Research into the Conditions and Criteria for Developing the Creativity Potential of Secondary School Students

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ABSTRACT

The current situation in education requires new necessities for training students of secondary schools, which proves the fact that acquiring only subject knowledge is not enough to be a competitive graduate, it is necessary to develop personality abilities that reveal students` individuality and creative potential.
Thus, the purpose of the study named "Research into the conditions and criteria for developing the creativity potential of secondary school students" is to identify the most appropriate conditions for developing students' creative potential at secondary schools, which is considered to be the means of intensifying the creative component of the student's personality. Mixed method was employed for the study, which identified the conditions and criteria, which contribute to the improvement of students` creativity within the program of subject curricula in secondary schools. The results of the study showed that the both administration staff and teachers of secondary schools require theoretical and methodological support due to their insufficient knowledge and practice on improving students` creativity potential. The study results can be helpful foe the main stakeholders of the secondary education including school authorities, teachers, students as well as their parents. It was concluded that the secondary school education provides not only the development of subject knowledge and skills, but also it gives a real opportunity for professional creative self-realization of future school graduates. In this regard, the development of creativity of students has become especially relevant.

Keywords
creative potential, creativity, motivational component, intellectual component, self-realization

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Introduction

The problem of creativity and creative potential is called as the problem of the century by scientists-psychologists. Despite the huge number of definitions of creativity (over 100), there is still no consensus on what creativity is. The first theoretical and practical studies in this area belong to the American psychologist Joy Paul Guildford [1, p. 12], who introduced the term "creativity," in 1959, understanding under it a special kind of thinking - so-called divergent ("diverging, going in different directions") thinking, which allows many ways to solve the problem and leads to unexpected conclusions and results. Such thinking is opposed to convergent ("converging"), aimed at the only one right decision.
According to the theory of J. Guildford, the difference between divergent thinking and convergent thinking lies in the mental search for a solution to a given problem, which is carried out in different directions of the semantic space depending on the content of the problem, representing divergent thinking (Figure 1).

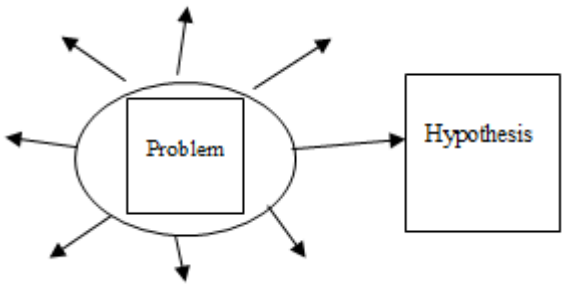

Figure 1. Divergent thinking.

Convergent thinking connects together all the elements of semantic space that relate to the problem, and finds only true composition of these elements (Figure 2).

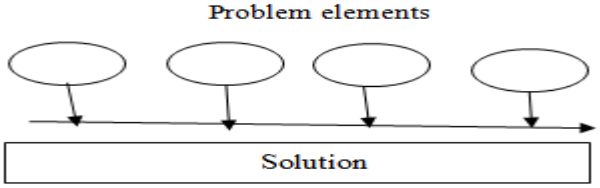

Figure 2. Convergent thinking

Unlike Guildford, S. Mednick [2, p.187] believes that in the process of creativity there are both convergent and divergent components; more precisely the division of the cognitive act into these components describes it inadequately.

According to S. Mednick [2, p.187], the process of solving the problem will be more creative if the elements of the problem are taken from remote areas. He states that the difference between a creative solution and a stereotyped one is determined not by the peculiarity of the operation, but by the ability to overcome stereotypes at the final stage of mental synthesis and the breadth of the field of associations. Thus, creativity does not preclude convergent thinking.

Despite the fact that the concept of creativity is considered to be the subject of a study of psychology, its interpretations are also presented in other sciences, among which the most interesting for our study are definitions in philosophy and pedagogy.

From the point of view of philosophy, creativity is the ability for creative thinking and human activity that transforms the natural and social world in accordance with the goals and needs of a person based on the objective laws of reality.

In pedagogy, creativity is considered from the perspective of problem situations and in general terms, it represents the ability to solve countless tasks in constantly changing circumstances: the ability to make decisions in various situations, and it also represents a set of the following competencies: the ability to declare your needs and interests; the ability to find other sources of information; the ability to make decisions in different pedagogical situations; the ability to generate original methods of solving the problem [165].

In psychology, the concept of creativity is interpreted in different ways: associative theory considers creativity from the point of view of the emergence of associations; gestalt psychology - from the point of view of productive thinking, psychoanalysis - from the perspective of the formation of creative energy and motivation of creative activity, humanistic psychology - through motivation and self-actualization. By summarizing all these psychological approaches, in our opinion, it is the appropriate definition presented in the dictionary of psychology: "creativity" is the creative potential and ability of the individual, which are manifested in mental acts, emotive act processes, in the process of communication with other individuals, as well as in various forms, types of activity, and activities associated with the creation - reproduction - by the production of certain objects"[119, 202].

Today, there are a huge number of definitions of the concept of "creativity" in foreign psychological and pedagogical research: J. Guilford [185] considers creativity as the ability to rethink the functions of an object and use it in a new quality. In his opinion, conformity is not inherent in a creative person. This allows her to explore the ways that other people, dare not enter because of the fear of seeming ridiculous in front of others. Thus, the creative person is characterized by low dogmatism and ambiguity of ideas about life and society, as well as about the meaning of their own actions.

Torrence [3, p.164] emphasizes sensitivity to problems and their awareness as a factor of creativity; as well as dissatisfaction with the lack of knowledge, the ability to find solutions, sensitivity to disharmony, conjecture, hypothesis formulation, and also agrees with J. Guilford, describing creativity in terms of thinking. In his opinion, creative thinking is "a process of feeling difficulties, problems, information gaps, missing elements, a bias in something; constructing conjectures and formulating hypotheses regarding these shortcomings, evaluating and testing these conjectures and hypotheses; the possibility of revising and checking them and, finally, summarizing the results." Based on the research, he came to the conclusion that the development of creativity is not influenced most by genetics, but by the culture in which a person is brought up and experimentally proved that the decline in creativity can be removed through special training.

Methods/Materials

The mixed method study included the following research instruments: general theoretical analysis of philosophical, psychological and pedagogical literature, study and generalization of pedagogical experience and scientific and methodical literature on the research problem, hypothesis construction, pedagogical modeling; empirical - questionnaires, testing, conversation, observation, diagnostics of the level of creativity, pedagogical experiment; statistical - determining the accuracy of matches and differences in the characteristics of creativity, confirmed by the methods of mathematical statistics.

Results and discussion

Our analysis of received data allows us to judge the degree of development of this problem in world practice and draw the following research findings:

1. At present, despite the great interest in the study of creativity by both domestic and foreign scientists, there is no single approach to the concept of "creativity". Creativity is the subject of a study of psychology, philosophy, pedagogy and it is considered as a product, personality, process and environment. In our study, we are in solidarity with scientists who consider creativity as a capacity for creativity, taking into account its divergent features.
2. The elective courses taught in the school such as "Graphics and Design" significantly contribute to the development of students' creativity. Based on this, it is worth highlighting the features of this process: firstly, the pedagogical orientation of education, and secondly, its artistic component, suggesting the development of both verbal (speech) and non-verbal (artistic) creativity.
3. Based on the analysis of theoretical material on the research problem and the revealed features of the development of creativity of secondary school students, we determined the structure of creativity of secondary school students, which is a combination of the following components:

- motivational-value (interest in creative ways of mastering the material; needs for self-realization; motivation for studying at school);
- cognitive (volume of knowledge; speed of completing tasks; meaningfulness of acquired knowledge, ability to use skills in practical activities.);
- praxiological (originality and fluency of thinking).

4. The creativity of secondary school students is understood as the ability to transform activities, which is based on motivation for learning, knowledge of production and pedagogical processes, and it is characterized by fluency and originality of thinking, manifested in the ability to generate non-standard and functionally applicable ideas to achieve a creative result in future professional activities.
5. In order to develop the creativity of students at the secondary school, we have identified and characterized pedagogical conditions:
1) enrichment of the educational content of secondary school education with their own life experience;
2) the inclusion of students in activities to solve professional problems;
3) ensuring the problematic nature of the educational process of secondary school students.
6. In our study, we turned to pedagogical modeling, as a result of which we created a structurally meaningful model for the development of creativity potential of secondary school students, which includes the goal, objectives, principles, stages, components, forms, methods, tools, pedagogical conditions, criteria and result. The introduction of this model in the educational process is designed to increase the level of students' knowledge, to positively affect their motivation; solve the problem of the content of training of students, select the necessary training technologies, develop originality and fluency of students' thinking. An experimental study was undertaken to test the validity of the proposals put forward by us regarding the effectiveness of the structurally-meaningful model for the development of creativity of secondary school students.
The characteristics of the pedagogical conditions, which, in our opinion, contribute to the development of students' creativity, were given in the theoretical chapter of the study. In the practical chapter of our study, we described the program for the organization of experimental work, the methodology for the implementation of pedagogical conditions, as well as present an analysis of the results and formulate conclusions.
In our study, we use the term "experimental work", meaning "independent research method". By experiment, following L. Noppe, we mean "a scientifically established test of an artificially induced phenomenon under precisely considered conditions, which allows us to monitor its development, progress, manage it and recreate it every time the conditions are repeated" [11, p.56].
The purpose of the experimental work of our study is to test the influence of the pedagogical conditions that we have identified on the development of creativity of secondary school students. The formulated goal defined specific tasks that we solved in the course of the experimental work: the choice of experimental sites and groups for the pedagogical experiment; determination of criteria and indicators of the level of development of creativity of secondary school students; clarification of the conceptual apparatus and the initial hypothesis of the study; conducting a stating experiment; development of diagnostic methods for the development of creativity of secondary school students; development of a plan and program for an experiment on the development of creativity, experimental verification of pedagogical conditions for the development of creativity; registration and analysis of the results of experimental work.
The appropriateness of the application of experimental work as an independent research method is significantly influenced by the system of general scientific and specifically scientific principles, which reflects the general requirements for the organization and conduct of experimental work. In our work, we relied on the following principles: The principle of objectivity, which involves: 1) verification of each fact by several methods; 2) fixing all manifestations of changes in the investigated object; 3) comparison of the data of our research with the data of other studies.
We were guided by this principle when developing programs for diagnosing the level of creativity of secondary school students, analyzing the results of a formative experiment. In addition, we applied the principle of efficiency. The essence of this method is that the results obtained should be higher than the results obtained in typical (standard) conditions at the same time, with the same material and financial resources. We were guided by this principle in the analysis and hypothesis, as well as in planning the conditions for conducting experimental work, tracking the experimental data obtained, their analysis and evaluation. When introducing the methodology for the development of creativity of secondary school students, we relied on such methodological approaches as personality-oriented, active, competent and motivational. The reliability of the results obtained in the experiment is largely determined by the conditions under which it was carried out, since these conditions can have a direct or indirect effect on the state or activity of the studied pedagogical object, thereby acting as uncontrolled experimental variables. We describe the conditions for organizing and conducting experiments.
Experiment was carried out by us in the natural conditions of the pedagogical process of one of the secondary schools in Kazakhstan. Students from Grade 7 to 12 took part in the experimental work. The age of f students varied from 12 to 17 years. The number of students in the control group is 65, and the experimental group consisted of 42 students.
Based on a theoretical analysis of the literature and study of the results of students' creative activities, we used the following scale to analyze the level of creativity of bachelors in teacher education: high, medium, low levels of creativity. Students with a high level of creativity are characterized by a wide range of knowledge, interests, including creative tasks, a conscious attitude to the matter, independent thinking, creative activity in non-standard situations, divergence of thinking, speed of solving a problem, criticality of the mind, offering a large number of solutions to problems and the ability to prove himself in all types of activities.
Students with an average level of creativity are characterized by the following indicators: their circle of interests and knowledge is already narrower than the students with a high level, they are distinguished by a slower pace of solving a creative problem, and the number of suggested ways out of situations is limited. Students with a low level of creativity do not have a pronounced interest in anything, but show selective activity and efficiency; they experience difficulty in solving creative problems and they are distinguished by indifference to the problem. Having determined the progress of students from a low level of

creativity to medium, and from medium to high, it is necessary to identify the criteria for these levels, as well as the mechanism for translating qualitative criteria into quantitative ones (Table 1).

Table 1.

Criteria and indicators for the development of creativity of secondary school students

Criteria	**Indicators**
Motivational value	necessity for self-realization; motivation for becoming life-long learner;
Cognitive	the volume of knowledge of students in various disciplines, the speed of completing graphic and test tasks and the meaningfulness of acquired knowledge;
Praxiological	the ability to use acquired knowledge in practical transformative activities, the ability to deviate from traditional patterns in the process of generating ideas, the ability to produce distant associations, the ability to propose a large number of solutions to the problem, the ability to quickly switch from one task to another.

The goal of the experiment was to determine the degree of development of students' creativity, as well as to identify students' attitudes to this problem and understanding its significance for the educational process as a whole. The data obtained as a result of processing the questionnaires allowed us to draw conclusions. Only 27.1% of the students surveyed believe that creativity is inherent in everyone, and it can be developed. 40.6% of respondents noted the genetic nature of creativity, and therefore not all people have creativity since birth. 18.1% of students explained the presence or absence of creativity by the social and living conditions in which the personality grows and develops. 14.2% of respondents admit that they never thought about this issue at all. At the same time, the vast majority of respondents (77.5%) are aware of the importance of creativity development and consider creativity to be a guarantee of a successful career in any field of activity. 14.8% of respondents believe that "this ability of a person is necessary only to people in particular professions only". 7.7% of students do not attribute creativity to the category of professionally significant qualities. According to the results of the survey, we concluded that students differently define the concept of "creativity".

In this regard, we suggested that the respondents explain what exactly they mean by "creative personality". It should be noted that only 7% of respondents found it difficult to give any answer to this question. The remaining 93% disclose this concept quite fully, but not always true, while mentioning its individual aspects only, which indicate that they do not understand the essence of the phenomenon under study. So, 36% of students identify the concepts of "creativity". In fact, creativity is more correctly defined not as a certain creative ability or a combination of those, but as a capacity for creativity, and these concepts are not identical although they are very close. 16% understand this concept as "non-standard, extraordinary thinking, and the ability to think creatively". Other definitions of "creative personality abilities" that deserve attention are "the ability to create something new" (9%), "the ability to be creative in solving problems" (8%), "well-developed fantasy, rich imagination" (6%) , "The ability to stand out from the gray mass, the crowd" (3%), "the ability to see the world differently" (3%), "courage, independence of opinion" (1.5%), and "the ability to see the unusual in the ordinary form" (1.5%), etc. The most correct interpretation of the concept was given by 9% of respondents, describing it as "creativity".

An analysis of the results of the study confirms our assumptions about the relevance of this problem, about the need for further searches for optimal solutions. The results of the questionnaire and conversations with teachers led us to the conclusion that the possibilities of educational material in the process of developing students' creativity are far from being used to a sufficient degree. In this regard, there was a need to experimentally substantiate the possibility of using educational material on the development of creativity of a secondary student. This explains the transition to the next stage of the experiment - the formative one.

The results of the ascertaining stage of the experimental work confirmed the idea of the need to create certain pedagogical conditions for the development of creativity of secondary school students. This section discusses the experience of implementing these conditions in the educational process of the secondary school. In developing and implementing pedagogical conditions, we relied on the opinions of psychologists and teachers about the impact of various types of training and conditions on the development of creativity. These include situations of incompleteness, openness, in contrast to rigidly defined and strictly controlled ones; encouraging a multitude of issues; promotion of responsibility and independence; emphasis on independence in observation, development, feelings, generalizations and conclusions.

In the framework of our study, we believe that the most important conditions stimulating the development of creativity secondary school students are the enrichment of the educational content of secondary school students with their own life experience; inclusion of students in activities to solve professional problems; ensuring the problematic nature of the educational process of secondary school students. The formative part of the experimental work was carried out according to the variational type, which is characterized by targeted variation in different groups with aligned initial conditions of individual parameters undergoing experimental research and comparison of the final learning results.

The experimental groups (EG) were distinguished by their orientation to various pedagogical conditions: in the first group, designated as EG-1, the 1st and 2nd conditions for the development of creativity of secondary school students were checked; in the second group, designated as EG-2, the 2nd and 3rd conditions were checked. In the control group designated as the CG, students were trained in the framework of the traditional system of organization of classes.

In order to test the hypothesis put forward by us, a methodology for the implementation of pedagogical conditions for the development of creativity of secondary school students was developed. The development of this methodology was carried out by us in accordance with the provisions of the main hypothesis, tasks, research stages, which are presented in the introduction to this work. In the process of implementing pedagogical conditions for the development of creativity of secondary school students, we relied on a number of fundamental works of domestic and foreign scientists: V.I. Andreeva, V.P. Bespalko, D. B. Epiphany, P.I. Pidkasisty, as well as Ya.A. Ponomarev, J. Guilford, E. Torrens and others. The introduction of these pedagogical conditions covered all the basic forms of students' activities: educational, extracurricular and research.

In educational activities, the pedagogical conditions that we highlighted were implemented in the form of business games, situational tasks, trainings and creative techniques, such as "6 hats of thinking", "Walt Disney method", the method of brain attack, the use of mental maps and clusters in solving problem situations . All of these techniques are based on the actualization of students' life experience and involve the student to solve professional problems. The main characteristic of these techniques is the presence of a problem that needs to be addressed.

In extracurricular activities, the technology of the comprehensive development of the student's creative personality and the activation of his motivational, cognitive, communicative, emotional and reflective areas were carried out. "Student Spring", "Freshman Debut", "Best Academic Group", social events, contests, competitions, organization of art exhibitions were the main components. In the professionally-oriented research activities, the creative potential of future bachelors of teacher education was updated in the form of projects, articles and reports and practice reports that contribute to the formation of cognitive activity and professional creativity.

In the control group, classes were conducted according to the traditional system. Students were given ready-made material without elements of problematicness and the seminars were traditionally reproductive in nature. Thus, students reproduced what they heard at the lecture, taking additional material from the recommended literature. The seminars were reduced to mastering the standards of other people's experience, and not to actualizing the students' own experience, due to the fact that the relations between the teacher and students were subject-objective, where the opinion of the teacher and the authors of the manuals was the only true one. However, we dwell in more detail on the methods for implementing the first and second pedagogical conditions:

1) enrichment of the educational content of secondary school students with their own life experience;

2) the inclusion of students in activities to solve professional problems. In order to increase the level of knowledge, one of the effective ways to make information significant for a student is to bring his life experience into it.

This is facilitated by the subject-subject relationship between the teacher and the student, aimed at including students in activities to solve professional problems. To implement these conditions, the teacher needs to create a relaxed atmosphere in his classes, which involves the active participation in all subjects of the educational process, where a special learning environment is formed, resulting from the interaction of teacher with students. Students can be included in activities to solve professional problems based on life experience in the first stage using appropriate situational practice-oriented tasks as a type of independent work. Situational tasks from practice can be different, but they must certainly be in the field of professional self-determination of secondary school students, and it should be significant and interesting for students. Situational practice-oriented tasks contribute to the immersion of students in professional activities, allow them to feel themselves in the role of the subject of the educational process, applying their knowledge and updating their life experience. The structure of this kind of task is as follows:

1. Goal setting
2. Justification of relevance
3. Collection and processing of information (analysis, synthesis, provision of reasoned conclusions)
4. Reporting the result (abstract, report, etc.)
5. Presentation
6. Reflection.

According to our observations, most students perceive situational practice-oriented tasks with enthusiasm, which is associated primarily with the topics of tasks taken from the real pedagogical process. Updating new, professionally significant information brings it closer to professional conditions and stimulates the desire not only to achieve constructive results, but also to show their knowledge and creative abilities, originality and fluency of thinking.

Conclusion

The article presents a theoretical and methodological justification for the development of creativity of students at secondary school, which allowed expanding the boundaries of scientific ideas about the subject of research, which was manifested in the definition of the conceptual apparatus and diagnostic tools of the research, the pedagogical support of this process was developed and implemented, and it proved its effectiveness in the course of experimental work. According to the purpose and objectives of the study, we made the following conclusions:

1. The theoretical prerequisites for the development of creativity of secondary school students have been identified due to the analysis of the problem development in the works of domestic and foreign scientists, which allows us to conclude that, despite the variety of definitions of the concept of "creativity", there is no a single approach to this problem. Researchers in this field identify large and small, primary and secondary types of creativity.

2. The concept of "creativity of secondary school students" is defined, which means the ability to transform activities, which is based on the needs for self-realization, knowledge in the field of pedagogy and design, characterized by the ability to quickly generate non-standard and functionally applicable ideas to achieve creative results in their future professional activities.

3. The components of creativity of secondary school students are highlighted: - motivational-value (interest in creative ways in mastering the material; needs for self-

realization; motivation for studying at school); - cognitive (volume of knowledge; speed of completing control tasks; meaningfulness of acquired knowledge.); - praxeological (the ability to use acquired knowledge in practical transformative activities, the ability to deviate from traditional patterns in the process of generating ideas, the ability to produce distant associations, the ability to propose a large number of solutions to the problem, the ability to quickly switch from one task to another).

4. Peculiarities of the development of creativity of secondary school students are revealed, taking into account the pedagogical and artistic orientation of education, consisting in the need to develop verbal (speech) and non-verbal (artistic) creativity.

5. A structurally substantive model for the development of creativity of secondary school students has been substantiated and developed, which includes the goal, objectives, principles, stages, components, forms, methods, tools, pedagogical conditions, criteria and results, allowing the contemporary education to increase the level of students' knowledge, positively influence on their motivation; solve the problem of the content of subject areas, select the necessary training technologies, develop originality and fluency of students' thinking.

6. The pedagogical conditions that ensure the effective development of creativity of secondary school students are identified, to which we include: enriching the educational content of secondary school education with true-to-life experiences; inclusion of students in activities to solve professional problems; and ensuring the problematic nature of the educational process at secondary school.

7. Criteria and indicators have been selected and adapted to measure the level of creativity of secondary school students: the motivational-value criterion consists of the following indicators: interest in creative tasks; self-fulfillment needs; motivation for studying at school, value attitude to future professional activities. The cognitive criterion included indicators such as the amount of acquired knowledge, the meaningfulness of acquired knowledge, the speed of completing control tasks, and the ability to apply knowledge in the real-life situations. We attribute the ability to deviate in thinking from traditional schemes, ability to produce unusual answers, and ability to produce distant associations, that is, originality and fluency of thinking to the indicators of the praxiological criterion.

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