents said they spent about 4 hours a day completing project-related tasks, 25% spent an average of 3 hours, and only 3% of respondents spent 2 to 3 hours a day on the project.

Question 2. 98% mentioned the participation in the educational projects related to the visit of educational institutions abroad as the most interesting. 63% of the respondents found such creative tasks as logo design, website design, copywriting, SMM to be interesting. 37% preferred management tasks and mentioned them in the list of the most interesting.

Question 3. 83% of respondents included in the list of such activities: sharing experience, educational projects, internships, workshops, self-education within the project objectives. 17%, in addition to those mentioned, also mentioned the experience of communication through various channels, (self-)branding, public activity.

Question 4. 96% of respondents named bias and inertia of educators as the main problems to be overcome, 32% named low level of computer literacy, 13% said that there was a problem of constructive communication in the educator environment.

Question 5. 73% agreed with this possibility, provided that this form of teacher training in higher education institutions is reflected in the regulatory documents and will be taken into account when determining the rating of the educational institution. 39% doubted that it is possible with the current level of technical support for higher education institutions. Only 14% of respondents said that clusters should undoubtedly be used as a form of professional training for future professionals.

In the course of statistical processing of answers regarding the perception by students studying pedagogy, teachers and educators of the potential of the educational cluster as a tool for improving the professional competence of future educators, the Pearson correlation test (considering that the r -values are statistically significant when they range from -1 to $+1$) showed that there is a positive dependence in the perception of clusters between students and teachers ($r = .39, p > .05$), between students and educators ($r = .35, p > .05$), and between teachers and educators ($r = .42, p > .05$).

Therefore, the above indicates that both students, teachers and educators have positively assessed the use of the educational cluster for improving the professional competence of future educators. Among the tools to be used by the clusters to improve the professional competence of future educators the following were identified: sharing experience, educational projects, internships, workshops, self-education within the project objectives, *experience* in: communication through different channels, (self-)branding, public activities.

Limitations of the study

The involvement of only two higher education institutions, their specialization and quantitative statistical data collection tools can be considered as major limitations of this study. The parameters characterized by subjectivity and latency may be added to the list.

Discussion

The study confirmed that students studying pedagogy, teachers and educators appreciated the use of the educational clusters with the purpose to develop students professionally, and there is a number of clusters tools that can enhance the professional competence of future educators. The imitation educational clusters created by the students have demonstrated a sufficient resource of tools that can be used to improve the professional competence of future educators, both within the educational process in a higher pedagogic education institution and beyond. It was found that 81% of the respondents-participants reported positive experience from involvement in clusters and 72% of focus group respondents dedicated 4 hours a day to project which might be an indicator of their increased interest and commitment. More than half of the students-participants were going to develop the project after this study and would be a referee to the project. The tools of educational clusters include: sharing experience, educational projects, internships, workshops, self-education within the project tasks, *experience* of: communication through different channels, (self-)branding, public activities can positively influence the style of thinking of future educators, their motivation for informed learning were found by 83% of respondents professionally useful activities. 73% of the surveyed agreed that clusters could be used as extracurricular learning environment so that the students could practice their job-related skills and grow professionally. Although this form of the organization of professional training is in line with the principles of competence-oriented professional education, legislative steps and technical upgrades of higher education institutions are required to make such an academic activity possible.

The findings met expectations of this study and went in line with Jita and Mokhele (2014) and Nwagbara (2015) emphasising the effectiveness of educational clusters and with the views of Postoyan (2015), Sybirtsev (2016), Volga (2015) and Klokar (2017) foreseeing good prospects for integrating them into both university educational system and regional economic and social systems.

It is possible to include this research in the general scientific achievements on the problem of introduction of educational clusters in education and professional training of teachers in such aspects as: theoretical principles of creation and functioning of educational clusters (Chernyshova, 2012; Molnar, 2015; Mphahlele & Rampa, 2014; Piatnytska, 2016;), educational policy (Aitbayeva et al., 2016; Edwards Jr., & Mbatia, 2013); methodology of professional pedagogical training (professional advancement) (Adeyanju, 2016; Chekaleva et al., 2016; Heinz & Fleming, 2019; Mphahlele & Rampa, 2014; Rizvi & Nagy, 2015).

Conclusions

Educational clusters can be beneficial for students studying pedagogy, teachers and educators as a tool of improving their professional competence. cluster-related tools like sharing experience, educational projects, internships, workshops, self-education within the project tasks, and *experience* of communication through different channels, (self-)branding, public activities can positively influence the style of thinking of future educators, their motivation for informed learning and in this way improve the professional competence of future educators. The tools of this form of organization of educational activity are competence-oriented and aimed at deepening professional experience, development of competences of realization of life-long education, creation of own public image, etc. It has been found out that all stakeholders in education are positive and optimistic about the prospect of this direction in Ukraine. Creating clusters to improve the professional competence of future educators and their professional advancement is now part of national education policy in Ukraine and in the world.

The field for further research in this direction is the development and experimental verification of a model for the preparation of teaching staff of higher education institutions.

Recommendations

There several prerequisites to draw attention to so that educational cluster was a success. These are as follows: (i) trained students and trained tutors (facilitators). There should be induction programme helping both students and teachers to form and get accommodated in the cluster; (ii) joint programmes (projects). The programmes can efficiently use knowledge, resources (facilities), and experience of every member of the team; (iii) financial resources. It is prerequisite that estimations are calculated before the project is launched and after this fundraising is performed; (iv) creating a legislative field. Currently, educational clusters are difficult to set up and run in Ukraine in terms of taxation issues; (v) appropriate theoretical and methodological preparation of the teaching staff and implementation of technical upgrading of higher education institutions, so that the introduction of this form of students' academic activities becomes possible.

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