Project Approach in the Organization of Scientific and Methodological Work by Applying Information Technology in Higher Education Institutions

Serhii Bieliaiev[†], Halyna Ponomarova[††], Inna Repko[†††], Ivan Stepanets[††††], Alla Chagovets[†††††], Mykola Mykhailichenko[††††††]

[†]bieliaievserhii@ukr.net, Department of Pedagogy, Psychology, Primary Education and Educational Management of the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council, Ukraine
[††]ponomarova@i.ua, Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council, Ukraine
[†††]innar@ukr.net, Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council, Ukraine
[††††]i.stepanets@gmail.com, Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council, Ukraine
[†††††]alla77@meta.ua, Department of Theory and Methods of Preschool Education of the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council, Ukraine
[††††††]mykhailichenko@i.ua, The National University of Life and Environmental Sciences of Ukraine, Ukraine

Summary

The article is devoted to studying the development of scientific and methodological work and its impact on the quality of students' vocational training in higher pedagogical education institutions by applying information technology. The article aim is to development of the organizational methodological support and pedagogical diagnostics of the effectiveness of the project «Modelling scientific and methodological work in a higher education pedagogical institution by applying information technology » realization in the framework of increasing the level of scientific and methodological work in a higher education pedagogical institution as a factor contributing to enhancing the quality of pedagogical education.

The research program of the project activity envisages stating and substantiating the problem of scientific and methodological work by applying information technology in the framework of increasing the level and quality of educational activities in a higher pedagogical education institution through the implementation of the project approach, developing a model for the system of organizational and methodological support of the project implementation as well as monitoring the process and evaluating the results of the project implementation in terms of developing teachers' scientific, methodological, information competency and enhancing students' progress in studying.

The set of criteria were developed to evaluate the level of formation of scientific and methodological competency as a result of implementing the project for the development of scientific and methodological work. The scientific and methodological work by applying information technology in the academy was carried out in accordance with the following principles: systematic character, consistent diagnostics, practical focus, scientific organizational and methodological support.

Key words:
information technology, training, study, scientific and methodological work, students, higher education institutions.

1. Introduction

Modern experience and practice prove that effectiveness and dynamics of modern higher education are greatly influenced by quantitative and qualitative changes in the development of productive forces, also implementation information technology in the educational process. They occur due to purposeful and consistent support of science and industry. Therefore, higher professional education requires active and in-depth introduction of a scientific approach to the educational process in higher education institutions. The statement is supported by the provisions of Raymond Boudon's theory of rationality (Leroux,2020), that claimed the scientific potential of society to be crucial for the positive development of socio-cultural, economic, and educational processes.

At the same time, we hold the opinion that the educational potential is closely connected with the scientific potential. It corresponds to the philosophical dialectical principles on the dependence of the level of educational process development on the resources that provide it in qualitative and quantitative terms.

Determining productive approaches to the formation of scientific and methodological competency belongs to the priority tasks aimed at improving the quality of students' scientific and methodological work in the information society. The project approach has shown its effectiveness in tackling various educational and scientific issues. At the same time, using of the project approach as innovative approach by means of information technology, in the organization of scientific and

Manuscript received December 5, 2021
Manuscript revised December 20, 2021
https://doi.org/10.22937/IJCSNS.2021.21.12.96

methodological work in higher education institutions has not been researched in detail.

International cooperation and integration of Ukrainian youth into European society is one of the top priorities of Ukraine's education system.

Almost all the countries of the world carry out certain research aimed at finding the skills that are necessary for any person, a specialist in any field in the XXI century. Our education is increasingly using the achievements and focuses on international practice in the field of organization of scientific and methodological work and informatization in higher education institutions.

2. Analysis of recent research and publications

Enhancing the scientific potential of higher education institutions leads to quantitative and qualitative changes in the educational process. The search for new teaching methods that improve the quality of training affects various aspects of interaction organization in the educational process.The authors Siew and Ambo (2020) suggested using STEM project-based cooperative learning (STEM-PjBCL) for the development of cognitive processes. In the article Chang & Hwang (2018) investigated the effects of flipped learning guiding approach on overall students' performance in scientific activities. The specificity of applying Project Based Learning Model with younger students was studied by Agusdianita, Karjiyati, Hasnawati and Dalifa (2018). The most productive is the introduction of a project approach. Gertrudix, Rajas, Gertrudis-Casado and Galvez-de-la-Cuesta (2020) focused their attention on functions, mode and techniques of effective communication in the framework of research projects. Researches Huang, Zhong, Dong, Huang, Sun (2019) claimed scientific research projects to be effective tools for developing students' innovative competency. The study by Julpisit and Esichaikul (2019) was aimed at collaborative activities that ensure knowledge sharing in scientific research projects. The importance of appropriate scientific and methodological support for high-quality research projects was emphasized by Perez, Fernandez, Hoyos, Martinez and Aviles (2019). Effective management strategies for conducting scientific researches with the application of project approach were suggested by Zhang (2019). Researches Chagovets, Chychuk, Bida, Kuchai, Salnyk, Poliakova (2020) explored the system of motivation for professional organization of scientific and methodological work in higher education institutions.

Project-based learning in the system of higher education has been in focus of scientific schools worldwide. The experience of Taiwan's World Class University Project was shared by Fu, Baker, Zhang (2020). The conclusions drawn in the article (Schulze, 2020) proved the effectiveness of scientific projects in stimulating educational, scientific and research activities in less prosperous countries.

The impact of project implementations on the scientific and methodological productivity of academic staff was investigated by Kang (2020), Zink and Curran (2020).

Scientific publications highlight the possibilities of improving the quality of the educational process for students of different levels. The project approach proved to be effective using during the study of certain topics by elementary school students (Agusdianita, Karjiyati, Hasnawati, Dalifa, 2018); for the development of fifth-graders' scientific creativity in the process of cooperative learning (Siew, & Ambo, 2020); for the development of college students' innovative abilities in the course of their participation in scientific research (Huang, Zhong, Ye, Dong, Huang, & Sun, 2019); promoting the development of communication skills through project-based learning models (Ariyani Muljo, I Nyoman Sudana Degeng, Cholis Sa'dijah, Sulton, 2021). Julpisit and Esichaikul (2019) studies the possibilities of uniting different groups of participants of research projects. The connection between the value of the scientific projects results and the publishing activity of researchers, patenting, etc. has been studied by Kang (2020). Some researches were devoted to scientific methodological and didactic assessment of the quality of research projects (Perez, Fernandez, Hoyos, Martinez, & Aviles, 2019); launching research projects in low-income and middle-income countries (Schulze, 2020); basic research project management systems (Zhang, 2019); methods of studying the academic performance of participants in research projects and research of startups (Zink, & Curran, 2020).

The current research fills a gap in the study of project activities potential in the organization of scientific and methodological work in a higher education institution aimed at the formation of scientific and methodological competency.

The article aims. Development of the organizational methodological support and pedagogical diagnostics of the effectiveness of the project «Modelling scientific and methodological work in a higher education pedagogical institution by the way of information technology » realization in the framework of increasing the level of scientific and methodological work in a higher education pedagogical institution as a factor contributing to enhancing the quality of pedagogical education.

Therefore, many scientists are more concerned with this problem. Having analyzed the literature, we express a critical opinion on the problem under study. Unfortunately, in Ukraine the problem of motivating the student's personality in educational activities is not dealt with at the proper level, so we have made a contribution to improving this problem.

Theoretical substantiation of designing scientific and methodological work in the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv

Regional Council based on the experience of the National University of Life and Environmental Sciences of Ukraine.

3. Research methods

Analysis of scientific publications on the problem of organization of scientific and methodological work by the way of information technology in higher education institutions. Generalizing the experience of scientific and methodological work in the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council.

Observation and study of educational and methodological documentation aimed at identifying the level of educational and methodological support for the educational process provided by the teacher.

Content analysis was used to identify the content, determine the components of the project and clarify the components of organizational and methodological support of the project.

Modelling was aimed at developing a model of organizational and methodological support of the project.

Formative experiment was used to realize the project.

Testing was applied to determine the level of teachers' competency and identify the quality and effectiveness of students' studying.

Method of expert evaluation and qualimetric method were used to determine the quantitative and qualitative indicators of realization effectiveness of the project approach to scientific and methodological work.

We treat scientific and methodological work in the information society as a component of the educational process that provides an organic (optimal, effective) combination of its scientific and educational potentials. In fact, it is a key tool for managing the process of forming an effective educational environment in higher education institutions, which, in its turn, determines the quality of the educational process and its outcome.

In the formal sense, it is a scientifically verified complex (scientifically substantiated system) of expedient forms, methods and means of teachers' advanced training, which contributes to ensuring the quality of education in the academy.

Our experience in the field of education proves that the priority task of scientific and methodological work in a higher education pedagogical institution is the integration of teachers' research and educational as well as scientific and methodological work and informatization aimed at solving specific educational problems. In this regard, high-quality teachers' advanced training, in particular, through the formation of their scientific and methodological, information competency, is cross-cutting for the entire system of scientific and methodological work.

This process should be methodologically based on the competence approach in pedagogical education, which is implemented through ensuring the orientation of the educational process to solving specific educational problems using scientifically valid ways and means through information technology. The result of such a process should be the formation and development of key (basic) competencies (supra-subject (interdisciplinary), general, subject).

These competencies include general competencies acquired by students of a higher education pedagogical institution in the process of mastering the content of the relevant educational field, which consists of professionally-oriented knowledge and skills and abilities of their application in professional activity as well as subject competencies acquired while mastering the program content of academic disciplines.

At the same time, creation (development) of special information projects to solve particular educational problems calls respectively for the development of teachers' scientific and methodological competency so that they could provide formation of the above-mentioned and information competency among students.

Supra-subject competencies include students' ability to carry out multifunctional, multidisciplinary, socio-cultural activities.

We treat scientific and methodological competency as the teacher's ability to independently acquire and effectively use in practice scientific knowledge of a particular professional area, efficiently implement the laws and principles of education, creatively applyacquired skills to introduce new (progressive, innovative, effective, etc.) forms, methods and means of pedagogical activity in order to create an optimal educational environment for students to achieve high-quality learning outcomes.

The mechanism of forming scientific and methodological competency will be revealed on the example of the project «Modelling scientific and methodological work in a higher education pedagogical institution by the way of information technology ».

Research methodology includes methodological approaches and principles of teaching, which are based on the process of motivating the student's personality in educational activities, in particular - on the ideas of systemic, personal, activity, axiological and acmeological approaches and is carried out taking into account general didactic principles (scientific, systematic and consistent, accessible, learning with life, consciousness and activity, clarity, strength of knowledge, skills and abilities).

4. Results

Organizational and methodological justification of projecting scientific and methodological work in the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council. Improving the quality of the educational process by involving academic staff in innovative (experimental, creative) activities by the way of information technology.

The purpose of the project. Improving scientific and methodological work through developing scientific and methodological competency of the subjects of the educational process in a higher education pedagogical institution by the way of information technology as an integral component of the educational process, which directly and indirectly affects its outcome.

Experimental base of the project. Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council.

The objectives of the project:

1. Stimulating research-experimental and creative activity of the academic and teaching staff;

2. Holistic and systematic holding of information and methodological forums (conferences, seminars, trainings, workshops, etc.) for HEI instructors' professional development by the way of information technology, which became necessary during the COVID 19, formation of their innovative culture;

3. Extension and enhancing teachers' scientific and methodological work in the educational process of a higher education institution by the way of information technology.

4. Pedagogical diagnostics of the developmental effectiveness of the scientific and methodological competency of the subjects of the educational process in the framework of scientific and methodological work.

Project implementation period. Ongoing.

Project type according to the duration of its implementation. Cyclic.

Expected outcome. Enhancing scientific and methodological competency by the way of information technology as well as the quality and effectiveness of teachers' and students' educational activities.

Number of project participants: 36 members of the academic staff and 220 students majoring in Pedagogy.

Components of project implementation:

1. Stating and substantiating the problem of scientific and methodological work;

2. Creating (developing) a model for the system of organizational and methodological support of the project implementation by the way of information technology;

3. Generalizing practical results of scientific researches and effective pedagogical experience by the way of information technology;

4. Carrying out trainings to increase the level of scientific and methodological competency of the academic and teaching staff by the way of information technology;

5. Implementing the educational project;

6. Monitoring the process and results of the project implementation;

7. Generalizing and analysing the effectiveness (efficiency) of scientific and methodological work in accordance with the outlined objectives;

8. Correcting work on improving the model for organizational and methodological support of the project.

Forms and methods of project implementation: mass (conferences, seminars, methodological meetings); group (scientific and methodological associations, creative (profile) groups; individual (consultations, self-education, training); modelling, internships, expert evaluation, methods of mathematical statistics.

Project participants: employees and students of structural divisions of the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council.

Efficiency criteria for the implementation of scientific and methodological support of the educational process and the formation of teachers' scientific and methodological competency.

The effectiveness of the project should be considered through the relationship of changes and dynamics of the results regarding the level of formation of teachers' scientific and methodological competency and students' progress in studying educational and professional programs.

The criteria for evaluating the level of formation of teachers' scientific and methodological competency are defined as follows:

1. Quality and quantity of published scientific and methodological works aimed at solving current educational problems.

2. The level of scientific expertise in the the professional field and the ability to effectively implement it to solve specific problems of education.

To evaluate students' progress, we used the following criteria:

1. The quality of students' knowledge.

2. The level of scientific and methodological justification for professional decisions taken by students on planning, organization, selection of teaching methods and assessment techniques for educational activities during classes and pedagogical practice.

Project implementation. The model of the organizational and methodological project support was realized in accordance with the defined theoretical fundamentals.

The scientific and methodological problem of the academy was defined taken into consideration principles of diagnostics, scientific character, practical focus, prospective viability, and its implementation involved modernization of scientific and methodological work, which was carried out by the way of information technology, which became necessary during COVID 19. Its implementation involved updating scientific and methodological work, its improvement on an innovative basis as a result of creative and experimental work, formation of new approaches to scientific and methodological work, formation of teachers' scientific and methodological competencies.

One of the key elements in planning and managing the scientific and methodological work was creating a model of organizational and methodological support for the implementation of this project (Fig. 1).

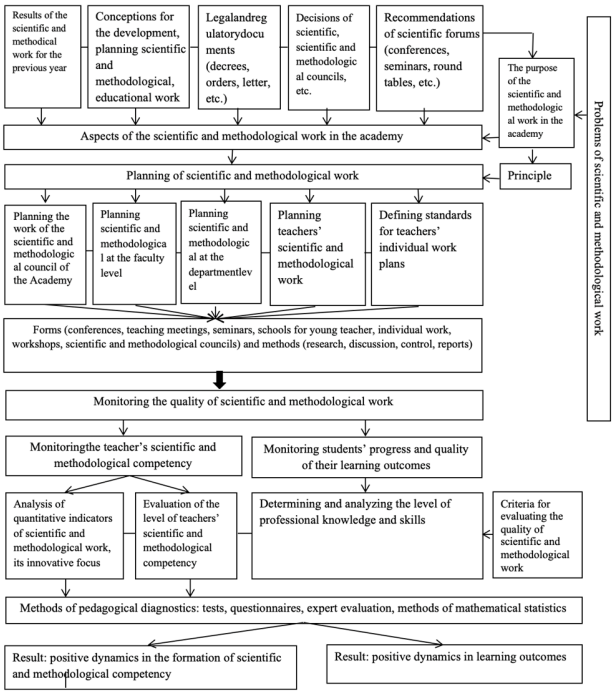

Fig. 1. Model of organizational and methodological support
for the project implementation

Determination the project purpose was in accordance with the purpose of scientific and methodological work of the academy. Its implementation, in turn, required compliance with the principles of effective management of the educational process in the academy regarding modelling scientific and methodological work, namely scientific organizational and methodological support, systematic character, consistent diagnosing, practical focus. The implementation of these principles ensured the orientation of scientific and methodological work on its holistic improvement, taking into account teachers' best methodological practices; determining discipline-related works in the short-, mid- and long-term; needs for a combination of individual, group and team work; goals of teachers' professional development; achievements of psychological and pedagogical science and providing conditions for their introduction into the educational process of the academy that was done by the way of information technology..

Defining the aspects of scientific and methodological work required analysing and estimating the previous experience of its realization, as well as taking into account perspective development of the educational process in the academy, objectives and distance peculiarities of advanced training of the teaching staff.

The main aspects and planning of scientific and methodological activities were also determined by the Statute

of the Academy, the Strategy, work plans of the divisions, in particular, to ensure compliance of scientific and methodological work with State Standards, qualification characteristics and improving the quality of student training.

Scientific and methodological work in the academy was planned on the basis of coordination of plans of various structural divisions and scientific and methodological councils of faculties.

The forms and methods of work used in the process of project implementation corresponded to the purpose, content and peculiarities of scientific and methodological work in a higher education pedagogical institution.

Administrative and pedagogical management of scientific and methodological work was accompanied by informing teachers about the purpose, content and objectives of scientific and methodological work by the way of information technology; development of recommendations for improving the planning and content of scientific and methodological work; observation and analysis of teachers' educational activities; registering and evaluating the products of teachers' scientific and methodological work (curricula, textbooks, tutorials, study aids, etc.); systematic control over the teachers' scientific and methodological activities, their quality and effectiveness in terms of teachers' professional development and quality of education in a higher education institution; conducting static analysis (monitoring) of quantitative and qualitative indicators of the project approach when implementing the tasks of scientific and methodological work for a certain period (dynamics of formation of scientific and methodological competency and quality of learning outcomes).

As the project implementation was cyclical, the quality of scientific and methodological work has been monitored since 2015, in separate stages (academic years).

5. Discussion of results

Quantitative and qualitative analysis of the project effectiveness according to the defined criteria

Studying and evaluating the dynamics of the formation of teachers' scientific and methodological competency involved identifying the level of their scientific and methodological knowledge and skills at certain stages of the project.

We assume that a competent teacher should be aware of the results of modern scientific researches to improve the quality of the educational process and apply them effectively. We suggested teachers to conduct self-assessment followed by peer-assessment by the way of information technology using a test that included:

1. Name and options for defining the concept, principle, scientific idea, educational technology, etc.;

2. Options that indicated proficiency at the level of creative application; high-level proficiency; low-level proficiency; non-proficiency.

Quantitative indicators of proficiency(respectively): 3 points; 2 points; 1 point; 0 points.

The level of theoretical competency by this criterion was determined by the formula: $\mathrm{Ct} = \frac{\mathrm{Cs+Ce}}{\mathrm{N}}$, where

Ct is the arithmetic mean value of the teacher's theoretical competency;

Cs is the result of self-assessment;

Ce is the result of expert evaluation;

N is the number of respondents.

There were 20 questions in the test.

We tested the formation of skills to implement the scientific and methodological foundations of the theory of professional activity using the method of observation of teaching activities, studying educational and methodological documentation (syllabi and curricula, educational and methodological support, scientific publications) and correlated the results with a certain level of skills, described in advance:

Level I stands for reproductive skills (1 point), when teachers act on the grounds of acquired knowledge and experience that allow them to solve professional problems in a traditional way;

Level II stands for adaptive skills (2 points), when teachers demonstrate the ability to restructure their scientific and pedagogical work, in accordance with new conditions by the way of information technology, methodological findings, their colleagues' research results. Teachers with this level of skills rely on perspective experience, adapted educational technologies (multimedia methods) in their professional activity.

Level III is local modelling (3 points), when teachers are eager to introduce elements of novelty (innovation) in their professional activity, based on perfect expertise in the traditional experience and awareness of promising innovations by the way of information technology, test new pedagogical ideas and their own as well as their colleagues' experimental findings to solve local professional tasks. Teachers with this level of skills carry out applied research, create methodological study aids.

Level IV is system modelling (4 points). Teachers aspire for constant updating of their knowledge by the way of

information technology, search (develop) innovative approaches to solving professional problems (local and global). They systematically implement new pedagogical ideas, forms and methods of educational activities, which are the results of purposeful research.

7 experts took part in the research.

To determine the quality and quantity of scientific and methodological publications, we used the method of expert evaluations to single out the qualimetric characteristics of the evaluated objects (monographs, textbooks, educational and methodological tutorials, methodological recommendations, etc.), approved by the scientific and methodological council of the academy (faculty).

A qualimetric model was created, which included the following criteria (factors) for assessing the quality of teachers' scientific and methodological work, taken in weight proportions (W):

1. The number of received grants, scientific and methodological approved by the Ministry of Education and Science of Ukraine, patents, etc. – 25% (W_1– 0,25);
2. Correspondence to the current state of science development – 15% (W_2 – 0,15);
3. Relevance for modern educational practice – 15 % (W_3 – 0,15);
4. The capacity of the innovative idea, approaches, technologies, tools, etc. – 15% (W_4 – 0,15);
5. Practical significance (content, methodical apparatus, diagnostic tools, etc.) – 10 % (W_5 – 0,1);
6. Number of scientific and methodological works – 10% (W_6–0,1);
7. Peer-evaluation of the publication – 5% (W_7 – 0,05);
8. Compliance with educational programs (program) – 5% (W_8 – 0,05).

Compilation of quantitative data obtained by the way of information technology using different methods allowed us to determine the level of teachers' scientific and methodological competency according to the formula:

$$SMC_t = \frac{\overline{C_t} + \overline{C_{sk}} + \overline{C_{wq}}}{C_m} \times 100\%, \text{where}$$

SMC_t is the level of the teacher's scientific and methodological competency;

$\overline{C_t}$ is theoretical competency;

$\overline{C_{wq}}$ is the quality of scientific and methodological works;

$\overline{C_{sk}}$ is skills formation;

C_m is the maximum number of points.

$\overline{C_{sk}}$ (skills formation) was defined as the arithmetic mean value of experts' marks.

$\overline{C_{sk}} = \frac{\sum \overline{C_{sk}}}{10}$, where

$\overline{C_{sk}}$ is the indicator of scientific and methodological skills formation;

$\sum \overline{C_{sk}}$ is the general number of points;

10 is the number of experts.

To determine the level of teachers' scientific and methodological competency we used the obtained indicators in the following way:

high level (H) – 90-100% of points scored;

average level (A) – 74-89%;

below average (BA) – 60-73%;

low (L) – 0-59%.

We used the test method by the way of information technology to evaluate the quality of students' knowledge. The tests consisted of 40 questions that involved understanding the scientific and methodological foundations of pedagogical theory (concepts, principles, technologies, types of education, etc.). Students got 1 point for each correct answer.

220 students took part in the study.

Students had to complete a test aimed at evaluating the level of scientific and methodological justification when taking professional decisions. The test included 5 situations that required professionally verified decisions on planning, organization, choice of content, teaching methods and assessment techniques for educational activities of students in general secondary education institutions during practical classes or pedagogical practice.

For example, students were asked to state a reasoned opinion on solving a particular pedagogical problem or specific situation in the classroom and in the process of planning pedagogical practice:

1. Analyze and evaluate ensuring the continuity of education for preschoolers and school-aged children on the grounds of the legal framework, programs and other regulations.
2. Identify the main factors in updating the content of education and give a comparative description of each of them on the grounds of the analysis of curricula and textbooks.
3. Conduct observations and collect information by the way of information technology about the dependence of teaching methods (technologies) on the nature (features, content) of the subject in a general secondary education institution. Sum up the information by the way of information technology obtained and draw a reasoned

conclusion about the relationship of teaching methods (technologies) with educational goals, students' age and ability to learn, educational environment of the educational institution.

Students got 3 points for a scientifically and methodically substantiated (reasoned) opinion on a certain problem. 2 points were awarded for insufficiently convincing reasoning. Formally reasoned answer (based only on ready knowledge, or own experience) scored 1 point. If no argumentation was provided, students got no points.

Accordingly, students' progress in educational activities was calculated by the formula:

$Q_e = \frac{\overline{Q_k} + \overline{SM_d}}{S_m} \times 100\%$, where

Q_e is qualitative effectiveness of students' educational activities;

Q_k is knowledge quality;

SM_d is the level of scientific and methodological justification of professional decisions (opinions);

S_m is the maximum possible score for the quality of students' learning outcomes.

The quality level of students' learning outcomes was determined in the following way:

high level (H) – 90-100% of points scored;

average level (A) – 74-89%;

below average (HC) – 60-73%;

low (H) – 0-59%.

The research was conducted before and after the implementation of the project «Modelling scientific and methodological work in the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy by the way of information technology » of Kharkiv Regional Council». The final monitoring of the impact of scientific and methodological work on teachers' professional development (their scientific and methodological competency) and the quality of students' learning outcomes proved their positive dynamics in accordance with certain criteria and indicators. Thus, the percentage of teachers having high and average level of scientific and methodological competency increased by 21.2%, the growth rate of students with a high and average levels of learning outcomes was 19% (Table 1).

Table 1: Summarized results of «Modelling scientific and methodological work in the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy» of Kharkiv Regional Council» project implementation efficiency (growth rate, %)

Criteria and indicators	Levels		Growth rate (%)
	Before project implementation	Before project implementation	
Formation of teachers' scientific and methodological competency	(H) – 19,9 (A) – 31,2 (BA) – 27,4 (L) – 21,5	(H) – 26.8 (A) – 45,5 (BA) – 20,0 (L) – 7,7	6,9 14,3 – 7,4 – 13, 8
Quality of students' learning outcomes	(H) – 23,1 (A) – 34,1 (BA) – 30 (L) – 12,8	(H) – 32,9 (A) – 43,3 (BA) – 21,2 (L) – 2,6	9,8 9,2 – 8,8 – 10, 2

Thus, the project «Modelling scientific and methodological work in the Municipal Establishment «Kharkiv Humanitarian Pedagogical Academy by the way of information technology » implemented through the realization of the model for its organizational and methodological support was successful enough as we observe increase in the level of teachers' scientific and methodological competency as well as in the quality of students' learning outcomes.

Emphasizing the interpretation of the data described in the article, we note that the results of the study, in particular, improving the motivation of the student's personality by the way of information technology in educational activities have positively affected the problem of education in general and the problem of motivating the student's personality in educational activities in particular.

6. Conclusions

The conducted research on the effectiveness of the project approach to scientific and methodological work in a higher education pedagogical institution by the way of information technology confirmed that increasing the level of scientific and methodological work of the subjects of the educational process directly and indirectly affects the development of their scientific and methodological competency and effectiveness of the educational process. The innovative nature of scientific and methodological work is believed to be an important condition for its effectiveness when ensuring certain indicators (Table 1). It is provided, in particular, through the introduction of a project approach to planning, organization, content, forms and methods.

The relationship between the formation of teachers' and students' scientific and methodological competency was

traced. Moreover, it was proved that it directly affects the quality and effectiveness of education in higher education pedagogical institutions, which is possible with the help of information technology.

Further research should be directed to studying information support, psychological foundations of scientific and methodological work in a higher education pedagogical institution in the course of creative cooperation of the academic staff and students.

References

[1] Agusdianita, N., Karjiyati, V., Hasnawati, H., & Dalifa, D. (2018). The Influence of Project Based Learning Model in Thematic Learning by Using Scientific Approach on the Elementary School Students. *Proceedings of the International Conference on Educational Sciences and Teacher Profession (ICETEP 2018)*, 295, 100-102. https://doi.org/10.2991/icetep-18.2019.24

[2] Chagovets, A., Chychuk, A., Bida. O., Kuchai, O., Salnyk, I., &Poliakova I. (2020). Formation of Motivation for Professional Communication among Future Specialists of Pedagogical Education. *Revista Românea scăpentru Educaţie Multidimensională,* 12(1), 20-38. https://doi.org/10.18662/rrem/197

[3] Chang, S. C.,& Hwang, G. J. (2018). Impacts of an augmented reality-based flipped learning guiding approach on students' scientific project performance and perceptions. *Computers & Education*, 125, 226-239. https://doi.org/10.1016/j.compedu.2018.06.007

[4] Fu, Y. C., Baker, D. P., & Zhang, L. (2020). Engineering a World Class University? The Impact of Taiwan's World Class University Project on Scientific Productivity. *Higher Education Policy, 33*(3, SI), 555-570. https://doi.org/10.1057/s41307-018-0110-z

[5] Gertrudix, M., Rajas, M., Gertrudis-Casado, M. D., & Galvez-de-la-Cuesta, M. D. (2020). Management of scientific communication of research projects in H2020: functions, models, and strategies. *Profesional de la Informacion, 29*(4), 290-424. https://doi.org/10.3145/epi.2020.jul.24

[6] Huang, C., Zhong, M., Ye, N., Dong, J., Huang, F., & Sun, K. (2019). Cultivating Students' Innovative Ability by Scientific Research Projects. *Proceedings of the 2nd International Seminar on Education Research and Social Science (ISERSS 2019)*, 322, 175-177. https://doi.org/10.2991/iserss-19.2019.46

[7] Julpisit, A., & Esichaikul, V. (2019). A collaborative system to improve knowledge sharing in scientific research projects. *Information Development, 35*(4), 624-638. https://doi.org/10.1177/0266666918779240

[8] Kang, B. (2020). Impact of academic patenting on scientific publication quality at the project level. *Asian Journal of Technology Innovation*, 29(2), 258-282.https://doi.org/10.1080/19761597.2020.1798795

[9] Leroux, R. (2020). Raymond Boudon : The origin of a scientific project. *Revue europeenne des sciences sociales*, 58(1), 209-220. https://doi.org/10.4000/ress.6581

[10] Perez, O. G. B., Fernandez, A. R., Hoyos, M. Z., Martinez, M. A., & Aviles, M. L. M. (2019). Scientific methodological and didactic quality in the evaluation of research projects. *Dilemas Contemporaneos-Educacion Politica Y Valores*, 6(3), 27. https://www.proquest.com/docview/2245648626

[11] Schulze, T. G. (2020). The WPA Education, Science, Publication, and Research Initiative (ESPRI): jumpstarting scientific projects in low- and middle-income countries. *World Psychiatry, 19*(1), 123-124. https://doi.org/10.1002/wps.20709

[12] Siew, N. M., &Ambo, N. (2020). The Scientific Creativity of Fifth Graders in a Stem Project-Based Cooperative Learning Approach. *Problems of Education in the 21st Century,* 78(4), 627-643. https://doi.org/10.33225/pec/20.78.627

[13] Zhang, W. (2019). Study on Management System of Major Scientific Research Projects. *Proceedings of the 2019 5th International Conference on Education Reform and Modern Management (ERMM 2019),* 361, 155-160. https://doi.org/10.2991/ermm-19.2019.31

[14] Zink, H. R., & Curran, J. D. (2020). Measuring the Startup Journey and Academic Productivity of New Research Faculty through Systems Engagement, Project Efficiency, and Scientific Publication, *Journal of Research Administration,* 51(1), 32-45. https://eric.ed.gov/?id=EJ1254042

[15] Ariyani Muljo, I Nyoman Sudana Degeng, Cholis Sa'dijah, Sulton (2021). Effectiveness of Project-Based Learning Models on Communication Skills in Schools. *Psychology and Education (2021)* 58(3): 1036-1045 http://psychologyandeducation.net/pae/index.php/pae/article/view/3098/2768