

I. ПРОБЛЕМИ МЕТОДИКИ НАВЧАННЯ МАТЕМАТИЧНИХ ДИСЦИПЛІН

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INNOVATIVE PEDAGOGICAL TECHNOLOGIES IN DEGREE EDUCATION OF NATURAL-SCIENTIFIC DISCIPLINES

In the article the features of pedagogical technologies application in the studies of naturally-scientific disciplines in colleges and technical universities are reflected. Competence approach is fixed in basis of planning with the use of akmeological and sinergistical principles. The process of innovative technologies realization in colleges and universities came true in parallel and antedated the changes of basic components of educational process - purposeful, semantic, judicial, methodical and diagnostic. Differences in application of studies methods were specified: in colleges reproductive and partly-searching are leading, and the problem and research methods of studies are wider used in institutions of higher education. Practical realization of the considered approaches in relation to preparation of building profile specialists predetermines the increase of continuous professional education efficiency.

Keywords: *continuous education, professional competence, pedagogical technology, personality oriented, akmeological, sinergistical approaches.*

The raising of problem. Realization of the pedagogical system model of professional preparation of future building profile specialists in the conditions of continuous education antedates optimization of maintenance and structure of educational programs of fundamental and professional preparation disciplines, choice of corresponding technologies and methodologies of studies, development of the methodical providing of educational process, co-ordination of educational process maintenance in the system "a college – a technical university". It is very important to find an optimal variant in application of innovative pedagogical technologies, what would organically connect everything better from foreign and Ukrainian pedagogical experience, with taking into account of the personal and public educational necessities, possibilities of different educational establishments and features of building profession.

The analysis of actual researches. Various ideas, theories, conceptions, models of innovative pedagogical processes are developed enough in modern pedagogical science, however they are not implemented enough intensively in the real practice of education and studies. Innovations in pedagogics must necessarily antedate planning of technological level of pedagogical theory realization [5; 10]. Technological approach provides exact instrumental educational process control and guarantee of the put aims achievement, integral system of professional preparation. Due to adaption of pedagogical technology every individual can realize maximally the intellectually-creative potential, adjust effectively to the fleeting changes at the market of labour, use optimally the accumulated educational capital in the conditions of cardinal world view changes [2, p. 71].

Pedagogical technology is considered as the actions system model of teacher and students that must be executed during the optimally organized educational-educator process of future builders' professional preparation with the aim of competent specialist forming. It is an active scenario of educational-cognitive activity organization of students with the aim of acquires a select profession [7, p. 128]. After official formulation of UNESCO, pedagogical technology is a system method of creation, application and determination of all process of teaching and mastering of

knowledge taking into account technical and human resources and their co-operation; the aim of that is optimization of education forms. Educational technology is examined in wide sense as part of didactics, and in narrow - as a concrete tool of teacher, object of didactics researches and applied developments.

Advantages of technological approach consist in possibility of pedagogical processes management and foresight of their results; scientific basic systematization and analysis of separate teachers practical experience; complex decision of educational and social-educator problems; providing of favorable terms for development of personality and reduction of effects of unfavorable circumstances influence on a man; optimal use of present resources [8, p. 246-247].

Understanding and use of term "pedagogical technology" is not far unambiguous. Complication, many-sided nature of pedagogical activity is a factor that opens space for many pedagogical technologies, which production dynamics grows constantly. The main task and sense of educational technology are possibility of her recreation for the obtaining of similar quality results [4, p. 18]. However the other idea is undeniable - the complete algorithmization of educational technology is improbable through vagueness, stochastic essence of not only humanitarian but also natural-science systems.

Te aim of the article: to ground application of innovative pedagogical technologies in the studies of naturally-scientific disciplines, what will allow to improve forming of future specialist's professional competence.

Research methods: theoretical – an analysis of scientific and methodical literature, educational-normative and legal documentation; method of structure-system analysis; generalization, classification, analogy, prognostication, planning for the ground of conclusions.

The exposition of basic material. Basis of the pedagogical system operating block of future specialists professional preparation of building profile in the conditions of continuous education are technologies of studies, that have such signs [6, p. 47-54]:

- standardization, unitization of studies process, possibility of technology recreation and circulating in relation to the set terms;
- effectiveness - assured achievement of the pre-arranged level of mastering;
- technology orientation on personality development in an educational process, realization of different degrees studies;
- diagnostic aim creation (taxonomy) – an underpinning on the stage of diagnostics planning of every didactics aim achievement;
- optimal organization of educational material;
- organization of educational process after educational aims, accent to differentiated independent work of students with the prepared educational material;
- examination of studies quality: entrance - current - final control;
- producibility – an achievement of the pre-arranged results in different educational establishments, by the different subjects of educational process;
- the special forms of evaluation of knowledge adoption and activity aspects level: next to traditional methods, testing is conducted and rating scale of evaluation is used.

Developing an operating-room constituent of the pedagogical system of building profile specialists professional preparation, we accede to the idea, that pedagogical technology is based on legitimacies of educational process, that are the result of scientific cognition of educational process, and methodology leans on empiric experience, mastery and art of teacher. Thus, the system of concrete maintenance transferrableness rules of studies is methodology of studies, and the projected

and theoretically underpinned system of educational activity rules, unconnected with concrete maintenance, - is pedagogical technology.

Applying pedagogical technologies in the building profile specialists teaching system, we followed such positions [1, p. 247-250]:

1. For basis of pedagogical technology planning of accept the competence approach, sent to development of formed key and subject competences and forming of professional competence constituents through the decision of the tasks related to future activity in the field of building industry.

2. Complex of projected for an university pedagogical technology methods can be partly applied in colleges, that will assist didactics adaptation of students and integration of educational programs in the system "a college – a technical university".

3. The personality oriented studies antedate the organization of studies on principles of deep respect to personality of student, taking into account features of individual development, attitude toward him as to the conscious responsible subject of educational-educator co-operation.

4. We use akmeology strategy as orientation on vital success, achievement of tops in development of every student and teacher, on creative potential development of future specialist and his socialization in the difficult terms of vital functions.

5. The head stone of technology is a self-education - possessing ability and necessity of knowledge addition and generation, ability to orient in difficult databases and systems of knowledge, necessary condition of professional competence of both teacher and future specialist.

6. Among the numerous methods of studies we chose action, sent to forming of knowledge obtaining and applying capabilities and producing concrete professional actions. In the process of studies the real situations of future builders professional activity are designed, problems are offered for a general decision.

7. Pedagogical innovations are related with the using of interactive methods that are based on ability to co-operate in the process of dialogue. Essence of interactive technologies consists in that studies take place by co-operation of all his participants, this is co-learning, in which both teacher and student are subjects.

Deserves of attention the law of pedagogical technology, formulated by an academician I. Ziaziun [3, p. 30]: "Than more by volume and by meaning the valued filling of pedagogical technology is, the more productive and more qualitative will be a process of study, more free, physically and morally healthier will be a subject of education, more ponderable and more necessary for him and society his creative potential will appear".

Innovation of educational process we examine as totality of successive, purposeful actions with the aim of an improvement of building profile future specialists professional preparation. The process of realization of innovative technologies in colleges and universities was provided in parallel and antedated the changes of basic components of educational process - having a special purpose, semantic, judicial, methodical and diagnostic. The improvement of forming of future builders professional competence became the primary purpose of educational process. The semantic component of technologies antedated integration transformation of natural-science and professional preparation maintenance with approaching to the level of modern building technologies. Changes in a judicial component touched methods of organization and realization of educational-cognitive activity (application of interactive, action methods, problem approach, project activity, forming of the positive motivation of studies, sent to the achievement of success). Efficiency of innovative technologies application was predefined by providing of system

methodical accompaniment of educational process. A diagnostic component tested changes due to the use of different plane didactics facilities of pedagogical control.

The choice of methods of studies as manners of well-organized mutual-related activity of teachers and students was predetermined by the put aims (improvement of future builders professional competence forming), features of educational process and personality differences of students of colleges and universities. With taking into account of classification of methods of studies by the nature of cognitive activity [9, p. 121], at teaching of natural-science disciplines we applied such methods:

1) explanatory-illustrative method: in colleges was applied for explanation of new material - students perceive and comprehend facts, estimations, conclusions at the level of the reproductive thinking; in institutions of higher education - for exposition of large array of information on separate lectures. Application of method does not form abilities and skills of the use of gained knowledge for a student, does not provide them conscious and strong memorizing, however it is effective for students with the low level of knowledge (in institution of higher education applied on consultative employments with backward students);

2) reproductive method: was applied in colleges (in a greater measure) and institutions of higher education on laboratory and practical employments; activity of students has algorithmic character (solving of tasks, exercises, making of experiments after instructions, charts, rules in analogical, similar with the considered standard situations). Application assists for forming of knowledge, basic thinking operations (analysis, synthesis, generalization, transfer, classification), skills and abilities, however it does not provide development of students creative abilities;

3) method of problem exposition: we applied the elements of method in colleges, in a greater measure - on lectures, laboratory works in institutions of higher education. Students not only perceive, realize and memorize the prepared information but also watch on logic proofs, after opinion motion of teacher, build own hypotheses, activate cognitive activity and creative approach;

4) partly-searching (heuristic) method: was applied in colleges and institutions of higher education for organization of active search of pulled out in studies (or formulated independently) decisions of cognitive tasks (method of projects) under the direction of teacher. As a result of method application thinking obtains productive and creative character, stable cognitive interest and self-education skills are formed;

5) research method: was applied in institutions of higher education, bringing over students to research work, implementation of course and diploma projects. We used tasks that were related to the modern building production and contain the elements of independent research process (raising of task, ground, supposition, search of corresponding necessary information sources, process of decision of task). At application of method initiative, independence, creative search in research activity are shown up, educational activity directly outgrows in scientific research.

Conclusions and prospects of further scientific research. For basis of pedagogical technology planning we accept the competence approach, sent to development of key and subject competences forming and forming of professional competence constituents through the solving of the tasks related to future activity in the field of building industry.

The process of innovative technologies realization in colleges and universities was provided in parallel and antedated the changes of basic components of educational process - purposeful, semantic, judicial, methodical and diagnostic. The improvement of forming of future builders professional competence became the primary purpose of educational process. The semantic

component of technologies antedated integration transformation of natural-science and professional preparation maintenance with approaching to the level of modern building technologies. Changes in a judicial component touched methods of educational-cognitive activity organization and realization (application of interactive, action methods, problem approach, project activity, forming of the positive motivation of studies, sent to the achievement of success). Efficiency of innovative technologies application was predefined by providing of system methodical accompaniment of educational process. A diagnostic component tested changes due to the use of different didactics facilities of pedagogical control.

Further researches will be send to diagnosticating of efficiency of the worked out technologies use.

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ІННОВАЦІЙНІ ПЕДАГОГІЧНІ ТЕХНОЛОГІЇ У СТУПЕНЕВОМУ НАВЧАННІ ПРИРОДНИЧО-НАУКОВИХ ДИСЦИПЛІН

У статті висвітлено особливості застосування педагогічних технологій у навчанні природничо-наукових дисциплін у коледжах та технічних університетах. В основу проектування покладено компетентнісний підхід із використанням акмеологічних та синергетичних засад. Процес реалізації інноваційних технологій в коледжах та університетах здійснювався паралельно і передбачав зміни основних компонентів навчального процесу – цільового, змістового, процесуального, методичного та діагностичного. Уточнено відмінності у застосуванні методів навчання: у коледжах провідними є репродуктивний та частково-пошуковий, а у ВНЗ ширше застосовуються проблемний та дослідницький методи навчання. Практична реалізація розглянутих підходів щодо підготовки фахівців будівельного профілю загалом зумовлює підвищення ефективності неперервної професійної освіти.

Ключові слова: *неперервна освіта, професійна компетентність, педагогічна технологія, особистісно орієнтований, акмеологічний, синергетичний підходи.*

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**ИННОВАЦИОННЫЕ ПЕДАГОГИЧЕСКИЕ ТЕХНОЛОГИИ В СТУПЕНЧАТОМ ОБУЧЕНИИ
ЕСТЕСТВЕННО-НАУЧНЫХ ДИСЦИПЛИН**

В статье освещены особенности применения педагогических технологий в обучении естественно-научных дисциплин в колледжах и технических университетах. В основу проектирования положен компетентностный подход с использованием акмеологических и синергетических основ. Процесс реализации инновационных технологий в колледжах и университетах осуществлялся параллельно и предусматривал изменения основных компонентов учебного процесса – целевого, содержательного, процессуального, методического и диагностического. Уточнены различия в применении методов обучения: в колледжах лидируют репродуктивный и частично-поисковый, а в вузах более широкое применение находят проблемный и исследовательский методы обучения. Практическая реализация рассмотренных подходов к подготовке специалистов строительного профиля в целом приводит к повышению эффективности непрерывного профессионального образования.

Ключевые слова: непрерывное образование, профессиональная компетентность, педагогическая технология, лично-ориентированный, акмеологический, синергетический подходы.

ВІДОМОСТІ ПРО АВТОРІВ

Гулай Ольга Іванівна – доктор педагогічних наук, доцент, професор кафедри матеріалознавства та пластичного формування конструкцій машинобудування Луцького національного технічного університету.

Коло наукових інтересів: проблеми теорії та методики неперервної освіти, компетентнісний підхід.

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Коло наукових інтересів: проблеми методики навчання хімічних дисциплін; властивості інтерметалідних сполук.

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**КОМПЕТЕНТНІСНИЙ ПІДХІД У ВИКЛАДАННІ ВИЩОЇ
МАТЕМАТИКИ В ТЕХНІЧНОМУ УНІВЕРСИТЕТІ**

В роботі надаються методологія та досвід реалізації математичних компетенцій (заснованих на професійній та міждисциплінарній спрямованості курсу вищої математики), які є основою соціально-особистісних, загальнонаукових, інструментальних та професійних компетенцій майбутнього фахівця в галузях знань «Природничі науки» та «Хімічна та біоінженерія». Підкреслюється, що результати роботи можна розглядати з точки зору реалізації стандартів сучасних міжнародних ініціатив з реформування базового рівня вищої освіти в галузі техніки та технологій в проектуванні математико-інформаційних дисциплін.

Ключові слова: вища математика, математична освіта, математичні компетенції, професійна та міждисциплінарна спрямованість, сучасні міжнародні стандарти.

Постановка проблеми. Основними задачами сучасної освіти є подолання проблеми наявного протистояння математичної, природничо-наукової, технічної та гуманітарної культур, вузького дисциплінарного підходу до викладання дисциплін та розриву між теорією