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MODEL AND EFFECTIVENESS OF IMPROVING THE PROFESSIONAL TRAINING OF FUTURE TEACHERS BASED ON AN INTEGRATIVE APPROACH

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Abstract
This article examines the improvement of future teachers' professional training based on an integrative approach and describes the structure and content of the developed model grounded in interdisciplinary integration and modern pedagogical technologies. The study includes experimental work, and the results were analyzed using mathematical and statistical methods, particularly the chi-square test, which confirmed the effectiveness of the integrative approach in developing professional competencies of future teachers.

Keywords: Integrative approach, professional training, future teacher, pedagogical model, competencies, interdisciplinary integration, pedagogical technologies, experimental study, chi-square test, educational effectiveness.

Introduction

МОДЕЛЬ И ЭФФЕКТИВНОСТЬ СОВЕРШЕНСТВОВАНИЯ ПРОФЕССИОНАЛЬНОЙ ПОДГОТОВКИ БУДУЩИХ УЧИТЕЛЕЙ НА ОСНОВЕ ИНТЕГРАТИВНОГО ПОДХОДА

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Аннотация:
В данной статье рассматривается совершенствование профессиональной подготовки будущих учителей на основе интегративного подхода, раскрываются структура и содержание разработанной модели, основанной на междисциплинарной интеграции и современных педагогических технологиях. В ходе исследования были проведены опытно-экспериментальные работы, результаты которых проанализированы с использованием математико-статистических методов, в частности критерия хи-квадрат, что позволило доказать эффективность интегративного подхода в развитии профессиональных компетенций будущих учителей.

Ключевые слова: интегративный подход, профессиональная подготовка, будущий учитель, педагогическая модель, компетенции, междисциплинарная интеграция, педагогические технологии, педагогический эксперимент, критерий хи-квадрат, эффективность обучения.

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INTEGRATIV YONDASHUV ASOSIDA BO‘LAJAK O‘QITUVCHILARNING KASBIY TAYYORGARLIGINI TAKOMILLASHTIRISH MODELI VA SAMARADORLIGI

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Anotatsiya:
Mazkur maqolada integrativ yondashuv asosida bo‘lajak o‘qituvchilarning kasbiy tayyorgarligini takomillashtirish masalasi ko‘rib chiqilib, pedagogik ta’lim jarayonida fanlararo integratsiya va zamonaviy pedagogik texnologiyalar asosida ishlab chiqilgan modelning tuzilmasi hamda mazmuni yoritilgan . Tadqiqot davomida tajriba-sinov ishlari olib borilib, natijalar matematik-statistik metodlar, jumladan Xi-kvadrat mezoni orqali tahlil qilindi va integrativ yondashuv asosida tashkil etilgan ta’lim jarayoni bo‘lajak o‘qituvchilarning kasbiy kompetensiyalarini samarali rivojlantirishi isbotlandi.

Kalit so‘zlar: integrativ yondashuv, kasbiy tayyorgarlik, bo‘lajak o‘qituvchi, pedagogik model, kompetensiya, fanlararo integratsiya, pedagogik texnologiyalar, tajriba-sinov, Xi-kvadrat mezoni, ta’lim samaradorligi.

A modern specialist should be knowledgeable, ethical, dynamic, responsible, cooperative, creative, and use an integrative approach in his work. Integration is one of the important innovative phenomena in education. As Z. Sh. Karimov wrote: "it surpasses all other phenomena in the breadth of experimental embodiment, the depth of the creative concept, the continuity and dialectics of historical development".

An integrative approach is a research position in which education is considered as a process and result of pedagogical integration (interdisciplinary, intra-disciplinary, interpersonal, interpersonal).

In the current conditions of globalization and modernization processes in the education system, improving the quality of training of pedagogical personnel is considered one of the urgent issues. Modern educational concepts require future teachers not only to possess theoretical knowledge, but also to effectively apply it in practice, to think independently, to use innovative approaches, and to ensure interdisciplinary integration.

From this perspective, the integrative approach is emerging as an important methodological basis for organizing pedagogical education. The integrative approach serves the comprehensive development of the professional training of future teachers by combining various disciplines, methods and types of activity. Through this approach, important qualities such as systematic thinking, problem-solving, and adaptability to professional activity are formed in students.

Research shows that traditional educational methods often form fragmentary knowledge and fail to sufficiently connect it with practical activities. This creates certain gaps in the professional training of future teachers. Therefore, the implementation of a pedagogical model developed on the basis of an integrative approach into practice and the substantiation of its effectiveness through experimental testing is of significant scientific and practical importance.

In Figure 1, a model aimed at improving the professional training of future teachers based on an integrative approach has been improved, and its effectiveness has been analyzed through experimental testing. In particular, the results of the educational process organized on the basis of the improved model were compared between the control and experimental groups and evaluated using statistical methods, including the Chi-square criterion.

The results of the study showed that the educational process organized on the basis of an integrative approach significantly develops the professional competencies of future teachers. These results serve to scientifically substantiate the effectiveness of the proposed model.

As part of the study, the model for improving the professional training of future teachers was improved on the basis of an integrative approach. (Figure 1) The model consists of interrelated goal, content and result components. The goal component is determined based on the social need for a competent and competitive teacher in the modern education system. The model provides for the formation of general professional, special, communicative and information-communication competencies. The content component is implemented on the basis of integrative, person-oriented and competency-based approaches, and the development process covers horizontal and vertical integration. Organizational and methodological support involves the use of modern teaching methods, interactive methods, STEAM, project-based learning, and information and communication technologies. The results are assessed based on the level of formation of competencies and practical skills, and are determined by low, medium, and high levels. The proposed model serves to effectively improve the professional training of future teachers.

At the pilot stage of the study, the effectiveness of improving the professional training of future teachers based on the improved integrative model was tested. The model presented in Figure 1 was implemented in practice, and the educational process was organized on the basis of its components - a system of competencies, integrative approaches, horizontal and vertical integration, and modern pedagogical technologies.

The pilot study was conducted in two groups: experimental (27 people) and control (25 people) groups. The results of the initial diagnostics showed that the level of professional training in both groups was almost the same (low level, high 63–64%). This confirms the existence of equal conditions for the experiment Table 1.

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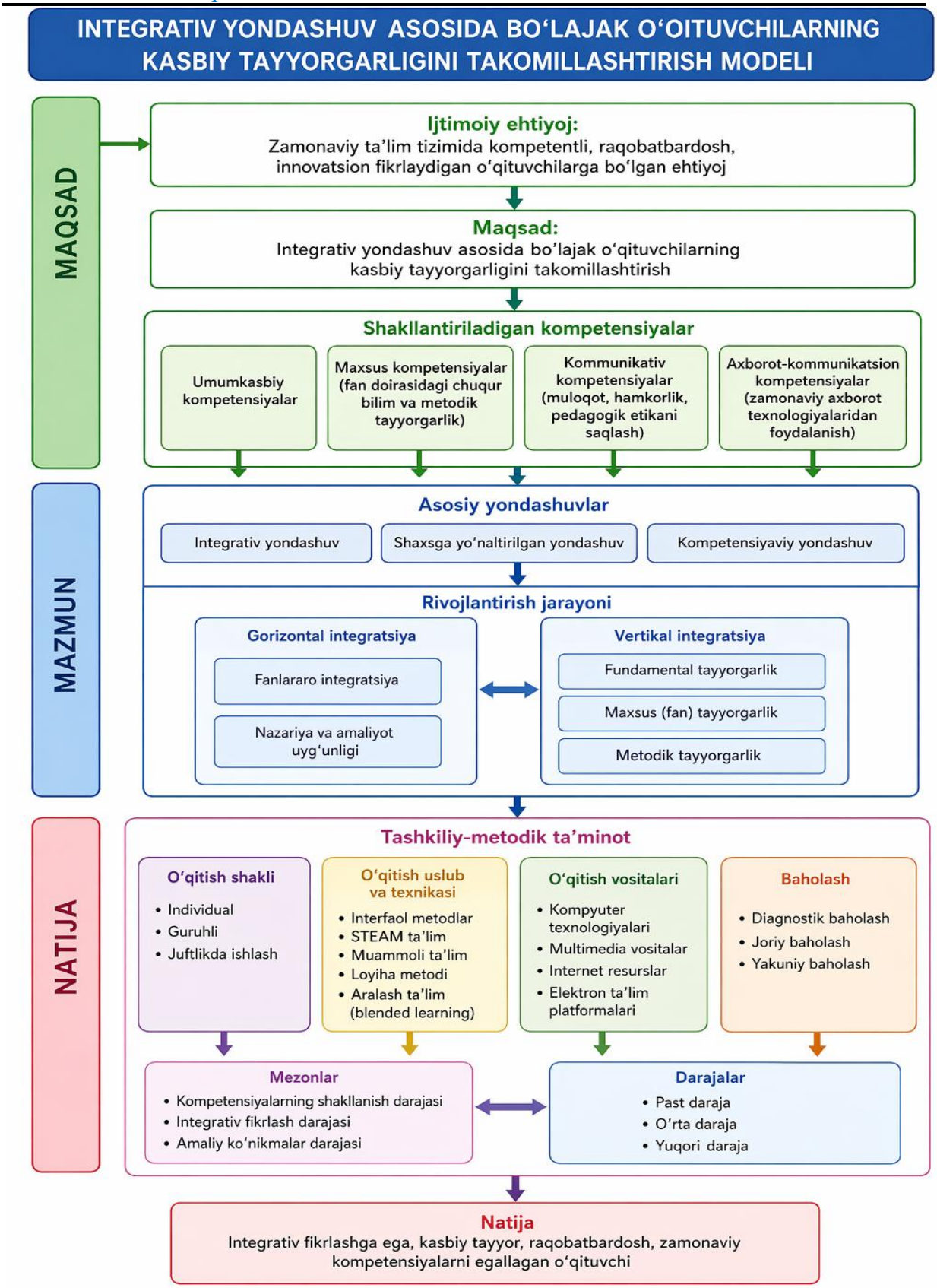

Figure 1. Model for improving the professional preparation of a future student based on an integrative approach

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In the formative stage, interdisciplinary integration, project method, interactive methods and ICT tools were used in the experimental group based on the model. In the control group, traditional teaching was continued. As a result, positive changes were observed in the experimental group: the high level increased from 11% to 37%, and the low level decreased from 63% to 19%. In the control group, such significant changes were not observed. The results of the experimental testing are presented in the form of a diagram in Figure 2.

Table 1. Comparison of the level of professional preparation of future teachers at the beginning of the internship and the final results

The level of improvement of the professional activity of future teachers based on an integrative approach	Experimental group				Control group			
	At the beginning of the experiment 27 students		At the end of the experiment, 27 students		At the beginning of the experiment 25 students		At the end of the experiment, 25 students	
	number	%	number	%	number	%	number	%
High	3	11	10	37	3	12	4	16
Average	7	26	12	44	6	24	8	32
Low	17	63	5	19	16	64	13	52
Total	27	100	27	100	25	100	25	100

The results were analyzed using mathematical and statistical methods, in particular, the Chi-square test, and it was determined that the difference between the experimental and control groups was statistically significant.

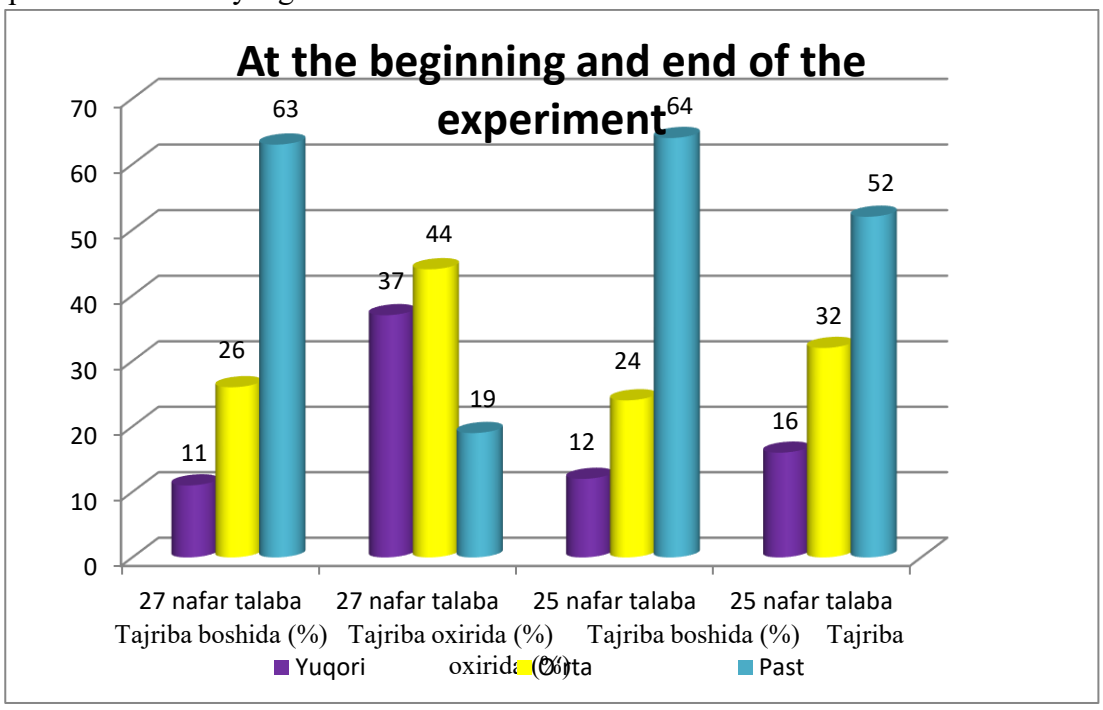

Figure 2. Dynamics of changes in the level of professional training of future teachers

Also, the average values and the efficiency coefficient (K=1.33) showed the high efficiency of the methodology used in the experimental group.

The results showed that the educational process organized on the basis of the developed integrative model is effective in developing the professional competencies of future teachers and significantly increases their level of integrative thinking, practical skills and professional training.

Based on the results obtained, a comprehensive statistical analysis was carried out using mathematical and statistical analysis methods to determine the reliability of the results of pedagogical experimental work. During the analysis, the mean values, standard errors, variance, Chi-square (χ^2) test, coefficient of variation, and Student's test (t) were calculated and their values were entered into Table 2.

Table 2. Complex statistical analysis of the results of the experimental and control groups

Kompleks statistik tahlil natijalari

Ko‘rsatkich	Tajriba guruhi	Nazorat guruhi	Xulosa
O‘rtacha qiymat ($\bar{X}$)	2.19	1.64	✔ Yuqori
Dispersiya (D)	0.54	0.55	✔ Barqaror
O‘rtacha kvadratik xatolik (σ)	0.73	0.74	≈ Farq kichik
Xi-kvadrat (χ^2)	6.86	5.99	✔ Ishonchli
Student mezoni (t)	2.68	2.01	✔ Ishonchli
Samaradorlik (K)	-	1.33	✔ 33% yuqori

The results of the conducted pedagogical experimental work scientifically substantiated the fact that the educational process organized on the basis of an integrative approach effectively develops the professional training of future teachers.

Conclusion

The results of this study showed that the educational process organized on the basis of an integrative approach effectively improves the professional training of future teachers, in which the purposeful, substantive and resultant components of the developed model are interconnected and serve the complex development of competencies; The results of the experimental test showed an increase in high-level indicators and a decrease in low-level indicators, and the results obtained based on mathematical and statistical analyses, including the Chi-square criterion, scientifically confirmed the effectiveness of the integrative approach

and proved that the introduction of this model into the practice of pedagogical education is an important factor in improving the quality of education.

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