Future elementary school teachers' research culture formation employing individual assignments

Dauren Buribayev [1*], Gulshat Bakhtiyarova [1], and Assan Tuxanbayev [2]

[1]   Department of Pedagogy, Psychology and Primary Education, K. Zhubanov Aktobe Regional University, 030000, 34 A. Moldagulov Ave., Aktobe, Republic of Kazakhstan;
[2]   Department of Humanitarian Disciplines, Kazakh-Russian International University, 030006, 52 Aiteke bi Str., Aktobe, Republic of Kazakhstan;
*   **Corresponding Author**: e-mail@email.com.

ABSTRACT: In the modern dynamic society, quality education and the development of children's creative abilities are the merits of successful teachers. The modern teacher must have independent learning skills, high motivation and developed research culture skills for effective teaching. The research aims to test the impact of individual student activity – future elementary school teachers, on the development of their research culture. The study was conducted employing various methods, using questionnaires to study the ability of future elementary school teachers to apply creative approaches and conduct pedagogical research in practice. The study contributes to teacher education by highlighting the importance of independent, research-oriented assignments in fostering a research culture. It underscores the need for integrating such practices into teacher training programs to prepare future educators capable of innovative and effective teaching. The methodology involved creative teaching assessments, self-evaluations, and surveys on research problem-solving. Results demonstrated significant improvements in students' motivation, self-assessment, and understanding of research methodologies, highlighting the potential of targeted strategies in fostering a robust research culture in teacher education.

Keywords: students; independent learning; educator; creativity; research culture.

I. INTRODUCTION

Creativity in education has been extensively researched from a variety of perspectives, and it is currently a part of successful employment. To teach using methods that are effective for each child and in a variety of school settings, the modern teacher needs to have a high research culture level, the ability to find solutions to different problems and effective ways to teach, which is often not provided in higher education curricula. Accordingly, the formation of a research culture in future teachers is a necessary part of their successful pedagogical activity.

While creativity in education has been extensively studied from multiple perspectives, there remains a notable gap in how higher education curricula address the formation of research culture among future teachers. Modern educators are expected to possess a high level of research culture, characterized by the ability to solve diverse teaching challenges, apply innovative methods, and adapt effectively to various school settings. However, these skills are often overlooked in current teacher education programs, adversely impacting teachers' capacity to foster creativity and problem-solving in their future practices [32].

Research culture development, essential for adapting to the demands of an ever-evolving society, involves the acquisition of knowledge in research methodology, ethics, and communication. It encompasses shared values and behaviors that prioritize research practices and outcomes, which are critical for educators tasked with solving complex pedagogical issues and promoting creative learning [17]. Despite recognition of its importance, there is insufficient focus in academic literature on how structured independent assignments contribute to cultivating this research culture among future educators, particularly in the context of [9].

Existing studies, such as [30], provide valuable insights into the structural and functional models for developing research culture in teacher training. However, these works largely omit the role of independent assignments as a mechanism for enhancing creative thinking and problem-solving abilities. Independent assignments, which involve the active comprehension of problems, the search for solutions, and the application

538

of these solutions in practice, are integral to preparing teachers to meet the diverse needs of their students effectively.

This study aims to address the identified gap by focusing on the development and testing of independent assignments tailored to enhance the research culture of future elementary school teachers. It examines how these assignments foster professional qualities such as theoretical thinking, methodological knowledge, and creativity, ultimately equipping educators to navigate and contribute meaningfully to the modern educational landscape.

The research aims to analyse the scientific literature on the formation of research culture, methods of testing the research culture level, develop a research culture formation program for future elementary school teachers during independent assignments (the experimental factor) and test the effectiveness of the developed program. The primary research objectives are to explore the formation of a research culture in future elementary school teachers through independent assignments and to evaluate the effectiveness of a structured program designed to foster this culture. Specifically, the study aims to:

1. Analyze existing literature to define the components and indicators of a research culture in teacher education.

2. Develop a research culture formation program that incorporates independent assignments emphasizing creativity, problem-solving, and self-directed learning.

3. Assess the program's impact on students' research culture by measuring changes in motivation, self-assessment of research capabilities, and creative teaching skills using validated tools such as surveys, self-evaluation forms, and creative teaching assessments.

4. Evaluate how independent assignments—structured over three academic semesters with gradually increasing complexity—contribute to students' understanding and application of research practices in educational settings.

These objectives provide a framework to not only implement but also measure the success of interventions aimed at cultivating a robust research culture in future educators.

II. LITERATURE REVIEW

The training of creative individuals is one of the main goals of education in many countries [24, 28]. Research on the development of creativity beyond the school curriculum shows that teachers often do not consider the development of children's creativity, requiring only knowledge, insufficient development of teaching methods and the school environment that would promote creativity in children [33]. High-level educational institutions promote research competency development, which positively influences the knowledge of future professionals. Creativity and innovation as skills are simply necessary for teachers to teach today's children [25]. Limited Focus on Research Culture Development in Teacher Education Despite the recognition of research culture as essential for modern educators, much of the existing literature does not adequately address how future teachers can develop this culture systematically. Studies often focus on broader pedagogical or methodological challenges, neglecting the specific processes through which research culture is cultivated during teacher training [23, 32].

To achieve this, it is necessary to plan the training of future teachers that promotes not only the assimilation of knowledge but also the development of a research culture. Given the development of modern society, developing a research culture of future elementary teachers is the key to successful teaching in future teaching practice. The future teacher needs to learn and apply new technologies, methods, and teaching tools that will be effective for each student [18, 32, 34, 35].

The development of research competencies combines cognitive, communicative, and personal factors, that is, it combines competencies for academic development [6]. An exploratory culture is a way of thinking that encourages curiosity, experimentation, and continuous learning. Motivation to learn is critical to maintaining such a culture. Developing a research culture of teachers contributes to the quality of education [37]. Future teachers need to develop the ability to use the methods of scientific and pedagogical excellence and effectively address the importance of scientific ideas for the development of modern society [12]. Future elementary school teachers need to assess different teaching conditions, and children's skills themselves, be able to explain possible problem solutions to students and create a learning environment that fosters creativity in children. The development of professional thinking allows future teachers to solve different pedagogical and psychological tasks in different situations [13].

[16] describes the formation of a research culture in three stages creation, expansion, and maturity. Current teachers develop a research culture by developing collective reflection in the school, sharing knowledge with colleagues, and initiating innovations. Study in [9] highlight the need to develop school culture, sharing experiences on the development of creative skills in students, training and recommendations for teachers regarding the learning process using technology, considering the need to develop creative skills, teaching the necessary material in the school curriculum.

[9] described the characteristics of students' creativity and conducted a survey of teachers regarding the beliefs of current teachers on the development of creative skills in their students. The need for teacher professional development during practicum, online professional learning, expediting professional development, and professional activities in the development of students with diverse abilities was explored [10]. These studies point to the importance of self-education, problem-solving skills, and child development in current teachers, but this also applies to the learning process of future teachers. The motivation of learning the basics of professional activity in the school education system is one of the criteria for the effectiveness of teaching the future teacher [29]. Creating a learning environment for future teachers using the tools recommended for current teachers will contribute to their professional education and create skills for effective teaching in the future.

III. MATERIALS AND METHODS

This research was conducted using a mixed-method approach. Thirty-two teacher educators with more than five years of experience and a PhD degree and 348 students, future elementary school teachers, participated in the study (Table 1).

Table 1. Demographic peculiarities of research respondents.

Educators	32
Age	41±7.58
Gender	
Woman	29
Man	3
Students	348
Age	19.25±2.50
Gender	
Woman	322
Males	46

To study the peculiarities of the research culture formation, the questionnaire method was applied. Teachers were interviewed based on the Russian version of the scale of teachers' creativity development proposed by [26]. The authors proved the validity and reliability of the Russian version of this questionnaire, Cronbach Alpha – 0.72-0.8 [25]. Teachers responded to the sentences (15 questions), rating them on a Likert scale ranging from 6 – strongly agree, to 1 – strongly disagree. Students were surveyed using a scale developed by [24], which consisted of a 4-factor structure (subscales – teacher self-efficacy, environmental encouragement, community value, and student potential). This scale was adapted for future teachers, that is, questions were asked with the prefix "I will" and questions for working teachers only were modified to fit the student environment. The reliability of the version for future teachers was confirmed using Cronbach's Alpha calculation. This survey was conducted on a 7-point Likert scale from 7 – strongly agree, to 1 – strongly disagree.

The students' self-assessment of their research culture was also conducted, as well as an assessment of their abilities to do research. For this purpose, question No. 1: How well do you think your research culture is developed? (rate from 1 – not developed at all to 10 – developed very well), and question No. 2: How do you rate your ability to learn independently and to find new methods and ways of teaching children? (rate from 1 – very bad, to 10 – very good). For the final assessment of future elementary school teachers on the formation of their research culture as the ability to conduct scientific research, a survey developed by [6]. Research Culture in the Formative Processes ResCul instrument. This instrument contains 33 questions that rate on a Likert scale from 1 – completely disagree to 4 – completely agree. The subscales of this instrument are values and attitudes toward research (9 questions), knowledge of research design (12 questions), and shaping research (12 questions). This scale examined students' skills, attitudes, and willingness to do qualified research.

540

Independent assignments, which should form the research culture, were based on gradual teaching of the pedagogical experiment's features, the importance of conducting them, studying and discussing experiments conducted by researchers, finding the necessary data in the scientific literature on the given topics, analysis and synthesis of information. The results of independent assignments were not evaluated, but actively discussed among students. After mastering the basics of implementing different teaching methods and techniques for elementary school children and the specifics of implementing them, students were given tasks to plan their teaching methods, which are based on teaching children the basic school curriculum, but children have opportunities to learn. Students searched for different approaches in the data from scientific sources, summarized the results of earlier experiments, and assumed how they would apply these results or recommendations in practice. Then, students had pedagogical practice, where they could analyse the composition of classes, identify problems, and offer solutions in different variants, (including changes in the learning environment of children and lesson planning, to methods and means of teaching for different children).

All proposed options were discussed with internship supervisors and current teachers at the school where the internship took place. Students fulfilled the curriculum requirements to the fullest extent and independent assignments additionally. Thus, students formed a research culture for creative teaching of children, analyzing the conducted and conducting their pedagogical research. The obtained data were processed using SPSS Statistics. The result homogeneity was calculated by Pearson's $\chi 2$ test and the difference in the obtained estimates by Student's T-test. All students signed an agreement to publish the research results and to respect anonymity.

IV. RESULTS

The results of the teachers' survey show that their behavior sufficiently contributes to the development of creative potential and, consequently, to the formation of a research culture in their students (Table 2).

Table 2. Results of the creative teaching scale survey of teachers.

Sub-indicators	Average	SD
Curiosity	4.24	1.11
Abstraction	3.89	1.24
Critical thinking	3.95	1.04
Motivation	3.85	1.21
Average	3.98	1.15

The average values of the subscale scores are 3.85-4.24, which is generally higher than the mean (max 6). After the faculty survey, meetings were organized during which recommendations for student learning for the next academic semester were given, and graduate student independent assignment was discussed separately. As such, during the academic year 2021/2022 and the first semester of 2022/2023, instructors gave one assignment every two weeks for independent study or to complete in their vocationally oriented disciplines. Students could choose to study/perform the assignment independently or with other students. The instructor's job was to keep students interested in the research activity regardless of the outcome. The obtained results of student's independent learning were discussed freely during the introductory and final part of the scheduled classes, during online discussions agreed upon by students and faculty, and in online forums.

The student survey results before the experiment assessed students' motivation for online and creative student learning, and two additional questions to self-assess the ability to research information for effective student learning. The survey and the experiment itself were conducted in the final year before the students graduated, and the pedagogical internship for the opportunity to test their capabilities in an appropriate environment and the students' natural motivation to learn independently. The student survey on their motivation to study online shows a wide range of scores, based on the calculations of Pearson's $\chi 2$ criterion. Therefore, students are divided into two groups following the results obtained – students with strong motivation to learn (where the total score of motivation to learn is 5 points), and students with low motivation (total score of motivation to learn is below 2.5 points). The results are presented in Table 3.

Table 3. Survey results of students on motivation to study online before the experiment.

Sub-indicators	Highly motivated student group (n=158)		Low-motivated student group (n=190)		t-criteria	P
	Average	SD	Average	SD		
Personal aim orientation	2.91	0.34	2.32	0.35	1.122	>0.05
Public aim orientation	2.84	0.35	2.11	0.24	1.981	<0.05
Beliefs assimilation control	2.95	0.27	2.20	0.29	1.652	>0.05
Self-efficiency	2.77	0.38	2.13	0.33	1.743	>0.05
Assignment aim	2.97	0.65	1.98	0.27	1.988	<0.05
Social activity	3.11	0.29	2.07	0.32	2.011	<0.05
Teacher support	3.05	0.31	2.14	0.26	2.013	<0.05
Average	2.94	0.37	2.14	0.29	2.024	<0.05

Comparing the results by Student's t-criterion, the presence of reliable differences between the students weakly and strongly motivated groups on the orientation to the private goal, the value of the task, social activity, teacher support and the average value of the survey results can be noted. After assigning students by motivation, assessed their ability to teach children creatively in the future, based on the translated and adapted scale of creative teaching. The results show a significant statistically significant difference between the level of motivation to teach and how ready future teachers are for creative teaching (Table 4).

Table 4. Assessment of creative learning subscales in students with different levels of motivation.

Sub-indicators	Highly motivated student group (n=158)		Low-motivated group (n=190)		t-criteria	P
	Average	SD	Average	SD		
Self-efficiency	4.47	0.23	2.32	0.22	1.994	
Creative education environment creation	4.25	0.47	2.41	0.21	2.234	
Social value	3.72	0.32	2.21	0.32	2.155	<0.05
Pupils' potential	4.22	0.48	2.03	0.41	2.364	
Average	4.16	0.38	2.24	0.29	2.214	

Self-efficiency is the most pronounced in the highly motivated group, and social value is the least regarded. Creative teaching environment creation is rated the highest in the low motivation group, and students' potential is rated the lowest. This indicates the need to develop these values in future teachers, but also the need for further development of others. The results of the correlation coefficient calculation show the presence of strong relationships between students' motivation level and their inclination to creative teaching in the future ($r=0.65$-0.77). The Cronbach's Alpha coefficient calculation confirms the reliability of the adapted and translated questionnaire for the groups of students with high (A) and low (B) motivation (Table 5).

Table 5. Scale psychometry of the translated and adapted research factor analysis questionnaire.

Sub-indicators	Total questions	Average		SD		Cronbach Alpha		Average inter-subject correlation		Inter-subject correlation in standard deviation	
		A	B	A	B	A	B	A	B	A	B
Self-efficiency	13	4.47	2.32	0.23	0.22	0.855	0.811	0.567	0.744	0.574	0.761
Creative education environment creation	6	4.25	2.41	0.47	0.21	0.784	0.845	0.623	0.564	0.537	0.524
Social value	9	3.72	2.21	0.32	0.32	0.749	0.711	0.644	0.588	0.741	0.635
Pupils' potential	7	4.22	2.03	0.48	0.41	0.853	0.753	0.635	0.585	0.685	0.547

542

Future elementary school teachers were also asked to answer questions on how developed their research culture is, and how well they assess their ability to do research. To this end, question No. 1: How developed do you think your research culture is? (rate from 1 – not at all developed to 10 – very well developed), and question No. 2: How do you rate your ability to learn independently and to find new methods and ways of teaching children? (rate from 1 – very bad, to 10 – very good). Low motivation students' evaluation of their research culture is 4.31±0.54, while students from the strongly motivated group have 6.54±0.74. The students from the weakly motivated group scored 4.11±0.34 for their ability to learn independently and to search for new methods and ways of teaching children, whereas the students from the strongly motivated group scored 6.39±0.74. Naturally, the answers to these questions have a strong correlation for students from both groups (r=0.74 for students from the weakly motivated group, r =0.69 for the strongly motivated group). The correlations of self-evaluation of their research culture and creative teaching in the future are presented in Table 6.

Table 6. Correlations between research culture self-assessment and creative teaching in the future.

Sub-indicators	Highly motivated student group (n=158)		Low-motivated student group (n=190)	
	Question # 1: "How developed is your research culture?"	Question # 2: "Assess your capacity for independent learning and to find new methods and ways of teaching children."	Question # 1: "How developed is your research culture?"	Question # 2: "Assess your capacity for independent learning and to find new methods and ways of teaching children."
Self-efficiency	0.68	0.65	0.65	0.73
Creative education environment creation	0.74	0.62	0.68	0.7
Social value	0.61	0.74	0.71	0.66
Pupils' potential	0.65	0.71	0.69	0.7

After teacher and student surveys, an experimental factor was introduced into the students' learning process – receiving assignments for independent performance in the studied subjects of professional direction in the amount of one per two weeks. The students chose their options for performing the task, completely on there or in discussion with their classmates. Students in both groups (strongly and weakly motivated) interacted with each other during independent assignments, learning independently, and sharing experiences during discussions. This is defined by the fact that students with the worst motivation and creative learning indicators can improve these qualities in the future by cooperating with strongly motivated students. For the independent performance of assignments, teachers gave recommendations for reading books and blogs on pedagogy on the web and watching videos, and materials, but the final decisions on the performance of assignments or enrichment of own knowledge, the performance of assignments in the groups or independently students chose themselves. The results after the experiment show the predicted positive impact of independent assignments, and independent work of students on the indicators of motivation, creative learning and self-assessment of research culture. As such, the motivation of weak-motivation students has statistically reliable improvements in comparison with the indicators before the experiment, and students with strong motivation before the experiment have an increase, although not statistically reliable, which is due to the high indicators before the experiment (Table 7).

Table 7. Students' motivation to learn online after the experiment.

Sub-indicators	Highly-motivated student group (n=158)						Low-motivated student group (n=190)						T (between groups after experiment)	p
	Before		After		t	p	Before		After		t	p		
	Av.	SD	Av.	SD			Av.	SD	Av.	SD				
Personal aim orientation	2.91	0.34	3.98	0.21	1.983	<0.05	2.32	0.35	3.95	0.32	1.996	<0.05	0.712	>0.05
Public aim orientation	2.84	0.35	3.82	0.32	1.992		2.11	0.24	3.78	0.41	2.022		0.523	

Sub-indicators											
Beliefs assimilation control	2.95	0.27	4.02	0.25	2.032		2.2	0.29	3.92	0.33	2.312	1.142
Self-efficiency	2.77	0.38	4.05	0.31	2.320		2.13	0.33	3.89	0.24	2.123	1.212
Assignment aim	2.97	0.65	4.11	0.22	2.251		1.98	0.27	4.02	0.22	2.221	1.033
Social activity	3.11	0.29	3.95	0.31	1.881	>0.05	2.07	0.32	3.68	0.41	2.098	1.487
Teacher support	3.05	0.31	4.32	0.34	2.031	<0.05	2.14	0.26	3.92	0.32	2.332	1.529

To verify the existence of a difference in the subscale scores of creative learning after the experiment, a comparison was made using Student's t-test and presented as part of the groups of weakly motivated and strongly motivated before the experiment (Table 8).

Table 8. Assessment of creative teaching sub-indicators in the future in students with different levels of motivation after the experiment.

Sub-indicators	Highly motivated student group, (n=158)		Low-motivated student group, (n=190)		T	p
	Average	SD	Average	SD		
Self-efficiency	4.49	0.32	4.33	0.41	0.933	
Creative education environment creation	4.35	0.32	4.22	0.25	0.687	>0.05
Social value	4.11	0.41	3.98	0.42	0.965	
Pupils' potential	4.38	0.26	4.2	0.56	0.859	

The results show no statistically significant differences between the students after the experiment in both motivation and assessment of the subscale of creative teaching in the future (Table 6, Table 7, p>0.05). The students' levels of motivation and assessment of creative teaching in the future increased and had no significant differences after the experiment, indicating the successful use of independent work assignments to develop the research culture of student future teachers. Repeated answers to questions No. 1: "How well do you think you have developed a research culture?", and question No. 2: "How do you assess your ability to independently learn and find new methods and ways to teach children?", also show a significant increase in self-esteem. In the group of weakly motivated students, self-esteem after the experiment was 7.41±0.68 (before the experiment – 4.31±0.54), and in students with high motivation – 7.85±0.47 (before the experiment – 6.54±0.74). Thus, the application of performing independent work had a positive effect on all students of the course. As well before the experiment a strong correlation between self-assessment and creative teaching in the future is observed (r=0.74-0.78). For the future elementary school teachers' final evaluation, a survey was developed by [6] research culture instrument in the formative processes of ResCul, to examine students' attitudes and values in writing research papers. The results are presented in Table 9.

Table 9. Rescale survey results.

Sub-indicators	Average	SD
Values and attitudes toward research	2.98	0.21
Research know-how	3.05	0.33
Research formation	3.11	0.32
Average	3.05	0.29

The results show the readiness of students to perform scientific papers, which is necessary for further study (in graduate and postgraduate courses) and the professional development of the future elementary school teacher.

V. DISCUSSION

The research shows that the use of independent learning assignments effectively complements the research culture formation model of future elementary school teachers in the process of professional training, proposed by [30]. To understand the importance of research culture, the studies of leading researchers on this topic were analysed. The development of a teacher's research culture is understood as the ability to be flexible [27]. Future elementary school teachers must adapt to the learning process, looking for effective methods and means of teaching children in the school where they will begin their professional careers. A teacher's research culture, the ability to look for teaching methods that are effective in each case (student population, school setting, school culture), is especially important during stress adjustment at the beginning of teachers' working careers because early in the career there is a large dropout rate due to the shock of the reality of teaching [1]. Teachers who manage stress effectively can have positive personal and professional outcomes [4]. An educated research culture and the ability to perform problem-solving will make it easier for future teachers to cope and adapt to the workplace.

In the modern environment, teachers must have a high level of preparedness for changes in pedagogical practice, introducing different teaching methods. This was especially true during forced distance learning when it was necessary to adapt learning in a short time to a distance format, to find effective means and methods [5]. But even now the process of learning development continues to evolve and improve with the development of different technologies. As such, creative learning of students is possible when the teacher has a well-developed research culture, such teachers use different teaching strategies to improve student performance and use new teaching strategies. The teacher must teach students effectively, otherwise, the consequences of ineffective teaching have students [20]. A teacher's creative self-efficacy and personal beliefs about his or her ability to achieve creative results, and to find solutions to problems to effectively teach different children in a school environment, is a predictor of effective teaching [7]. It is important to be able to teach with different tools, methods, and approaches, to create a creative environment that promotes effective learning for children with different levels of subject understanding, especially in the elementary school years. Exploring innovative teaching methods and approaches to students will help effectively teach children with socioeconomic backgrounds, and children with different abilities and capabilities [3, 36]. Research culture contributes to the development of teachers' creative skills, and these in turn are critical factors in the relationship between the school's creative climate and the creative behaviour of the future educator [11].

Due to the importance of the personal qualities and skills of a teacher, the professional training of a future teacher should be based on the formation of their information culture, self-learning, and lifelong learning. For this purpose, teachers should also have a high level of motivation. The studies conducted show the effectiveness of various approaches to the formation of the research culture of future teachers, for example, the introduction of additional courses [12]. Current teachers' attitudes toward innovative change develop through their participation in professional learning, which can take place during formal activities and professional learning in the workplace, employing different teaching methods [14, 15]. And according to [31], informal teacher learning positively influences the use of innovative methods in practice. As the results of the experiment show, independent work in an informal setting contributes to the development of necessary professional qualities of a future teacher. For this purpose, it is necessary to have a formed research culture, which is developed in the process of independent learning.

Applying the experimental factor of introducing two creative tools "role play" and "drama," where students presented text analysis in French in a creative way, did not have a positive effect on students' creative performance in the study [21]. This can be explained by the creative media framework presented, which is effective for some students but ineffective for others. The research results show that the use of self-performance tasks had a positive impact on the formation of the research culture of future elementary school teachers. This can be explained by the prolonged exposure to the experimental factor (three academic semesters), a suitable workload for students (one independent assignment per two weeks), the opportunity to choose how to perform the assignment (alone or with other students), the absence of unconstructive criticism from teachers, and the presence of the necessary support. Such assignments and options promote self-learning and the development of the ability to develop one's teaching skills while sharing experiences with colleagues in future teaching practice, which is essential for a successful teacher [19, 22].

This also supports the evidence that the development of research culture occurs in three phases-development, expansion, and maturity-that are achieved through the presence of people, resources, and research activities that function in different ways in each phase. Developing a research culture in future elementary school teachers needs to take these factors into account, gradually and consistently instilling and motivating others to explore new knowledge, learning to create their materials, and their teaching style, and learning and applying new teaching methods and tools that are effective for children of a particular age and developmental level [16]. In the pedagogical practice of the modern teacher research of different forms, means and methods of teaching, information technology is necessary, and possible during independent learning. Performance of independent assignments helps to increase motivation for learning and allows future teachers to develop an understanding of the need for self-study.

The characteristics of teachers' creative personalities and their beliefs about creativity are consistent with the perception of their methods of encouraging children's creativity, in addition, teachers with more experience working in private schools have stronger and more positive attitudes regarding children's creativity [2]. Teachers with a strong research culture promote effective and creative learning in children. Teachers' attitudes toward creativity have direct relevance to enriching the learning environment to develop students' creativity, which, as mentioned earlier, has a strong influence on elementary school-aged children [8]. Teachers' beliefs about creativity in education shape the process of their work with students [9].

This study used the ResCul formative research culture tool to examine students' attitudes and values in writing research studies, proposed by [6]. This questionnaire helps determine students' readiness and skills to perform research papers, conduct pedagogical experiments, and interpret results. After three semesters of independent assignments to develop a future educator's research culture for effective teaching of children, performing research papers in a small format shows students' readiness for research pedagogical activities. Forming the research culture by performing independent assignments, the students future elementary school teachers improved their motivation for learning, as well as gained knowledge to perform their qualitative research.

VI. CONCLUSIONS

Forming a research culture in future elementary school teachers is essential to the education of today's students. The learning process must be carried out with and without digital tools, considering the capabilities of students and the school in which students will teach, and many other influencing factors on the effectiveness of learning. In this research, the use of tools to develop a research culture, namely assignments for independent performance in a long period (one and a half school year) and with a small load (one assignment for two weeks from each subject of professionally oriented disciplines, that is, two to three assignments from different subjects). This is justified by previous research data on the need to form a research culture in three stages – emergence (the emergence of interest and initial skills of independent learning, research), expansion, and maturity in a culture of continuous research and expansion of knowledge and skills of elementary school teachers. The behavior of the teachers who participated in this study promoted the development of research culture (teachers' self-assessment on the scale of creative teaching was 3.98±1.15 points, max – 5), and in addition, they were given recommendations for effective work with students.

To study the formation of research culture, the motivation to learn online was analyzed, translated and adapted to the scale of creative teacher teaching for students, and future teachers. Before the experiment, most students' motivation to learn was not too high (2.14±0.29 in weakly motivated, and 2.94±0.37 points in strongly motivated students, max – 5), as well as self-assessment of their abilities to research activities (4.31±0.54 for weakly motivated students and 6.54±0.74 for strongly motivated students, max – 10), and assessment of creative teaching in the future (2.24±0.29 for weakly motivated and 4.16±0.38 points for strongly motivated, max – 7). Students were divided into strongly motivated and weakly motivated groups, which also had developed creative teaching abilities, respectively. Calculation of Cronbach's Alpha coefficient and inter-subject correlations of mean value and standard deviation correlation confirms the reliability of motivation influence on creative teaching in the future, as well as the validity of the adapted questionnaire for studying creative teaching in the future. The introduction of the experimental factor – performing independent work gradually and for a long time had a positive effect on the studied indicators. Thus, the application of free-form independent work tasks has a positive effect on the formation of a research culture and motivation for self-study in future elementary school teachers.

For future research, it is recommended to analyses the impact of independent assignments on the development of teachers' research culture from various subjects in the middle school and high school curricula.

546

REFERENCES

1. Admiraal, W., & Røberg, K. I. K. (**2023**). Teachers' job demands, resources and their job satisfaction: Satisfaction with school, career choice and teaching profession of teachers in different career stages. *Teaching and Teacher Education, 125*, 104063.

2. Al-Dababneh, K. A., & Al-Zboon, E. K. (**2017**). Can teachers' self-reported characteristics and beliefs about creativity predict their perception of their creativity practices in the classroom? *International Journal of Special Education, 32*(4), 723-745.

3. Al-Dababneh, K. A., Al-Zboon, E. K., & Ahmad, J. (**2019**). The creative environment: Teachers' perceptions, self-efficacy, and teaching experience for fostering children's creativity. *Early Child Development and Care, 189*(10), 1620-1637.

4. Ansley, B. M., Houchins, D. E., Varjas, K., Roach, A., Patterson, D., & Hendrick, R. (**2021**). The impact of an online stress intervention on burnout and teacher efficacy. *Teaching and Teacher Education, 98*, 103251.

5. Apak, J., Taat, M. S., & Suki, N. M. (**2021**). Measuring teacher creativity-nurturing behavior and readiness for 21st century classroom management. *International Journal of Information and Communication Technology Education (IJICTE), 17*(3), 52-67.

6. Coronel-Santos, M. A., & Ramírez-Montoya, M. S. (**2020**, October). An instrument to assess the research culture in formative processes: The validation of the instrument. In *Eighth International Conference on Technological Ecosystems for Enhancing Multiculturality* (pp. 803-809).

7. Hernández-Torrano, D., & Ibrayeva, L. (**2020**). Creativity and education: A bibliometric mapping of the research literature (1975–2019). *Thinking Skills and Creativity, 35*, 100625.

8. Hoseini, A. S. (**2014**). Survey the influence of the creativity teaching model on teachers' knowledge, attitude, and teaching skills. *International Journal of Sociology of Education, 3*(2), 106-117.

9. Ibrayeva, L., Helmer, J., & CohenMiller, A. (**2022**). "Thinking outside the Yurt": Kazakhstani upper secondary school teachers' beliefs about the nature of creativity and creative students. *Thinking Skills and Creativity, 46*, 101176.

10. Koellner, K., Jacobs, J., Borko, H., & Seago, N. (**2022**). Current trends, tensions and unresolved issues in research on teacher professional learning. *International Encyclopedia of Education: Fourth Edition*, 550-561.

11. Liu, H. Y., & Wang, I. T. (**2019**). Creative teaching behaviors of health care school teachers in Taiwan: Mediating and moderating effects. *BMC Medical Education, 19*, 1-10.

12. Lyailya, I., Amangeldy, K., Lyailya, B., Seidaliyeva, G., Gulnara, A., & Erzhan, E. (**2022**). Enhancement of scientific research function of future teachers in modern education system. *Cypriot Journal of Educational Sciences, 17*(3), 741-751.

13. Musaeva, D. M. (**2022**). Development of professional thinking of future specialists in the educational process. *KRS Journal of Social Education, 2*(2), 56-61.

14. Nemeržitski, S., & Heinla, E. (**2020**). Teachers' creative self-efficacy, self-esteem, and creative teaching in Estonia: A framework for understanding teachers' creativity-supportive behaviour. *Creativity. Theories–Research-Applications, 7*(1), 183-207.

15. Nguyen, D., Pietsch, M., & Gümüş, S. (**2021**). Collective teacher innovativeness in 48 countries: Effects of teacher autonomy, collaborative culture, and professional learning. *Teaching and Teacher Education, 106*, 103463.

16. Olvido, M. M. (**2022**). Developing research cultures in teacher education institutions: The gestation-expansion-maturation theory. *Routledge Open Research, 1*(14), 14.

17. Olvido, M. M. J. (**2021**). Developing research culture: An outcomes perspective. *Journal of Research Administration, 52*(1), 15-37.

18. Ou-sekou, Y., Kaddari, F., & Zaid, A. (**2021**). Characterizing the digital culture of prospective primary school teachers. *Education Research International, 2021*(1), 9968216.

19. Ouyang, F., Hu, Y., Zhang, Y., Guo, Y., & Yang, Y. (**2021**). In-service teachers' knowledge building during face-to-face collaborative learning. *Teaching and Teacher Education, 107*, 103479.

20. Pazin, A. H., Maat, S. M., & Mahmud, M. S. (**2022**). Factors influencing teachers' creative teaching: A systematic review. *Cypriot Journal of Educational Sciences, 17*(1), 240-254.

21. Puozzo, I. C., & Audrin, C. (**2021**). Improving self-efficacy and creative self-efficacy to foster creativity and learning in schools. *Thinking Skills and Creativity, 42*, 100966.

22. Radzabova, K. N. (**2021**). Pedagogical conditions for improving research activity in future primary school teachers. *International Journal of Human Computing Studies, 4*(1), 20-24.

23. Rahmatova, F. (**2021**). The formation of research competencies of future primary school teachers. *Boshlang'ich ta'limda innovatsiyalar, 1*(Архив № 2).

24. Rubenstein, L. D., McCoach, D. B., & Siegle, D. (**2013**). Teaching for creativity scales: An instrument to examine teachers' perceptions of factors that allow for the teaching of creativity. *Creativity Research Journal, 25*(3), 324-334.

25. Sharma, E., & Sharma, S. (**2018**). Creativity nurturing behaviour scale for teachers. *International Journal of Educational Management, 32*(6), 1016-1028.

26. Sharma, S., Sharma, E., & Mirosnik, K. (**2021**). Factorial structure and internal consistency of the Russian version of Teachers Creativity Nurturing Behavior Scale (TCNB).

27. Sheridan, L., Andersen, P., Patulny, R., McKenzie, J., Kinghorn, G., & Middleton, R. (**2022**). Early career teachers' adaptability and resilience in the socio-relational context of Australian schools. *International Journal of Educational Research, 115*, 102051.

28. Shi, L., Chen, S., & Zhou, Y. (**2023**). The influence of social capital on primary school teachers' creative teaching behavior: Mediating effects of knowledge sharing and creative teaching self-efficacy. *Thinking Skills and Creativity, 47*, 101226.

29. Sultanbek, M. (**2015**). Pedagogical problems of primary school teachers' professional preparation. *Procedia-Social and Behavioral Sciences, 197*, 2490-2493.

30. Syzdykbayeva, A. D., Bainazarova, T. B., & Aitzhanova, E. N. (**2015**). Formation of research competence of the future elementary school teachers—in the process of professional training. *International Education Studies, 8*(4), 200-209.

31. Tan, X., Chen, P., & Yu, H. (**2022**). Potential conditions for linking teachers' online informal learning with innovative teaching. *Thinking Skills and Creativity, 45*, 101022.

32. Toshpulatovna, B. S. (**2021**). Development of creative competence of future primary school teachers based on art-pedagogical technology. *Asian Journal of Multidimensional Research, 10*(5), 708-714.

33. Tubb, A. L., Cropley, D. H., Marrone, R. L., Patston, T., & Kaufman, J. C. (**2020**). The development of mathematical creativity across high school: Increasing, decreasing, or both?. *Thinking Skills and Creativity, 35*, 100634.

34. Turakulov, X. A., Toraqulova, I. X., & Rakhmatova, F. A. (**2021**). Preparation of future primary school teachers for intellectual activity. *ACADEMICIA: An International Multidisciplinary Research Journal, 11*(12), 554-556.

35. Tusheva, V. (**2021**). The phenomenon of a future teacher's scientific-research culture under the new socio-cultural conditions. *JETT, 12*(1), 147-153.

36. Van den Broeck, L., Demanet, J., & Van Houtte, M. (**2020**). The forgotten role of teachers in students' educational aspirations. School composition effects and the buffering capacity of teachers' expectations culture. *Teaching and Teacher Education, 90*, 103015.

37. Verhoef, L., Volman, M., & Gaikhorst, L. (**2022**). The contribution of teachers of research-intensive teacher education programmes to a culture of inquiry in primary schools. *Professional Development in Education, 48*(5), 861-877.