Research-based learning in the education process of a higher education institution

Навчання на дослідницькій основі в освітньому процесі закладу вищої освіти

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Abstract

The article examines the issue of research-based learning in the education process of institutions of higher education. The aspect of formation of research skills in students is central in our research. The following research methods have been applied: theoretical – the secondary analysis of philosophical, psychological, and pedagogical sources on the issue under consideration, which has given the possibility to systematize and generalize the available data; comparative – has allowed finding a new angle in the issue of the role of research-based learning in the education process of higher education institutions. Besides, in our research we also rely on the data gathered personally while implementing curriculum direted on the development of research-and-development skills in students of a higher education institution. The results of the study allow concluding that that the research-based learning involves the introduction of scientific research methods into the process of educational cognition at all its stages (from perception to application in practice), determines ways of organizing educational and extracurricular

Анотація

Розглянуто проблему навчання на дослідницькій основі в освітньому процесі закладу вищої освіти. Центральним у дослідженні є аспект формування дослідницьких умінь у студентів. Застосовані методи дослідження: теоретичний – вторинний аналіз філософських, психолого-педагогічних джерел з проблеми, що дав можливість систематизувати та узагальнити наявні дані; порівняльний – дозволив знайти новий ракурс у питанні ролі розвитку дослідницьких навичок та умінь у студентів. У дослідженні ми також покладаємося на дані, зібрані особисто під час впровадження освітньої програми, спрямованої на розвиток дослідницьких навичок у студентів закладу вищої освіти. Зроблено висновок, що навчання на дослідницькій основі передбачає впровадження методів наукового дослідження в процес навчального пізнання на всіх його етапах (від сприйняття до практичного застосування), визначає способи організації поза/навчальної дослідницької діяльності студентів. Результатом є сукупність засвоєних знань та сформованих умінь при вирішенні

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research activities of students. Its result is a set of acquired knowledge and formed skills when solving research tasks in various social and professional situations.

Keywords: curriculum, institution of higher education, research-based learning, research activity, research skills.

дослідницьких завдань у різних соціально-професійних ситуаціях.

Ключові слова: дослідницька діяльність, дослідницькі уміння, заклад вищої освіти, навчання на дослідницькій основі, освітня програма.

Introduction

Higher education, built on the principle of international cooperation, sets the goal: to eliminate obstacles and ensure wide access to quality higher education on the principles of democracy and independence of universities, their scientific and research independence; to activate the mobility of students and scientific-pedagogical staff; to prepare the student youth for the active life in a democratic society and lay the foundations for their professional career and individual development.

The system of research-based learning has become widely developed in higher education institutions all over the world. It is relevant in connection with modern aspects of higher education reform as it provides an opportunity to train a future specialist in the conditions of practical training, and not only theoretical one.

Within the framework of the European Higher Education Area (European Commission, 2020), all educational programs for the training of specialists and important components of these programs are to be based on the concept of orientation to the learning outcome. Planned learning outcomes are to inform on the learning activities and assessment format, and education is to become "student-centered". Educational programs for the training of future specialists are focused not only on the development of competencies related to a specific study profile, but also on the development of both general skills (communication, problem solving, ability to integrate ideas and concepts, ability of teamwork and groupwork) and research skills.

Reforms in the higher education system of Ukraine provide ample opportunities for the training of highly qualified specialists. They clearly regulate the educational and scientific policy of modern institutions of higher education. The changes involve the training of specialists in the system of higher education, first of all, using research-based techniques, that is, research-based learning.

Research-based learning is a concept that encompasses a number of pedagogical approaches in the educational process aimed at development of research skills in students. Its main characteristics is: a complex of student-centered goals, implemented through scientific research; teaching involves the interpretation of experimental data, cases/situations/problems for solution; management of the educational process takes place with posing questions and practical tasks; training is based on the search for novelty and its relevance; an educator becomes a facilitator. Thus, the key elements of research-based learning are research issues and problem situations that involve experimental verification. Research-based learning forms the student's understanding of the value of research work and the ethics of scientific research. It develops critical and analytical thinking, ability to solve problems of a research nature. It educates on operating with quantitative and qualitative research methods, which have a positive impact on the learning outcomes.

In the conditions of globalization, integration into the world educational environment, it is expedient to study and understand the issue of forming research-and-development skills of students in higher education institutions (Kennedy et al., 2006).

Thus, the aspect of formation of research-and-development skills, that students can master in the educational process of the institution of higher education, is central in our research.

Theoretical Framework

The issue of developing of research-and-development skills and organizing scientific-research activities of students of higher education institutions is multifaceted. Its importance in the education process is reflected in both domestic and foreign scientific researches. In particular, scholars devote their research to the study of: foundations of the organization of research activities of future specialists in various professional fields; peculiarities of the formation

of students' research skills; training of students for research activity as a holistic process. Most researchers note the need to improve curriculum for the training of future specialists in various professional fields, taking into account the educational and scientific-research needs of students.

Currently, one of the leading global trends in university education is the integration of the research component into the process of training of future specialists, or the so-called teaching-research nexus (Gros et al., 2020; Tretko, 2015). Fanghanel et al. (2016) in their research mention that this concept in higher education constantly changes, yet is considered to be as an academic ideal. Wuetherick (2009) refers the teaching-research nexus to "any aspect of the interplay between the teaching and research roles of universities, whether at the level of the institution, faculty, department, or individual academic." The introduction of a research component to a university curriculum and programs has differences in different institutions of higher education. This component can be integrated into existing educational courses or provided by special courses on the methodology of scientific research (Kozlov, 2015).

However, scholars Clark and Hordosy (2019), Paul and Tansy (2020), Perron et al., (2020) prefer a consistent holistic approach to the formation of research-and-development skills of undergraduate and graduate students. It is worth emphasizing that in institutions of higher education with the status of research institution, such an approach is imperative.

Rossum and Schenk (1984) claim, that perception of the educational process by the students affects the learning outcomes. Balloo et al., (2018), Vermunt and Vermetten (2004) consider that knowledge that students acquire about research, the impact of the research environment and involvement in research activities affect the results of their education, future career and life in a society. Therefore, in order for students to develop their research-and-development skills and abilities, educators are to ensure the implementation of effective methods of learning fundamental research knowledge (Salmento & Murtonen, 2019; Salmento et al., 2021).

Balloo et al., (2016), researching the factors that contribute to the development of knowledge related to research methods, the development of research abilities and skills in undergraduate students, proved that self-regulation and motivation are associated with higher degree of structural knowledge. This indicates that the factors of self-regulation and motivation influence the development of research skills. Research self-efficacy and research interest also demonstrated significant positive correlation with knowledge, but purposeful application of research methods was the largest predictor of research abilities and skills. McKinley et al. (2021) consider important implications of a teaching-research nexus. Higher education institutions, refocusing priority, are to respond to the challenges innovation, in particular, innovation linked with student employability.

Scholars come to the conclusion that the practice of applying research methods is a component that educators are to include in the educational training programs for improving the level of knowledge and skills of students.

Methodology

The following research **methods** have been applied:

− Theoretical − the secondary analysis of philosophical, psychological, and pedagogical sources on the issue under consideration, which has given the possibility to systematize and generalize the available data. We rely on international academic literature, as the study is relevant to global contexts where teaching and research are competing;
− Comparative − has allowed finding a new angle in the issue of the role of research-based teaching in the education process of higher education institutions.

Besides, in our research we also rely on the data gathered personally while implementing curriculum direted on the development of research-and-development skills in students of a higher education institution.

Results and Discussion

Morozov (2014) and Meniailo (2015) characterize research activity as the human attitude to life, displayed in motivational readiness and intellectual ability: to cognize the reality, to independently set various research goals, to obtain unforeseeable results and analyze them to acquire the further knowledge.

Thus, we understand research activity as a specific human activity, regulated by the individual's consciousness, aimed at satisfying

cognitive and intellectual needs. Its product is new knowledge, acquired in accordance with objective laws and circumstances that determine the reality and possibility of achieving the goal.

Murtonen et al., (2008) studied the influence of research abilities and skills on future career development. The scholars revealed that about half of the students who participated in the study were not convinced that research skills would be useful for their future activity. These students experienced problems with motivation while performing research tasks. Students who valued research skills for their future career were more task-oriented, applied an in-depth approach to learning, and experienced less difficulty when learning educational components using research methodology.

Shaw et al., (2013) proved that research-related self-efficacy, motivation, familiarity with the research environment and a positive orientation to research are the key predictors that contribute to students' readiness for the future research activities.

Jenkins and Healey (2005) distinguish four approaches to the inclusion of a research component in the education process of students:

– Research-led teaching – involves familiarizing students with the results of scientific research by the educators of a higher education institution by introducing them to the content of courses;
– Research-oriented teaching – focuses on understanding the process of knowledge production, on the formation of a research ethos, and not on the assimilation of the acquired knowledge;
– Research-based teaching – most of the curriculum consists of research activity, but little attention is paid to the content of education; in this case, students carry out research together with educators, their role as participants in the educational process is almost the same;
– Research-informed teaching – scientific research is an integral component of teaching and learning.

Anderson (2002), Shostak et al., (2010) and Vieno et al., (2022) summarize and define three categories of research skills provided by bachelor and master programs:

– Targeted – research skills that educators or experts directly indicate as the goal of study

within the components of the educational program;
– Perceived – research skills, which, according to students or educators are considered to have been developed within the components of the educational program;
– Assessed – research skills defined using objective measurement criteria as having been developed within the components of the educational program.

Laidlaw et al., (2012) define research skills as teachable activities that are to be practiced to establish facts, postulate new ideas, test ideas to collect data, and analyze data to provide conclusions. Researchers point to seven research skills that are most often mentioned in bachelor and master programs:

1. Critical assessment – assessment of methods, data and conclusions of open studies to determine their credibility and reliability;
2. Information synthesis – combining of information from different sources in a logical way to provide conclusions;
3. Decision-making – selection and implementation of a specific course of action;
4. Problem solving – identifying the sources of difficulties and finding effective solutions for them;
5. Data collection – collection of information by structured methods to support the objectives of research;
6. Data analysis – processing and modeling of data to identify tendencies and correlations to draw conclusions that relate to a set of research objectives;
7. Communication – exchanging of information using written or oral means.

Aspects of the development of research skills can be considered through the prism of Bloom's taxonomy (1954), demonstrating that students move along a continuum in which they:

– Start research and thus determine the need for knowledge and understanding;
– Find and generate the necessary information and data using the appropriate methodology;
– Critically evaluate information and data and the process used to find, generate this information and data;
– Organize collected and generated information;
– Synthesize and analyze, apply new knowledge,

– Transmit knowledge, understanding and processes used to create it with an awareness of ethical, social and cultural aspects.

Jenkins (2008) supports the idea that research-based experience of students actively:

– Contributes to changing the understanding of student-centered or inquiry-based or problem-based learning;
– Adjusts the philosophy and values of educational programs;
– Encourages and enables students to study in a way, which is parallel and reflects the way the educators research and develop in their course or professional field;
– Creates opportunities to for the course evaluation processes;
– Illustrates how educators develop and disseminate their research results on the course provided or in the professional field (for example, through student research journals, student scientific conferences, etc.).

In this context interesting is the structure of formation of research skills developed by Willison and O'Regan (2006), which students can master in the process of study at a higher education institution. The specified structure covers five levels of student autonomy in conducting research, in particular:

1) Student research within the framework of issues defined by educators under strict control of educators;
2) Student research within the framework of issues defined by educators under the guidance of educators;
3) Independent student research activity within the framework of issues defined by educators;
4) Student research within self-defined issues under the guidance of educators;
5) Independent student research within self-defined issues.

Willison and O'Regan (2007) also define the stages of research activity of students:

1) Preparatory – awareness of the need for research;
2) Collection of information;
3) Critical assessment of collected information;
4) Processing of collected information;
5) Synthesis and analysis of new knowledge;
6) Communication of research results as well as defining of research skills students are

still to develop at each individual level of autonomy.

Auchincloss et al., (2014), Seymour et al., (2004) provide the following positive consequences for the students activity when research skills have been developed – students indicate a clearer understanding of the purpose of learning tasks and the assessment system, a deeper understanding of the educational component, and an increased ability to think as a scientist.

Crebert et al., (2004) provided the results of their research, where the majority of undergraduate students agreed that it was more important for their future careers to develop their research skills and abilities than to study individual educational components within the cycle of professionally-directed courses. This finding indicates that students understand the value of developing research skills for their future careers and life in a society. Therefore, the inclusion of opportunity to develop research skills in undergraduate and graduate curricula is to be encouraged.

Willison (2012) proves that the development of research skills in students during studies at bachelor and master programs offers a number of advantages for both students and educators. Positive consequences for educators include narrowing the gap between their teaching activities and research, clarification of teaching methods, and understanding of the educational component.

The research approach involves the introduction of scientific research methods into the process of educational cognition at all its stages, determines ways of organizing educational and extracurricular research activities of students.

Povidaichyk (2019) notes, that the position of completion of each degree of training with a specific result of scientific and research training. Such a result is a set of acquired knowledge, formed skills and a level of independent, confident mastery of them when solving research tasks in various socio-professional situations.

Thus, the bachelor degree (the basic level of higher education) involves the formation of a certain set of scientific and research activities, the development of which takes place in the process of studying certain academic courses and extracurricular activities and ends with the writing of a qualifying paper, which testifies to the bachelor's level of readiness to perform research tasks.

The master degree involves expanding, deepening of experience acquired at the bachelor level. It takes place due to the assimilation of the theoretical and methodological foundations of scientific activity; applying new methods, methods of research, technologies for processing of results. Deepening is carried out during the assimilation of the content of the main components of the research work. Master degree students are characterized by greater independence, initiative, and research activity.

Students develop the research-and-development skills during both theoretical studies and practice passing. The following is the example of developing the research-and-development skills at practice of social work program students at Uzhhorod National University, Ukraine.

At the bachelor level the research practice takes place at the final year of studies. In particular, research practice involves the independent development of a social project aimed to improve the skills of projecting and prognostication activities. Based on the results of practice, students perform research-description of a case resolved in a social service. This work reflects the understanding and application by a student of knowledge, skills, and values of social work, methods and technologies of social work.

The research task is drawn up in the form of an essay, which consists of:

1. The first part is a presentation of a client a student worked with (the nature of the client' needs is determined, the range of specialists and institutions involved in solving the problem is outlined).
2. In the second part includes the goal and tasks that are set to solve or mitigate the problem formulated. Personal reflections and practical acquisitions are demonstrated regarding the possible options offered by a student.
3. The third part presents the methods and technologies applied. To confirm the work done, scenario development, descriptions of these methods and technologies are attached to the case study. Various types of interviews, conversations, consultations, surveys, testing, etc. are prepared and used.
4. The results of the work, evaluation of its effectiveness, conclusions and recommendations are presented in the conclusion part.

Thus, practice is aimed at the formation of skills in the application of social work methods and

technologies, as well as the development of research-and-development skills, in particular, diagnostic, information-analytical, organizational, communicative, etc.

Research practice at the bachelor level is carried out on the basis of social institutions and institutions of various directions and departmental affiliation. Students act as assistants to specialists of the respective institutions. They apply knowledge and skills acquired during theoretical studies in various courses and the experience of previous practices. They are given the opportunity to demonstrate initiative, abilities, and to independently conduct work in the field chosen. This contributes to the deepening and consolidation of professional knowledge and skills, research skills in particular. In the course of practice, knowledge in the field of theory, methodology and technology of social work, social prognostication and projecting, management of the social sphere is integrated. The study of issues related to social management, the creation of various models of social services and forms of customer service is planned. On this basis, students prepare a social project as a part of the bachelor thesis.

The practice of future social work masters is a mandatory component of the educational program and involves the improvement of professional skills and abilities acquired in the process of theoretical training by students. The practice involves the performing of practical tasks for the provision of social services, including the performing of managerial functions in social service institutions (Povidaichyk & Borshch, 2013).

During practice, the research component of students' activity is one of the leading ones. The purpose of research practice is to ensure students' understanding of the role and importance of scientific research in the process of future professional activity; formation of skills in the organization and conducting of scientific research; development of creative thinking.

The main tasks of research practice are as following:

− Deepening and consolidation of theoretical knowledge from the cycle of professionally-directed courses;
− Involving students in direct practical activities;
− Accumulating experience in practical mastering of techniques of research-and-development activities;

- Formation and improvement of professional abilities and skills in the implementation of research-and-development activities in various areas of social work;
- Conducting research;
- Processing of research results using software;
- Accumulation and processing of specific material for the completion of the master thesis.

During research practice, each student performs an individual task that is directly related to the topic of the master thesis. The main content of this task is to conduct an empirical study to be included as a part of a thesis. The conditions that ensure the necessary quality of empirical research are: preliminary development of the research program, its coordination with an educator and the head of practice and the resolution of organizational issues regarding empirical research implementation. The results of the individual task are drawn up in the form of a report on the conducted empirical research.

Students both bachelors and masters develop the research skills during self-performed independent work too. We classify the research tasks within self-performed independent work by the skills developed as following:

- Methodological skills: mastering theoretical and empirical methods of knowledge; application of methodological principles of research-and-development; application of mathematical research methods, substantiation of the hypothesis.
- Information and analytical skills: selection of necessary and reliable sources of information from the analyzed subject area of research; analysis and systematization of information, identification of understudied aspects of research, opportunities for problem solving; analysis of certain social phenomena and processes using statistical procedures.
- Diagnostic skills: mastering methods of interviews, monitoring, questionnaires, expert evaluation, biographical, case method, testing, projective methods, sociometry.
- Projective skills: development of a project to solve the problem set taking into account the pre-project study of the situation; analysis, evaluation and selection of the optimal project; qualitative and quantitative analysis of the project results, formulation of conclusions; development of a plan for implementation at practice.

- Prognostic skills: mastering the methods of expert survey, anticipatory information, brainstorming, statistical modeling, scenarios, and heuristic methods.
- Technical skills: templating of scientific work; graphical and tabular presentation of research material; description of bibliographic references, preparation of a presentation.
- Organizational skills: determining the sequence of actions and compiling the research algorithm; planning of the research as a whole and its stages; distribution of responsibilities; selection of tools for the research implementation.
- Communication skills: dialogical type of relationship, contact with the research participants; application of communicative methods of obtaining information from experts in the field researched; mastering verbal and non-verbal means of communication; implementation of virtual scientific communication.
- System and information skills: mastering the skills of working with a text editor, electronic spreadsheets, databases, searching on the Internet; developing the skills of working with specialized research information packages; forming skills to use ICT; developing skills on using electronic didactic tools.

Therefore, according to the considered positions, research activity is primarily aimed at improving the professional activity of a future specialist through the use of certain methods, forms and methods of work.

Conclusions

In recent decades, the process of ensuring the unity of educational and research training has become increasingly active in institutions of higher education due to the wide involvement of students in research work.

The issue of orientation of students – future specialists to the research activity is considered as the most important precondition of their individual and professional self-determination, professional culture, and readiness to the research-and-development as a way to ensure competitiveness in the labor market.

The research-based teaching involves the introduction of scientific research methods into the process of educational cognition at all its stages (from perception to application at practice), determines the ways of organizing

educational and extracurricular research activities of students.

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