Journal of Education and e-Learning Research
Vol. 10, No. 2, 260-269, 2023
ISSN(E) 2410-9991 / ISSN(P) 2518-0169
DOI: 10.20448/jeelr.v10i2.4591

Assessment of future primary school teachers' development of creative competence: A case study

Zhupat Astambayeva[1]
Roza Kenzhetaeva[2]
Zhanara Zhumash[3]✉
Nagima Sagidolda[4]
Raushan Italmassova[5]


(✉ Corresponding Author)

[1,3]*Abai Kazakh National Pedagogical University Almaty, Kazakhstan.*
[1]*Email: zhupat66@mail.ru*
[3]*Email: zhanar83@bk.ru*
[2,4,5]*Narxoz University, Almaty, Kazakhstan.*
[2]*Email: roza.kenzhetaeva@narxoz.kz*
[4]*Email: nagima.sagidolda@narxoz.kz*
[5]*Email: raushan.italmasova@narxoz.kz*

Abstract

The aim of this study is to assess future primary school teachers' learning outcomes, their achievement goals, support for the development of their creative competence and the appropriate methodological and technological processes that take place. The data was analyzed using a mixed research approach. The participants of the study are 160 students from Abai University and Auezov University (Kazakhstan). The results showed that students found their university education mostly uncreative indicating the need to determine a new and effective way to form students' creative competence. The research findings suggest that special training improved the creative capacity of the aspiring participants in the study and had an effect on the experimental group. The findings of this study have implications for policy to transform higher education, further research as well as methodological and technological approaches for the assessment of primary school teachers' development of creative competencies in Kazakhstan.

Keywords: Assessment, Case study, Creative competence, Development, Future teachers.

Citation | Astambayeva, Z., Kenzhetaeva, R., Zhumash, Z., Sagidolda N., & Italmassova, R. (2023). Assessment of future primary school teachers' development of creative competence: A case study. *Journal of Education and E-Learning Research*, *10*(2), 260–269. 10.20448/jeelr.v10i2.4591
History:
Received: 31 January 2023
Revised: 3 March 2023
Accepted: 29 March 2023
Published: 12 April 2023

Publisher: Asian Online Journal Publishing Group

Funding: This study received no specific financial support.
Authors' Contributions: All authors contributed equally to the conception and design of the study.
Competing Interests: The authors declare that they have no conflict of interest.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.
Ethical: This study followed all ethical practices during writing.

Contents

Contribution of this paper to the literature

This study contributes to the existing literature by assessing future primary school teachers' learning outcomes, their achievement goals and how support for the development of their creative competence and the appropriate methodological and technological processes take place.

1. Introduction

Fundamental changes are taking place in all spheres of Kazakh society. Responding to modern realities, the national education system is also changing which requires a creative and professional approach in the preparation of future specialists (Nagima et al., 2023). One of the most critical issues is establishing a new pedagogical foundation for the professional and personal development of the modern teacher (Ospankulov, Nurgaliyeva, Kunai, Baigaliev, & Kaldyhanovna, 2022). According to research conducted at Kazakh universities, aspiring teachers lack sufficient experience in independent creative behavior in the field of professional activity (Iskakova et al., 2021). It has been found that some of the specialists are less motivated to further their education, advance their careers and they feel disappointed with their professional choices (Zhussupbayev et al., 2023). The researchers noted the problems and shortcomings of education in Kazakhstan which focused on the transfer of knowledge as part of the legacy of Soviet education. This fact has led to the acknowledgment that higher education institutions need to change their objectives and replace the concept of a knowledge-based approach with that of a competency-based approach (Amirova, Iskakovna, Zakaryanovna, Nurmakhanovna, & Elmira, 2020; Zhumash et al., 2021). This makes it necessary to re-evaluate the advantages and disadvantages of using the competency-based approach in the educational space in Kazakhstan with a focus on international requirements and the multi-subject nature of educational programs.

Studying the problem of the formation and development of the potential primary school teachers' capacity for creativity in the current education system made it possible to identify several contradictions.

(1) Between the dynamism of social, economic and technological transformations in society and the inertia of the vocational education system which does not have time to respond to these changes in a timely and adequate manner.
(2) Between society's need for a creative personality and the unwillingness of the educational system to satisfy it due to the lack of teachers who are creative and competent in the creative development of students.
(3) Between the modern possibilities of vocational education in the development of the necessary competencies that make up the creative personality of the teacher and the predominance of traditional forms of organization of student training.
(4) Between the need to organize an educational space that ensures the formation and development of the capacity for the creativity of the future teacher and the insufficient development of methodological support and conditions for the implementation of the innovative pedagogical process.

The factors above determine the importance and relevance of the selected research topic.

1.1. Research Questions

Q1: What are the perceptions of students about creative competence?
Q2: What is the actual level of the creative ability of future teachers?
Q3: What are the dynamics of the level of development of creative competency in the first stages of professional training?

1.2. Objectives

The purpose of the study is to evaluate various ways to increase the creative capacity of aspiring primary school teachers while at the same time determining their current level of competency.

2. Research Content

2.1. Literature Review

Students' creative competence is the most important aspect of modern education for professional activities. It is necessary to introduce new teaching methods. The study shows that professional and competency issues are considered in terms of research preparation, creativity, innovation etc. When analyzing research on competency-based learning models it was revealed that in terms of ability, the most important thing is the experience of the student and the readiness to set goals (Açıkgöz & Babadoğan, 2021; Nihishova & Kryvonosova, 2021).

Most research (Fernández-Villardón, Valls-Carol, Melgar Alcantud, & Tellado, 2021; Ritter, Gu, Crijns, & Biekens, 2020) concurs that universities need to foster students' creative abilities. However, there is no proper definition of creativity in education (Perry & Collier, 2018; Sidek, Halim, & Buang, 2022) and academic institutions have not established methods for measuring its development or tools specifically designed to monitor student progress.

If educators take creativity more seriously, we must be more specific about what creativity is Bloom and VanSlyke-Briggs (2019). Additionally, we must develop an assessment strategy that is trustworthy and simple enough for teachers to use with their busy schedules (Clarke & Basilio, 2018; Wyse & Ferrari, 2018).

Creativity for this task contains the following components.

In our view, creativity is:

- Creativity is a specific ability due to the presence and combination of various personal qualities (Akkanat & Gökdere, 2018; Beaumont, 2022).
- Creativity is the general ability to transform previous experiences (Acar, Tarakci, & Van Knippenberg, 2019; Fredagsvik, 2021; Mazzone & Elgammal, 2019).
- Creativity is an integral quality of personality, combining cognitive and personal spheres (Kavanaugh, Tuncer, & Wexler, 2019; Smid, Karbach, & Steinbeis, 2020).
- Creativity is a specific form of mental activity, a complex multidimensional phenomenon with its own structure (Dietrich, 2019; Gu et al., 2018).

Creativity is also identified with the maximum level of development of mental (intellectual) abilities (Chen & Padilla, 2022; Gubbels, Segers, & Verhoeven, 2018).

The term "creativity" was first introduced by Guilford (1950). The creativity of the teacher is considered in the works of Gamino, Frost, Riddle, Koslovsky, and Chapman (2022) as a certain system of expression of his individual, professional and personal qualities as a result of which he reproduces himself in his essence as a person and a professional. Agreeing with the opinions of researchers, we believe that educational activity contains both aspects and is a creative activity because by acting on their inclinations, independently solving their problems and creating and transforming the conditions of their existence, the teacher simultaneously transforms himself and his activity. Teachers' creative abilities are considered an essential feature of professional development.

After analyzing the above sources in the context of our problem, we took as our basis the concept of creativity as an activity in which a person changes, combines, transforms and creates something new.

What is creative competence?

In our view, creativity competence is:

Knowledge and skills are the basis of competence.

- Special psychological qualities and properties.
- The new personal properties.
- The acquisition and assimilation of professional skills.

In the proposed interpretation, the teacher's creative competence is a professional and personal characteristic that requires a complex approach to its study. It includes moral and humanistic orientations, motivations, goals, value orientations and a set of knowledge, abilities, skills, forms and ways of application by teachers in the context of creative interaction in elementary schools.

Currently, the scientific and theoretical basis for the development of future teachers' professional competence in all aspects of the university study process is actively being developed.

Evaluation and creativity are significant topics with substantial literature.

As challenging as the task is, it's easy to see the potential benefits of trying to measure or track the creative growth of aspiring elementary school teachers.

They consist of:

- Giving teachers a means of expressing their perspective on creativity (Kim, Raza, & Seidman, 2019), enables them to better comprehend various aspects of future primary school teachers' development and to successfully promote their creative competency (Altinyelken & Hoeksma, 2021).
- Assisting educators and future primary school teachers in understanding creative competence.
- Giving future primary school teachers constructive criticism so they can improve their creative competence (Shen, Wang, Qi, Wang, & Yan, 2021).
- Provide feedback to teachers and future primary school teachers and direct their attention to this dimension.
- Establishing a consensus on the definition of creative competence.
- Learning more about personal progressions and trajectories in creative learning.

The problem is that there is disagreement about the creative capacity of aspiring elementary school teachers.

Hence, the following are some difficulties with the assessment of students' creativity competence:

- Have the potential to be misinterpreted as pejorative terms, for example, the character of a primary school teacher being unimaginative.
- If we assume that comparing the creativity of aspiring primary school teachers on a summative basis is not an appropriate goal, there is also a chance that assessment "scores" may be applied improperly for summative purposes.

Any assessment activity's goal has a significant impact on the methods used. According to Martínez, Mon, Álvarez, Fueyo, and Dobarro (2020), there are two fundamentally distinct goals for assessment: one is to certify accomplishments and the other is to promote learning. Hence, evaluation can be summarized, compared and formed to assist primary school teachers.

3. Method

3.1. Research Design

A mixed research approach was chosen to explore the perceptions, ratings and experiences of a group of university students that can be used together in the survey to provide comprehensive results. The methods of collecting, processing and analyzing data are different in the two strategies chosen. As a part of the quantitative strategy, methods of data formalization were used. In qualitative strategies, the methods of data collection, processing and analysis are based on interpretive procedures.

3.2. Research Sample

The research was carried out at the Kazakhstan National Pedagogical University named after Abai and the South Kazakhstan University named after Auezov in Kazakhstan. The researcher used non-probability sampling as a sampling technique. Incredible sampling is a method by which researchers select samples for research based on certain criteria. The researchers did not select participants at random but selected a specific subset based on factors such as location or age. The researchers used this method because time and cost are important considerations in a study or when they are looking for participants with similar characteristics. In total, 160 students participated in the pilot study (3rd-year students of the 6B013-pedagogical course " specialization"), 81 in the experimental group and 79 in the control group.

3.3. Research Instruments and Procedures

Tools were developed to collect survey data and answer survey questions. The measurement tool used for the study consists of two parts: a questionnaire, 7 subtests for the battery of verbal tests and a " visual-figurative test battery".

3.3.1. Questioning

The questionnaire developed by the authors was used as the main instrument and as a guide for data analysis indicating relationships between concepts and variables. The questionnaire presented modules of themes and nine questions related to each theme. The group of respondents was previously informed about the goals and objectives of the study, the timing and procedure for its implementation.

3.3.2. The Verbal, Imaginative and Verbal-Sound Tests (Torrance's Battery).

When diagnosing creative thinking, it was necessary to perceive the creative abilities of participants in different types of mental activity: visual-figurative and verbal. A wide variety of carefully selected tasks provide respondents with opportunities to demonstrate their creative abilities. This idea significantly increases the reliability of the results obtained using the E. Torrens test compared with the results of other tests for creativity. The selection of tasks for subtests was carried out based on factor analysis which made it possible to include tasks that correlate with each other in the battery. The verbal part of the methodology consists of seven subtests aimed at measuring various aspects of verbal creativity.

The tests are carried out in groups that consist of 15 participants depending on the size of the group. Hence, the participants in the study were divided into several groups for testing. The researcher prevented participants in the study who had already been tested from providing information. During group testing, each subject received stimulus material and subtest instructions as well as answer sheet on which he would record his thoughts. It takes 45 minutes to conduct a verbal battery (figuratively - 30 minutes) without taking into account the time for instructions. Verbal and figurative batteries were carried out on different days.

The verbal battery consists of seven subtests:

Subtest #1. Questions.

Subtest #2. Causes.

Subtest #3. Consequences.

Subtest #4. Make things better.

Subtest #5: Special use.

Subtest #6: Ask specific questions.

Subtest #7. Special situation.

For the oral subtest, it was planned that students would have 45 minutes and an additional 15 minutes to distribute and gather the necessary materials.

The " visual-figurative test battery" consists of three subtests:

Subtest #1. "Creating a new image by drawing".

Subtest #2. "Unfinished figures".

Subtest #3. "Repeat Lines"

Special forms for fixing the results for verbal and figurative batteries are used when processing test data.

3.4. Data Analysis

While collecting the data, the phases of accessing the documents, checking their authenticity, understanding and interpreting the documents and using the data were followed. The data were examined, tabulated, interpreted and presented accordingly in the study.

4. Findings and Discussion

The data on the first question of the study is presented in Table 1.

The data in Table 1 shows that there were 4 students at the "very high" level on the "certain" scale (5.02%); 8 students at the "high" level on the "yes" scale (10.06%) ; 27 students at the "average" level on the "sometimes" scale (32.2%) and 42 students at the "low" level on the "difficult to answer" scale (52%).

Table 1. The indicators of the results of the author's survey of future primary school teachers about their perceptions of creative competence.

Questions	Experimental group				Control group			
	Very high level	High level	Average level	Low level	Very high level	High level	Average level	Low level
	Certainly	Yes	Sometimes	I have trouble answering	Certainly	Yes	Sometimes	I have trouble answering
1	2	3	4	5	6	7	8	9
Do you consider yourself a creative person?	6.1%	13.4%	36.5%	44%	6.6%	15.6%	40.3%	37.5%
Do you know the signs of creativity?	5.1%	14.4%	38.5%	42%	4.4%	12.1%	41.6%	41.9%
Do you understand what a creative person is?	3.7%	14.2%	43.1%	39%	5.2%	12.2	43.1%	39.5%
Do you know the synonyms for creativity?	3.7%	10.2%	48%	38.1%	4.2%	11.1%	39.8%	44.9%
Are you familiar with the works of scientists who studied the concepts of creativity and creative competence?	2.2%	3%	34.2%	60.6%	3%	2.7%	35.9%	58.4%
Is it effective to use creative tasks in the process of teaching literacy?	9.1%	18.4%	28.5%	44%	10.3%	14.4%	43.1%	32.2%
Do you use creative thinking technology in practice?	5%	6.2%	28.7%	60.1%	4.2%	8.3%	30.4%	57.1%
Can you design creative tasks?	5%	6.1%	13.1%	75.8%	6.2%	7%	16.1%	70.7%
Do you have problems with creative tasks?	5.3%	4.7%	18.4%	71.6%	4.8%	5.5%	19.6%	70.1%

During the experiment of determining the results of the author's survey in the control group, there were 5 students at the "very high" level on the "certain" scale (5.3%); 7 students at the "high" level on the "yes" scale (9.8%) ; 27 students at the "average" level on the "sometimes" scale (34.3%) and 40 students at the "low" level on the "difficult to answer" scale (50.6%).

The level of creative competence evaluates the types of " verbal subtests"(see Table 2).

Table 2. The results of the level of creative competence evaluate the types of "verbal subtests".

Experimental - 81 students							Control - 79 students					
Qualitative assessment	Fluency		Flexibility		Original		Fluency		Flexibility		Original	
	N	%	N	%	N	%	N	%	N	%	N	%
Very high level	5	6.17%	4	5%	4	5 %	4	5.6%	4	5.06%	3	3.9%
High level	17	21%	17	21%	17	21%	15	18.4%	16	20.2%	17	21.5%
Average level	29	35.8%	24	29.6%	29	35.8%	30	38%	25	31.6%	30	37.9%
Low level	30	37.03%	36	44.4%	31	38.2%	30	38%	34	43.14%	29	36.7%

According to the data given in Table 2, there are 5 students in the experimental group who are at the "very high" level on the "fluency" scale (6.17%); 4 students are on the "flexibility" scale (5%) and 4 students are on the "original" scale (5%).

17 students or 21% are on the "fluency" scale at the "high" level. On the "flexibility" scale, 17 students are on the "original" scale (21%).

29 students are at the "average" level (35.8%); 24 students are on the "flexibility" scale (29.6%). 29 students are on the "original" scale.

30 students or 37.03% are on the "fluency" scale at the "low" level; 36 students or 44.4% are on the "flexibility" scale and 31 students are on the "original scale".

During the experiment of determining the results of "verbal subtests," four students in the control group were at the "very high" level on the "fluency" scale (5%); 4 students were on the "flexibility" scale (5%) and 3 students were on the "original" scale.

15 students scored 19%, on the scale of "fluency" at the "high" level, 16 students scored 20.2% on the "flexibility" scale and 17 students scored 21.5% according to the "original" scale.

30 students are at the "medium" level scored 38%; 25 students on the "flexibility" scale scored 31.6% and 30 students scored 37.9% on the "original" scale.

30 students or 38% are on the scale of "fluency" at the "low" level, 34 students show 43.14% on the "flexibility" scale and 29 students make 36.7% according to the "original" scale.

Table 3. The results of the level of creative competence evaluate the types of "visual-figurative test battery".

Qualitative assessment	Experimental - 81 students						Control - 79 students					
	Fluency		Flexibility		Original		Fluency		Flexibility		Original	
	N	%	N	%	N	%	N	%	N	%	N	%
Very high level	3	3.7%	5	6.17%	5	6.2%	4	5%	4	5%	3	3.8%
High	15	18.5%	15	18.5%	16	19.7%	17	21.5%	13	16.6%	14	17.7%
Average level	31	38.3%	32	39.5%	31	38.4%	30	38%	33	41.7%	32	40.5%
Low level	32	39.5%	29	35.8%	29	35.7%	28	35.5%	29	36.7%	30	38%

During the performance of the "visual-figurative test battery," it can be seen that students' visual/figurative thinking characteristics, creativity, and creativity converge to the same level (see Table 3 and Figure 1).

Figure 1 presents a quantitative and qualitative analysis of the results of the " visual-figurative test battery".

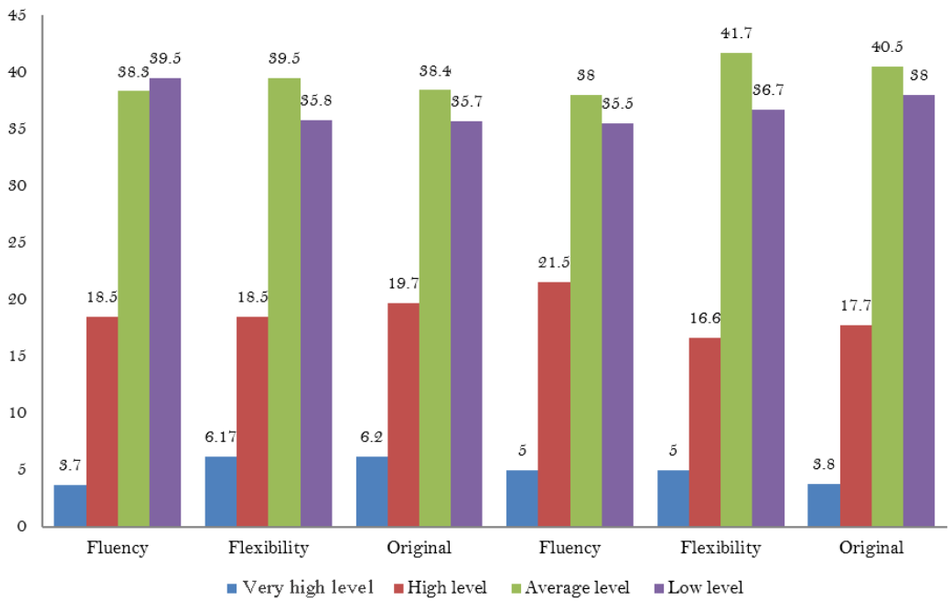

Figure 1. Diagram of quantitative and qualitative analysis of results of "visual-figurative test battery".

During the experiment to determine the indicators of the results of the " visual-figurative test battery" in the experimental group, there were 3 students at the "very high" level on the "fluency" scale which is 3.7%; 5 students on the "flexibility" scale which is 6.17% and 5 students score 6.2% on the "original" scale.

31 students on the scale of "fluency" are at the "average" level (38.3%); 32 students are on the "flexibility" scale (39.5%) and 31 students score 38.4% on the "original" scale.

32 students score 39.5% on the scale of "fluency" at the "low" level and 29 students on the "flexibility" scale score 35.8%. According to the "original" scale, 29 students score 35.7%.

During the experiment to determine the results of the " visual-figurative test battery" in the control group, there were 4 students at the "very high" level on the "fluency" scale scored 5%; 4 students on the "flexibility" scale scored 5% and 3 students in the "original" class score 3.8%. 17 students scored 21.5% on the scale of "fluency" at the "high" level, 13 students on the "flexibility" scale score 16.6%. According to the "original" scale, 14 students scored 17.7%.

30 students are at the "average" level scored 38%; 33 students on the "flexibility" scale scored 41.7%. According to the "original" scale, 32 students scored 40.5%.

On the "fluency" scale, 28 students scored 35.5% at the "low" level and 29 students scored 36.7% on the "flexibility" scale. According to the "original" scale, 30 students scored 38%.

The primary goal of developing the creative abilities of future primary school teachers is to develop creative personalities.

The study's objectives were to develop in students the capacity to think for themselves, acquire knowledge and apply it; to develop cognitive, research and creative activities; to identify novel approaches to any new problems that might arise and to cultivate an interest in engaging in creative endeavors.

The study identifies a set of organizational and pedagogical requirements to guarantee and validate the effectiveness of future primary school teachers' creative development complexes in addressing these issues.

The results of the experimental work show that the developed process is a useful tool for cultivating students' creative abilities.

The influence of experiential learning on a student's creative approach in non-standard conditions has a positive dynamic: motivation for creative self-development; own creativity; professional development, the concentration of creative efforts, perseverance; courage and independence in judgment; leadership, initiative; independence; a positive self-perception and readiness for innovation.

As shown in Table 4, the results of the repeat questionnaire used as the main instrument also serve as a guide for data analysis indicating relationships between this concept and variables. The results are shown in Tables 4 and 5 as well as in Figure 2.

Table 4. The indicators of the results of the repeat survey of future primary school teachers about their perceptions of creative thinking.

Experimental group - 81 students								Control group - 79 students							
Before the experiment				After the experiment				Before the experiment				After the experiment			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Very high level	High level	Average level	Low Level	Very high level	High Level	Average level	Low level	Very high Level	High level	Average level	Low level	Very high level	High level	Average Level	Low Level
5.04	10.06	32.3	52.6	17.5	21.7	15.5	26.3	5.3	10	34.4	50.3	6.1	11.6	31.2	51.1

Table 5. The levels of the results of the repeat survey of future primary school teachers about their perceptions of creative thinking.

Group	Period	Participants	Levels			
			Very high	High	Medium	Low
			N	N	N	N
Experimental group	Before the experiment	81	4	8	26	43
	After the experiment	81	14	26	20	21
Control group	Before the experiment	79	4	8	27	40
	After the experiment	79	5	9	25	40

Figure 2 presents the data obtained in response to the repeat survey of future primary school teachers about their perceptions of creative thinking.

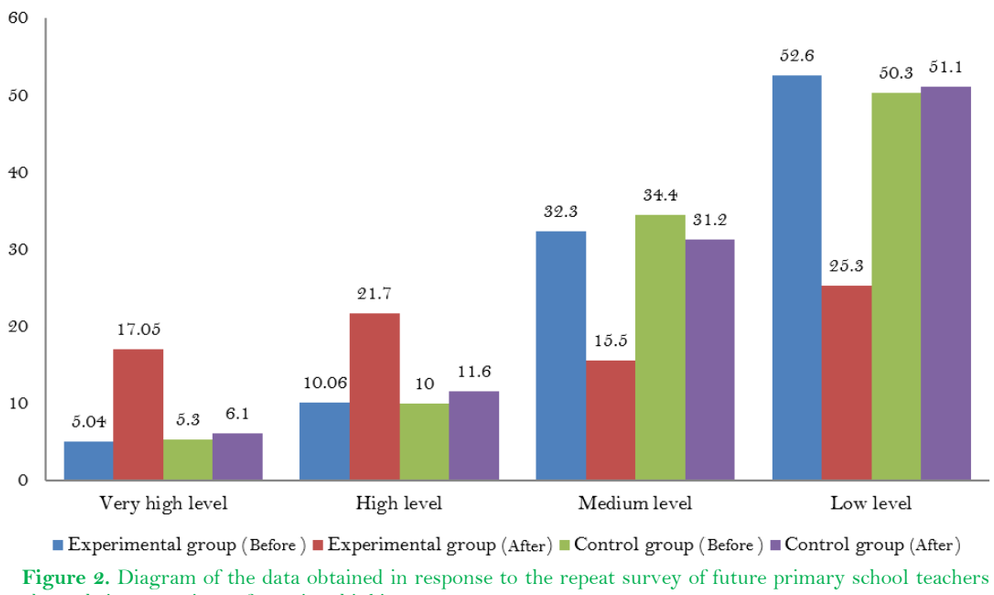

Figure 2. Diagram of the data obtained in response to the repeat survey of future primary school teachers about their perceptions of creative thinking.

It is clear that everyone's opinion is "very good," and creativity increased by 5.04% - 17.5%. This metric indicates that study participants have completed the elective course " fundamentals of teaching creative literacy."

The " high" level shows an increase in creativity from 10.06% to 21.7%. Consequently, the knowledge about the creative competence of the study participants is expanding and will be used in future seminars.

The activity level indicator "average" decreased by 32.3% - 15.5%. During learning and practice, ideas about the effectiveness of creative task use and participants' abilities to perform creative tasks are systematized.

The " low" level decreased by 52.6% - 26.3%. We note that the students who completed the elective course have improved their creative competence.

According to the given data, future elementary school teachers are making progress in fostering creativity.

To test the difference in level between the control and experimental groups, we used Pearson's chi-squared test (χ^2) test and got the following result.

$$\chi^2 = \frac{1}{n_1 n_2} \sum \frac{\left(n_1 Q_{2i} - n_2 Q_{1i}\right)^2}{Q_{1i} + Q_{2i}}$$

Where n1 is the number of students in the experimental and control groups and n2 is the number of students in the control and experimental groups. The frequency of symptom 1 in the control and experimental groups is Q_{1i} and i is the number of symptoms Q_{2i}.

$$\chi^2 = \frac{1}{81 * 79}\left[\frac{(81 \cdot 4 - 79 \cdot 4)^2}{8} + \frac{(81 \cdot 8 - 79 \cdot 8)^2}{16} + \frac{(81 \cdot 26 - 79 \cdot 27)^2}{53} + \frac{(81 \cdot 43 - 79 \cdot 40)^2}{83}\right]$$
$$= \frac{1}{6399}(8 + 16 + 13.7 + 1256.9) = \frac{1294.6}{6399} \approx 0.02$$

Significance level q = 0.05, number of degrees of freedom v = 4-1=3

$x_1^2 = 0.02$

$\chi^2 = 7.82$

$\mathcal{X}_1^2 < \mathcal{X}_2^2$. 0.02 ‹ 7.827

At this level of significance, there were no significant statistical differences between the control and experimental groups which meant that these groups were considered eligible for the study (see Table 6).

Table 6. The initial level and final indicators of the development of creative ability in the experimental group.

Experimental group - 81 students							
Before the experiment				**After the experiment**			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Very high Level	**High level**	**Average Level**	**Low level**	**Very high Level**	**High level**	**Average level**	**Low level**
5.04	10.06	32.3	52.6	17.5	21.7	15.5	26.3

After applying the proposed methodological system and determining the statistical significance of the results, we used the Pearson χ^2 (chi-square) test to verify the correctness of our conclusion about the increase in the percentage and methodological efficiency of the experimental group of students.

To do this, we will check the hypothesis that the creative competencies of students are formed during the performance of practical tasks.

$$\chi^2 = \sum_{i=1}^{k} \frac{\left(f_i^1 - f_i^{II}\right)^2}{\left(f_i^1 + f_i^{II}\right)} -$$

Index calculation formula, where f_i^1 and f_i^{II} are the frequency of the comparison index.

$$\chi^2 = \frac{(5.04 - 17.5)^2}{22.54} + \frac{(10.06 - 31.7)^2}{41.76} + \frac{(32.3 - 24.5)^2}{56.8} + \frac{(52.6 - 26.3)^2}{78.9} = \frac{155.2}{22.54} + \frac{468.2}{41.76} + \frac{60.84}{56.8} + \frac{691.69}{78.9}$$
$$= 6.8 + 11.2 + 1.07 + 8.7 = 27.77$$

For a given significance level q = 0.05 and the number of degrees of freedom v = k-1 = 4-1 = 3, we determine the critical value according to the optional table.

$$\chi^2 \rangle \chi^2_{0.05}$$

(27.77>7.82) $_{H_0}$ the hypothesis is rejected.

Consequently, students through practical tasks acquire knowledge and skills aimed at the effectiveness of the formation of their creative competence.

In the following table, a final test is carried out to determine the level of the experimental group and the control group and it is calculated by the student's T-test. The control group results are shown in Table 7.

Before the experimental group, 5 students (6.17%) were at a "very high" level on the "fluency" scale, after 12 students; (14.8 %); before 4 students; 5% on the "flexibility" scale after 10 students (12.3%) 4 students (5%) are on the "originality" scale after 9 students (11.1%). Consequently, after the elective course, the indicators of students' creative competence at a "very high" level increased by 22.03%.

Before the experiment, the "high" level on the "fluency" scale in the experimental group was 17 students (21%), and after - 33 students (40.8%); before the experiment, 17 students (21%) had a "high" level on the "flexibility" scale and after - 38 students (46.9%); the "high" level on the "originality" scale was 17 students (21%) and after -

39 students (48.2%).Thus, the influence of the elective course reduced middle-level students' performance by 40.6%. We can see that the test score increased by 73.9%.

Table 7. Quantitative and qualitative analysis of the results of " verbal subtests" before and after the experiment.

Qualitative assessment	**Experimental group – 81 students (Before)**						**Experimental group – 81 students (After)**					
	Fluency		**Flexibility**		**Original**		**Fluency**		**Flexibility**		**Original**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Very high level	5	6.17%	4	5%	4	5 %	12	14.8%	10	12.3%	9	11.1%
High level	17	21%	17	21%	17	21%	33	40.8%	38	46.9%	39	48.2%
Average level	29	35.8%	24	29.6%	29	35.8%	18	22.2%	14	17.3%	17	21%
Low level	30	37.03%	36	44.4%	31	38.2%	18	22.2%	19	23.5%	16	19.7%
Qualitative assessment	Control group – 79 students (Before)						Control group – 79 students (After)					
	Fluency		Flexibility		Original		Fluency		Flexibility		Original	
	N	%	N	%	N	%	N	%	N	%	N	%
Very high level	4	5.1%	4	5.06%	3	3.9%	5	6.32%	4	5.1%	5	6.3%
High level	15	18.4%	16	20.2%	17	21.5%	17	21.5%	17	21.5%	19	24.1%
Average level	30	38%	25	31.6%	30	37.9%	30	38%	26	32.9%	27	34.2%
Low level	30	38%	34	43.14%	29	36.7%	27	34.2%	32	40.5%	28	35.4%

Before the experiment, the "average" level on the "fluency" scale in the experimental group was 29 students (35.8%), and after - 18 students; (22.2%); before the experiment, 24 students (29.6%) had a "high" level on the "flexibility" scale after - 14 students (17.3%); the "high" level on the "originality" scale was 29 students (35.8%), and after - 17 students (21%). Thus, the influence of the elective course reduced middle-level students' performance by 40.6%.

Before the experiment, a "low" level on the "fluency" scale in the experimental group was 30 students (37.03%), and after 18 students (22.2%) before the experiment, 36 students (44.4%) had a "high" level on the "flexibility" scale, and after - 18 students (22.2%); the "high" level on the "originality" scale was 31 students (38.2%), and after it was – 16 students (19.7%). Therefore, we noticed a 75.23% increase in the creativity of students while the number of underachievers decreased.

Before the experiment with the control group, 4 students (5%) were at a "very high" level on the "fluency" scale, and after it was 5 students (6.32 %); before 4 students (5.06%) on the "flexibility" scale and after it was - 4 students (5.1%); 3 students (3.9%) on the "originality" scale and after it was 5 students (6.3%).

Before the experiment, the "high" level on the "fluency" scale in the control group was 15 students (19%) after it was - 17 students (21.5%); before the experiment, 16 students (20.2%) had a "high" level on the "flexibility" scale, and after - 17 students (21.5%); the "high" level on the "originality" scale was 17 students (21%), and after it was - 19 students (24.1%).

Before the experiment, the "average" level on the "fluency" scale in the control group was 30 students (38%), and after it was – 30 students (38%); before the experiment, 25 students (31.6%) had a "high" level on the "flexibility" scale, and after it was - 26 students (32.9%); a "high" level on the "originality" scale up to 30 students (37.9%) and after it was - 27 students (34.2%).

Before the experiment, a "low" level on the "fluency" scale in the control group was 30 students (38%) and after it was – 27 students (34.2%); before the experiment, 34 students (43.14%) had a "high" level on the "flexibility" scale and after - 32(40.5%); a "high" level on the "originality" scale was 29 students (36.7%) and after it was - 28 students (35.4%). Hence, these indicators show no change in the control group. The following mathematical and numerical indicators are given below:

Calculations revealed conflicting hypotheses (H_0, H_1) about significant differences in the levels of creative ability between the experimental and control groups. To do this, we first use the student's T-test for each indicator separately and then for all indicators together.

If

$$t < t_0$$

Then - H_0 has a zero value, and if $t < t_0$ then the opposite hypothesis H_1 is accepted.

Here t

$$t = \frac{x-y}{m_{1+}^2 m_2^2}$$

And x is the mean value of the experimental group.

$$x = \frac{\sum f_{i^*} x_i}{n}$$

And y is the mean value of the experimental group.

$$m_1 = \frac{S_1}{\sqrt{N_1}} \text{ and } m_2 = \frac{S_2}{\sqrt{N_2}}, S = \sqrt{\frac{\left(x_i - \bar{x}_{opm}\right)^2 f_1}{N-1}}$$

Experimental group – 81 students .

If $t < t_0$ then - H_0 has a zero value, there were no significant differences in the levels of creative ability among the groups. If $t > t_0$ then the hypothesis H_1 is accepted, there are significant differences in the level of creativity among groups.

$$x = \frac{2.30 + 3.2\vartheta + 4.17 + 5 \times 5}{81} = \frac{240}{81} = 2.96$$

$$S = \frac{(2-2.96)^2 * 30 + (3-2.96)^2 * 29 + (4-2.96)^2 * 17 + (5-2.96)^2 * 5}{81-1}$$

$$= \sqrt{\frac{27.6 + 0.046 + 18.36 - 20.8}{80}} = \sqrt{\frac{66.8}{80}} = \sqrt{0.83} = 0.9$$

$$m_1 = \frac{0.9}{\sqrt{81}} = \frac{0.9}{9} = 0.1$$

$$y_{\text{opr}} = \frac{2*18+3*18+4*33+5*12}{81} = \frac{36+54+132+60}{81} = \frac{282}{81} = 3.4$$

$$S = \sqrt{\frac{(1.4)^2 * 18 + (0.4)^2 * 18 + (0.6)^2 * 33 + (1.8)^2 * 12}{80}} = \sqrt{\frac{35.2 + 0.2 + 11.8 - 30.7}{81}} = \sqrt{\frac{77.9}{81}}$$

$$= \sqrt{0.96} = 0.97$$

$$m_1 = \frac{0.97}{\sqrt{81}} = \frac{0.97}{9} = 0.1$$

$$\text{t} = \frac{-0.44}{0.01+0.01} = 0.22$$

$t_{0.05}$ = 1.984 was, $t < t_0$, so the hypothesis H_0 is accepted.

5. Conclusion

This study confirmed the predominance of the problem of the lack of holistic knowledge at the university about regular connections and methodological foundations of professional training that contribute to the formation of future primary school teachers' creative competence; about an adequate creatively developing educational sphere and ways to create it in the current situation of modernization of professional pedagogical education; about the scientifically based logical sequence of the development of the creative competence of the students and about the appropriate methodological and technological support for this process. The content of the elective course "fundamentals of teaching creative literacy" was developed by the study's objectives and practiced in the university's educational process. Experimental results increased creativity. These findings allowed for the modification of the country's existing training structure as well as the development of new models and options.

References

Acar, O. A., Tarakci, M., & Van Knippenberg, D. (2019). Creativity and innovation under constraints: A cross-disciplinary integrative review. *Journal of Management, 45*(1), 96-121. https://doi.org/10.1177/0149206318805832

Açıkgöz, T., & Babadoğan, M. (2021). Competency-based education: Theory and practice. *Psycho-Educational Research Reviews, 10*(3), 67–95.

Akkanat, Ç., & Gökdere, M. (2018). The effect of academic involvement and school climate as perceived by gifted students in terms of talent, creativity, and motivation in science. *Universal Journal of Educational Research, 6*(6), 1167-1174. https://doi.org/10.13189/ujer.2018.060606

Altinyelken, H. K., & Hoeksma, M. (2021). Improving educational quality through active learning: Perspectives from secondary school teachers in Malawi. *Research in Comparative and International Education, 16*(2), 117-139. https://doi.org/10.1177/1745499921992904

Amirova, A., Iskakovna, J. M., Zakaryanovna, T. G., Nurmakhanovna, Z. T., & Elmira, U. (2020). Creative and research competence as a factor of professional training of future teachers: Perspective of learning technology. *World Journal on Educational Technology: Current Issues, 12*(4), 278–289. https://doi.org/10.18844/wjet.v12i4.5181

Beaumont, N. E. (2022). "It makes you feel a little bit freer": Committing to creativity: A hermeneutic phenomenological study of a primary teacher's use of drama with additional language learners. *Teachers and Curriculum, 22*(2), 35-47. https://doi.org/10.15663/tandc.v22i2.405

Bloom, E., & VanSlyke-Briggs, K. (2019). The demise of creativity in tomorrow's teachers. *Journal of Inquiry and Action in Education, 10*(2), 90-111.

Chen, X., & Padilla, A. M. (2022). Emotions and creativity as predictors of resilience among L3 learners in the Chinese educational context. *Current Psychology, 41*(1), 406-416. https://doi.org/10.1007/s12144-019-00581-7

Clarke, T., & Basilio, M. (2018). Do arts subjects matter for secondary school students' wellbeing? The role of creative engagement and playfulness. *Thinking Skills and Creativity, 29*(1), 97-114. https://doi.org/10.1007/s12144-019-00581-7

Dietrich, A. (2019). Types of creativity. *Psychonomic Bulletin & Review, 26*, 1–12. https://doi.org/10.3758/s13423-018-1517-7

Fernández-Villardón, A., Valls-Carol, R., Melgar Alcantud, P., & Tellado, I. (2021). Enhancing literacy and communicative skills of students with disabilities in Special Schools through dialogic literary gatherings. *Frontiers in Psychology, 12*, 662639. https://doi.org/10.3389/fpsyg.2021.662639

Fredagsvik, M. S. (2021). The challenge of supporting creativity in problem-solving projects in science: A study of teachers' conversational practices with students. *Research in Science & Technological Education*, 1-17. https://doi.org/10.1080/02635143.2021.1898359

Gamino, J. F., Frost, C., Riddle, R., Koslovsky, J., & Chapman, S. B. (2022). Higher-order executive function in Middle School: Training teachers to enhance cognition in young adolescents. *Frontiers in Psychology, 13*, 2200. https://doi.org/10.3389/fpsyg.2022.867264

Gu, S., Gao, M., Yan, Y., Wang, F., Tang, Y.-Y., & Huang, J. H. (2018). The neural mechanism underlying cognitive and emotional processes in creativity. *Frontiers in Psychology, 9*, 1924. https://doi.org/10.3389/fpsyg.2018.01924

Gubbels, J., Segers, E., & Verhoeven, L. (2018). How children's intellectual profiles relate to their cognitive, socio-emotional, and academic functioning. *High Ability Studies, 29*(2), 149-168. https://doi.org/10.1080/13598139.2018.1507902

Guilford, J. P. (1950). Creativity. *American Psychologist, 5*(9), 444. https://doi.org/10.1037/h0063487

Iskakova, L., Amirova, A., Ospanbekova, M., Zhumabekova, F., Ageyeva, L., & Zhailauova, M. (2021). Developing the future primary school teachers intellectual skills in Kazakhstan. *International Journal of Instruction, 14*(3), 755-770. https://doi.org/10.29333/iji.2021.14344a

Kavanaugh, B. C., Tuncer, O. F., & Wexler, B. E. (2019). Measuring and improving executive functioning in the classroom. *Journal of Cognitive Enhancement, 3*, 271-280. https://doi.org/10.1007/s41465-018-0095-y

Kim, S., Raza, M., & Seidman, E. (2019). Improving 21st-century teaching skills: The key to effective 21st-century learners. *Research in Comparative and International Education, 14*(1), 99-117. https://doi.org/10.1177/1745499919829214

Martínez, V., Mon, M. A., Álvarez, M., Fueyo, E., & Dobarro, A. (2020). E-self-assessment as a strategy to improve the learning process at university. *Education Research International, 2020*, 3454783. https://doi.org/10.1155/2020/3454783

Mazzone, M., & Elgammal, A. (2019). Art, creativity, and the potential of artificial intelligence. *Arts, 8*(1), 26. http://dx.doi.org/10.3390/arts8010026

Nagima, B., Saniya, N., Gulden, Y., Saule, Z., Aisulu, S., & Nazigul, M. (2023). Influence of special learning technology on the effectiveness of pedagogical ethics formation in future teachers. *Journal of Education and e-Learning Research, 10*(1), 1-6. https://doi.org/10.20448/jeelr.v10i1.4313

Nihishova, A., & Kryvonosova, E. (2021). Professionally-oriented technologies for teaching foreign languages in a non-linguistic university. *International Journal of Current Approaches in Language, Education and Social Sciences, 3*(2), 187-203. https://doi.org/10.35452/caless.2021.10

Ospankulov, Y. E., Nurgaliyeva, S., Kunai, S., Baigaliev, A. M., & Kaldyhanovna, K. R. (2022). Using physical education lessons to develop the autonomy of primary school children. *Cypriot Journal of Educational Sciences, 17*(2), 601-614. https://doi.org/10.18844/cjes.v17i2.6856

Perry, M., & Collier, D. R. (2018). What counts as creativity in education? An inquiry into the intersections of public, political, and policy discourses. *Canadian Journal of Education, 41*(1), 24-43. https://www.jstor.org/stable/90019779

Ritter, S. M., Gu, X., Crijns, M., & Biekens, P. (2020). Fostering students' creative thinking skills by means of a one-year creativity training program. *PLoS One, 15*(3), e0229773. https://doi.org/10.1371/journal.pone.0229773

Shen, S., Wang, S., Qi, Y., Wang, Y., & Yan, X. (2021). Teacher suggestion feedback facilitates creativity of students in STEAM education. *Frontiers in Psychology, 12*, 723171. https://doi.org/10.3389/fpsyg.2021.723171

Sidek, R., Halim, L., & Buang, N. A. (2022). Pedagogical approaches to inculcate scientific creativity among secondary students. *Creative Education, 13*(5), 1779-1791. https://doi.org/10.4236/ce.2022.135112

Smid, C. R., Karbach, J., & Steinbeis, N. (2020). Toward a science of effective cognitive training. *Current Directions in Psychological Science, 29*(6), 531-537. https://doi.org/10.1177/0963721420951599

Wyse, D., & Ferrari, A. (2018). Creativity and education in the European Union and the United Kingdom. *Learning and Teaching Around the World*, 192–200. https://doi.org/10.4324/9780429491498-23

Zhumash, Z., Zhumabaeva, A., Nurgaliyeva, S., Saduakas, G., Lebedeva, L. A., & Zhoraeva, S. B. (2021). Professional teaching competence in preservice primary school teachers: Structure, criteria and levels. *World Journal on Educational Technology: Current Issues, 13*(2), 261-271. https://doi.org/10.18844/wjet.v13i2.5699

Zhussupbayev, S., Nurgaliyeva, S., Shayakhmet, N., Otepova, G., Karimova, A., Matayev, B., & Bak, H. (2023). The effect of using computer assisted instruction method in history lessons on students' success and attitudes. *International Journal of Education in Mathematics, Science and Technology, 11*(2), 424-439. https://doi.org/10.46328/ijemst.3136