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**EXPERIMENTAL VERIFICATION OF THE EFFECTIVENESS OF THE STRUCTURAL-FUNCTIONAL MODEL OF THE PEDAGOGICAL SYSTEM OF FUTURE TEACHERS' EARLY PROFESSIONAL IDENTITY FORMATION IN HIGHER EDUCATION INSTITUTIONS BY MEANS OF PROJECT-TRAINING TECHNOLOGIES**

*The article presents the results of the experimental verification of the effectiveness of the pedagogical system of future teachers' early professional identity formation by means of project-training technologies in the system of professional-training technologies of higher education institutions. The effectiveness of the process of forming emotionally positive perception by students of the professional group, belonging to the professional community, forming a holistic professional image, attitude to the profession, professional self-esteem, building curricula, developing their professional motivation, professional position was proved by processing research results by the method of mathematical statistics  $\chi^2$  (chi-square).*

**Key words:** *early professional identity of future teachers, formation of future teachers' early professional identity, professional-pedagogical training, pedagogical system of forming future teachers' early professional identity, educational-scientific pedagogical project.*

**Introduction.** The problem of professional identity of the individual is an important subject of study in various fields of knowledge. Formation of future teachers' early professional identity is considered as a purposeful process of creating in the first years of professional training of emotionally positive perception of the professional group, pedagogical activity, self-belonging to the professional community, formation of a holistic professional image, attitude to profession, professional self-esteem, professional goals, plans, development of professional motivation, professional position for active mastery of the profession and further effective self-realization in pedagogical activities in the system of professional-pedagogical training in higher pedagogical education institutions.

**Analysis of relevant research.** The professional identity of a teacher is considered by scientists in the context of the psychology of personality development (I. Bekh, H. Bordovskyi, I. Isaiev, O. Kochkurova, S. Maksymenko, A. Mudryk, K. Torop, V. Shadrikov, L. Schneider, etc.); psychological features of the teacher's professional identity formation are presented in the scientific investigations of such researchers as O. Anisimov, V. Davydov, M. Kashapov, M. Pavliuk, etc.; problems of professional identity formation of the teacher are considered by scientists M. Abdullaiev, H. Harbuzova, V. Haluziak, O. Yermolaieva, N. Ivanova, I. Vachkov, O. Hryniova, N. Hoha, O. Ishchuk,

M. Klishchevska, V. Koziev, A. Lukiianchuk, O. Romanyshyna, M. Savchyn, M. Sherman, V. Yakunin and others.

**The aim of the article** is to test experimentally the effectiveness of the pedagogical system of future teachers' early professional identity formation by means of project-training technologies in the system of professional-pedagogical training at higher education institutions.

**Research methods:** theoretical: analysis, –eneralization, comparison – to characterize the issue of early professional identity formation by means of project-training technologies in the theory and practice of domestic and foreign education, clarification of the conceptual and terminological apparatus of the researched problem; systematic, structural-logical analysis - in order to determine the factors of formation and structural components of early professional identity of future teachers; classification – to determine the criteria, indicators and levels of future teachers' early professional identity formation; abstraction, synthesis – in order to characterize the process of future teachers' early professional identity formation by means of project-training technologies; modeling – for the development and theoretical substantiation of the structural-functional model of the pedagogical system of future teachers' early professional identity formation by means of project-training technologies; empirical: conversations, questionnaires, surveys, testing, observation, generalization of pedagogical experience of teachers, diagnostics, self-analysis, self-observation, pedagogical experiment; methods of mathematical statistics – for processing the obtained results, analysis and testing of hypotheses and establishing quantitative relationships between the studied phenomena and processes using the sign criterion,  $\chi^2$  (chi-square).

**Research results.** Early professional identity of the future teachers (EPIFT) is defined as an integral dynamic, unstable, focused on external dominants personal quality, awareness and acceptance of the future teacher as a professional in the context of personal and social identity at the early stages of vocational training in the institutions of higher education.

The pedagogical technology of the future teachers' early professional identity formation is considered as an educational-scientific pedagogical project (ESPP), the content of which provides integration of study of a pedagogical discipline, educational pedagogical practice and realization of scientific pedagogical research on relevant pedagogical problems, aimed at creation by students of the project products and their realization in the educational process of general secondary education institution.

It is determined that formation of EPIFT in the system of professional-pedagogical training of higher education institutions is effective under the following psychological and pedagogical conditions: development of reflexivity of future teachers in the corporate environment of a higher education institution; creation of educational-scientific pedagogical project, which integrates the study of the discipline, organization of the educational pedagogical practice, implementation of scientific pedagogical research; interaction of the institution of higher education and the institution of general secondary education at all stages of creation and realization of the educational-scientific pedagogical project; use of training technologies in the educational-scientific pedagogical project.

The professional identity of the respondents was studied according to the method of A. Ozerina according to the following indicators: P1 – educational-professional plans (defined/undefined; own/borrowed); P2 – attitude to the profession (emotional acceptance/rejection; rational/irrational); P3 – image of the profession (integral/fragmentary; internal/external superficial); P4 – image of a professional (clear/blurred; conscious/stereotyped); P5 – professional position (active/passive; autonomous/dependent); P6 – professional self-esteem (adequate/inadequate; reflexive/rigid); P7 – professional motivation (positive/negative; intrinsic (internal)/extrinsic (external)).

To determine the effectiveness of the developed system of future teachers' early professional identity formation, the chi-square criterion was used, which allows to compare the similarity of distributions at the beginning and the end of the experiment: if the distributions of empirical data are statistically different, it gives grounds to state that there is an impact (positive, if the average is higher and negative if the average is lower) of the developed system on learning outcomes.

Application of the chi-square criterion is acceptable because a number of requirements relevant to the criterion are met: random samples; the samples are independent of each other, and the members of each sample are independent of each other; the scale of measurements coincides with the scale of names of indicators (P1-P7). Null hypothesis: the probabilities of getting into the indicators P1-P7 for students of the CG and EG are the same (i.e., the distributions in the EG and CG on these indicators P1-P7 coincide). Alternative hypothesis: the probability for students of the CG and EG to get at least one of the indicators P1-P7 differs (i.e., the distributions in the EG and CG on these

indicators P1-P7 are statistically different). Decision rule: to test the hypothesis, the empirical value of T (1) is calculated:

$$T = \frac{1}{n_1 + n_2} \sum_{i=1}^{i=7} \frac{(n_1 \cdot O_{2i} - n_2 \cdot O_{1i})^2}{O_{1i} + O_{2i}}, \quad (1)$$

where  $n_1$  and  $n_2$  – number of participants in the EG and CG respectively,  $i$  – number of an indicator,  $O_{1i}$  – number of persons for the EG,  $O_{2i}$  – number of persons for the CG.

If we have a percentage distribution of data, then formula (1) is greatly simplified (2):

$$T = \sum_{i=1}^{i=7} \frac{(O_{2i} - O_{1i})^2}{O_{1i} + O_{2i}}, \quad (2)$$

where  $i$  – number of an indicator,  $O_{1i}$  – number of persons for the EG,  $O_{2i}$  – number of persons for the CG. For the significance level of 0,05 and the number of degrees of freedom  $\nu = 7 - 1 = 6$ , the critical value of the criterion  $T_{cr} = 12,59$ . Since the scale has seven names, which is more than 5, the bilateral critical region is considered, and therefore at  $T > T_{cr}$  null hypothesis is rejected and an alternative hypothesis about statistically significant differences in the distributions of values by selected indicators is accepted. We turn to the direct analysis of empirical data, which are recorded in the EG and CG at the beginning and the end of the pedagogical experiment on the formation of professional identity (Fig. 1).

The similarity is obvious for the results of the control group at the beginning and at the end of the experiment, at the same time the breaks do not coincide for the pairs [EG (after) and CG (after)] and [EG (before) and EG (after)].

A detailed analysis of the results of the study has revealed that the largest percentage of positive dynamics was observed in the indicator of the formation of EPIFT – the image of a professional (P4). In the experimental group (P4) was +42 % in the level of EPIFT formation “moratorium”, while in the control group this result was +2 %. The indicator of EPIFT formation – image of the profession (P3) according to the level of EPIFT formation “achieved” had dynamics in the experimental group (+4 %) and the control group (-2 %), according to the level of EPIFT formation “moratorium” EG (+25 %), CG (-9 %) with a general tendency to reduce the number of respondents

whose level of EPIFT formation was “conditioned” in the EG (-3 %), CG (+2 %) and “diffused” – EG (-26 %), CG (+9 %).

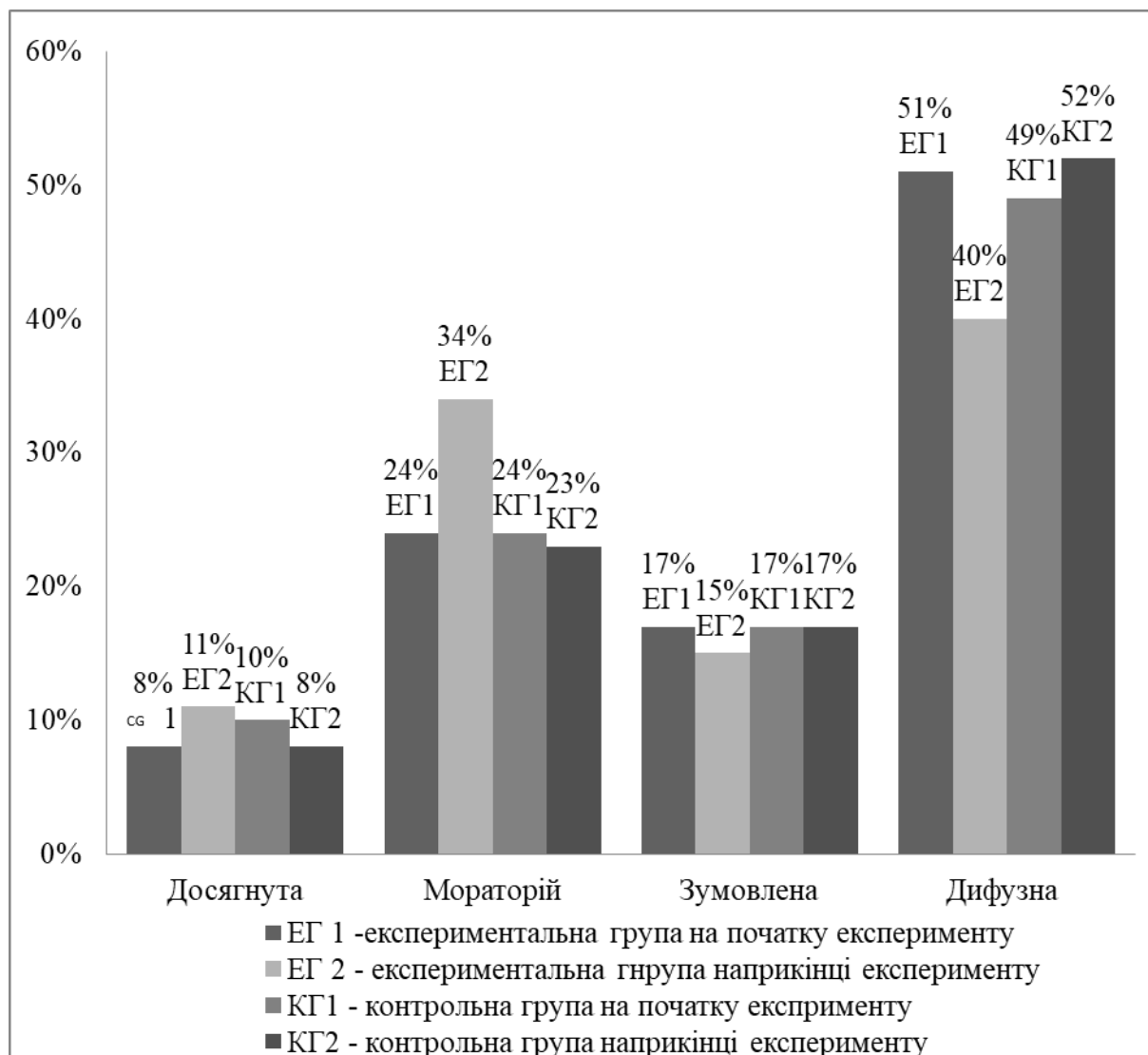


Fig. 1. Dynamics of the levels of future teachers' early professional identity formation by means of project-training technologies in higher education institutions

We believe that a clearer and more conscious image of the professional, as well as a positive image of the profession in students who made up the experimental group due to the content of ESPP, which was aimed at forming in the topics of the discipline “Pedagogy”, in the content of the educational pedagogical practice of students' representations about the model of a modern teacher, a generalized standard of a representative of the profession. Exercises of professional identity development training, which were aimed at creating future teachers' own image of the professional and the image of the profession

and further identification with it, in our opinion, helped to identify students with a professional group, accept themselves as representatives of the pedagogical community, forming a positive image of the profession and a professional and, at the same time, matching oneself as a professional, a representative of a professional group.

Analysis of the results of the study on the indicator of attitude to the profession (P2) has revealed generally positive changes. In the experimental group there was an increase in respondents (+17 %) on the level of EPIFT formation “moratorium”, while in the control group this result was +10 % with positive dynamics on the level of EPIFT formation “achieved”: EG (+3 %), CG (-4 %). According to the levels of EPIFT formation, the level “conditioned” was observed in the EG (-1 %), CG (-1 %) and “diffused” in the EG (-19 %), CG (-5 %). These results are explained by the fact that in the developed pedagogical system the potential of the corporate environment of the higher education institutions was involved. We believe that formation of a sense of belonging to a professional group was facilitated by corporate views and beliefs, traditions that united the professional community. We consider formation of a corporate identity to be a result of a cognitive-emotional process of perceiving oneself as member of a certain organization, a certain degree of identification with it is an effective mechanism for forming EPIFT, and interaction of the members of the academic community in business and interpersonal contacts, creative structures of scientific-pedagogical schools – potentially able to provide personal-professional development of the future specialists. We also believe that training of professional identity development contributed to the formation of a positive attitude of future teachers to the pedagogical profession, which offered students to understand the mission of the pedagogical profession, to analyze its features and conditions.

The results of the observational experiment revealed a reduced professional self-esteem (P6) of the future teachers who took part in the survey, and their ability to accept the external assessment of their own professional abilities and capabilities. According to the results of the molding experiment, positive dynamics was stated in the experimental group according to the level of EPIFT formation “achieved” – EG (+ 4 %), CG (-3 %). The obtained results are substantiated by the implementation in the pedagogical system of EPIFT formation of interaction of a higher education institution and a general secondary education institution at all stages of creation and implementation of the educational-scientific pedagogical project, which led to support, approval by teachers-practitioners of the educational products created by students; joint development of methodological materials for conducting educational weeks. At

the same time, we consider these results to be due to the involvement of training technologies in ESPP, which allowed to form the pedagogical skills needed during the internship, to increase personal and professional self-esteem.

According to the results of the analysis of changes in the indicator “educational-professional plans and goals” (P1) there was observed a positive trend in the level of EPIFT formation “achieved” – EG (+3 %), CG (-3 %), which, in our opinion, was due to a series of the exercises of professional identity development training, in which students foresaw future professional steps, projected professional growth, defined professional plans. According to the positive dynamics in the experimental group on the level of EPIFT formation “achieved”, we determine the decrease in the percentage of students on the level of EPIFT formation “moratorium” in the EG (-22 %), and an increase in the percentage of EPIFT “conditioned” (EG (+2 %)) and “diffused” (EG (+17%)), which is explained by students’ awareness of their professional future, development of their autonomy and the desire to build a professional career within insufficient awareness of building of a professional future, formation of skills of independent planning, placing responsibility on external dominants (HEI, reference people, etc.). These results and conclusions need to strengthen the training exercises for the development of professional identity of the future teacher in such part as educational-professional plans and goals.

Analysis of formation of the professional position (P5) has revealed a positive trend in the experimental group on such levels of EPIFT formation as “achieved” EG (+6 %), CG (+1 %) and “moratorium” EG (+35 %), CG (-1 %) with the existing decrease in the percentage of the levels of EPIFT formation “conditioned” EG (-85 %), CG (+6 %) and “diffused” EG (-33 %), CG (-6 %). These results indicate a more active and autonomous professional position of students who were part of the EG, confirm the greater independence of respondents of the EG in their own visions of professional position, in representing their place in the profession, accompanied by a sense of identity with themselves as future specialists, awareness and demonstration belonging to a certain professional group. We believe that these results are due to the mutual links of the pedagogical system of EPIFT, namely: psychological-pedagogical conditions (the first – development of future teachers’ reflexivity in the corporate environment of the higher education institution and the third – interaction of the higher education and general secondary education institutions at all stages of creation and implementation of the educational-scientific pedagogical project) and implementation of ESPP.

Analyzing the changes in the indicator (P7) – professional motivation, we have found that within the level of EPIFT formation “moratorium” there was observed a decrease in the number of students in the EG (-15 %) and CG (-19 %) with increasing percentage of the level of EPIFT formation “diffused”, which indicates the weak dynamics of the EPIFT formation. At the same time, we note that in the EG there was an increase in the number of respondents with the level of EPIFT formation “achieved” by 5 %, which we consider a significant result, because for the second-year students whose professional identity is still being formed, the state of achieved professional identity is rare. At the same time, the control group observed a negative trend in the level of EPIFT formation “achieved” (-6 %), which indicates a crisis of professional identity of students in the second year of study. We believe that the obtained results in the EG are due to the fact that in accordance with the developed pedagogical system, the content of the ESPP envisaged integration of components of the system of professional-pedagogical training of future teachers of the second year of study, namely: study of a pedagogical discipline, doing pedagogical practice and conducting scientific pedagogical research on current pedagogical issues. In our opinion, this integrity allows future teachers to perform educational and professional tasks with more motivation. At the same time, in the conditions of organization of the system of professional-pedagogical training as ESPP the content of the specified components is united by the common actual pedagogical problems: tolerance, media literacy, etc. This issue becomes system-forming in the organization of ESPP, determines the emphasis of studying the topics of the academic discipline “Pedagogy”, the topics of the educational week at school during practice and the direction of course pedagogical research of students. We consider important the fact that results of this study have become the basis for students’ independent choice of topics of the upbringing work for pupils and creation of a plan of educational week for primary school pupils. Thus, the relevance of the upbringing topics of the ESPP, its integration, taking into account the individual educational and professional interests of students in the ESPP increase students’ motivation to mastering the profession.

The calculated values of statistics by the chi-square criterion are given in table 1.

For pairs [CG (before) and CG (after)], [CG (before) and EG (before)], [EG (before) and CG (after)] according to the rule of hypothesis at the level of significance of 0,05 and six degrees of freedom we must accept the null hypothesis of statistical similarity of distributions: these values are less than the critical value of 12,59. At the same time, for the pairs [EG (before) and EG (after)], [CG (before) and EG (after)], [CG (after) and EG (after)], we must reject

the null and accept the alternative hypothesis of statistically significant differences in survey results: for these pairs the calculated values of the criterion are greater than the critical 12,59 at the significance level of 0,05.

*Table 1*

**Calculations for the chi-square criterion (value T empirical)**

	<b>CG (before)</b>	<b>CG (after)</b>	<b>EG (before)</b>	<b>EG (after)</b>
<b>CG (before)</b>		4,104445882	2,870624583	<b>15,17734563</b>
<b>CG (after)</b>	4,104445882		2,984593313	<b>12,88080577</b>
<b>EG (before)</b>	2,870624583	2,984593313		<b>13,05403359</b>
<b>EG (after)</b>	<b>15,17734563</b>	<b>12,88080577</b>	<b>13,05403359</b>	

Statistical analysis has shown that in the implementation of the developed pedagogical system of the future teachers' early professional identity formation the experimental group showed a statistically different result for indicators P1-P7, which cannot be explained by random reasons. Visualization of values by indicators for the EG at the beginning and the end of the experiment proves that in the EG (after) the values are higher, and therefore we can conclude about the positive statistically significant impact of the developed system and its efficiency.

Analyzing the dynamics of the levels of the future teachers' early professional identity formation (Fig. 1) by means of project-training technologies in higher education institutions, we can note the similarity for the results of the control and experimental groups at the beginning of the experiment and the positive dynamics of EPIFT formation in the experimental group.

Positive dynamics of changes in the levels of future teachers' early professional identity formation is proved: achieved (+3 % EG, -2 % CG), moratorium (+10 % EG, -1 % CG), and negative: conditioned -2 % EG, 0 % CG), diffused (-11% EG, +3% CG), which proved the effectiveness of the developed pedagogical system (Fig. 1). We consider positive the dynamics of such level of EPIFT formation as moratorium (+10 % EG, -1 % CG), as the increase in students in this area, due to decreasing levels of EPIFT formation: diffused, conditioned, indicates development of personal autonomy in students of this group and provides for the opportunity to envisage their further development to such level of EPIFT formation as achieved identity, which presupposes the previous state of the moratorium. That is, we can say that for this group of future teachers, external determinants cease to play a priority role, the basis for further development of

professional identity are internal conditions and determinants (levels of EPIFT formation: achieved and a moratorium). That is, independence of students in creating their own ideal model of a professional, pedagogical profession, determining a professional position, planning their own pedagogical career, making independent educational and professional decisions has become more significant. The results reflect the greater ability of students to assess their own skills, pedagogical experience, using common representations, but based on their own criteria of ability to emotionally positive perception.

**Conclusions and prospects for further research.** The results of the experiment have allowed to assert that the developed and substantiated pedagogical system of future teachers' early professional identity formation by means of project-training technologies on the basis of activity, systems, acmeological, axiological, environmental, praxeological, existential, competence, educational, competence, student-centered and context approaches and its implementation in the educational process of professional-pedagogical training of the higher education institution ensured the effectiveness of the process of forming emotionally positive perception by students of the professional group, pedagogical activities, their own belonging to the professional community, formation of a holistic professional image, attitude to the profession, professional self-esteem, building of educational-professional plans, professional motivation, professional position.

The study does not cover all the aspects of the problem of forming an early professional identity of future teachers in the system of professional-pedagogical training of higher education institutions. The promising areas of further research include: conceptual foundations for the formation of early professional identity of the future teacher; pedagogical monitoring of the formation of the professional identity of the future teacher at different stages of professional training; development of the pedagogical system of formation of the corporate environment of the institution of higher education for the purpose of development of professional identity of future teachers on the basis of studying and systematization of perspective European and world experience.

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### РЕЗЮМЕ

**Коваленко Наталия.** Экспериментальная проверка эффективности структурно-функциональной модели педагогической системы формирования ранней профессиональной идентичности будущих учителей в вузах с помощью проектно-образовательных технологий.

*В статье представлены результаты экспериментальной проверки эффективности педагогической системы формирования ранней профессиональной идентичности будущих учителей средствами проектно-тренинговых технологий в системе профессионально-тренинговых технологий высших учебных заведений. Подтверждена эффективность процесса формирования эмоционально-положительного восприятия соискателями образования профессиональной группы, принадлежности к профессиональному сообществу, формирование целостного профессионального образа, отношение к профессии, профессиональной самооценки, построения учебно-профессиональных планов, развития их профессиональной мотивации, профессиональной позиции с помощью обработки результатов исследования методом математической статистики  $\chi^2$  (хи-квадрат).*

**Ключевые слова:** ранняя профессиональная идентичность будущих учителей, формирование ранней профессиональной идентичности будущих учителей, профессионально-педагогическая подготовка, педагогическая система формирования ранней профессиональной идентичности будущих учителей, учебно-научный педагогический проект.

### АНОТАЦІЯ

**Коваленко Наталія.** Експериментальна перевірка ефективності структурно-функціональної моделі педагогічної системи формування ранньої професійної ідентичності майбутніх учителів у закладах вищої освіти засобами проектно-освітніх технологій.

*У статті здійснено експериментальну перевірку ефективності педагогічної системи формування професійної ідентичності майбутніх учителів засобами проектно-тренингових технологій у процесі професійно-педагогічної підготовки в закладах вищої освіти.*

У результаті експериментальної перевірки ефективності розробленої педагогічної системи виявлено позитивну динаміку сформованості РПІМУ за показниками: образ професії, образ професіонала, ставлення до професії, професійна самооцінка, навчально-професійні плани, професійна мотивація, професійна позиція, що забезпечило усвідомлення та прийняття майбутнім учителем себе як професіонала в контексті особистісної та соціальної ідентичності на ранніх етапах професійно-педагогічної підготовки в закладах вищої освіти. Доведено динаміку змін рівнів сформованості ранньої професійної ідентичності майбутніх учителів критерієм знаків і критерієм  $\chi^2$  (хі-квадрат) у процесі педагогічного експерименту в цілому: позитивну (досягнута (+3 % ЕГ, -2 % КГ), мораторій (+10 % ЕГ, -1 % КГ)), і негативну (зумовлена (-2 % ЕГ, 0 % КГ), дифузна (-11 % ЕГ, +3 % КГ)) та покомпонентно.

Підсумки експериментальної перевірки дозволили стверджувати, що розроблена й обґрунтована педагогічна система формування ранньої професійної ідентичності майбутніх учителів засобами проєктно-тренінгових технологій на основі діяльнісного, системного, акмеологічного, аксіологічного, середовищного, праксеологічного, екзистенційного, компетентнісного, студентоцентрованого, контекстного підходів та її імплементація в освітній процес професійно-педагогічної підготовки ЗВО забезпечили ефективність процесу формування емоційно-позитивного сприйняття здобувачами освіти професійної групи, педагогічної діяльності, власної належності до професійної спільноти, формування цілісного професійного образу, ставлення до професії, професійної самооцінки, побудови навчально-професійних планів, розвитку їх професійної мотивації, професійної позиції.

Проведене дослідження не вичерпує всіх аспектів проблеми формування ранньої професійної ідентичності майбутніх учителів у системі професійно-педагогічної підготовки закладу вищої освіти. До перспективних напрямів подальших наукових розвідок відносимо: концептуальні основи формування ранньої професійної ідентичності майбутнього вчителя; педагогічний моніторинг сформованості професійної ідентичності майбутнього вчителя на різних етапах професійної підготовки; розробку педагогічної системи формування корпоративного середовища закладу вищої освіти з метою розвитку професійної ідентичності майбутніх учителів на основі вивчення й систематизації перспективного європейського та світового досвіду.

**Ключові слова:** рання професійна ідентичність майбутнього вчителя, формування ранньої професійної ідентичності майбутнього вчителя, професійно-педагогічна підготовка, педагогічна система формування ранньої професійної ідентичності майбутнього вчителя, навчально-науковий педагогічний проєкт.