

Teacher's Readiness For Innovation Through Practical Application Of New Approaches In The Updated Content Of Education

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Abstract

The objectives of this paper is to confirm the effectiveness of practical application of the Cambridge three-level program for the further teachers' training in the context of the teacher's readiness to innovation in the updated content of education. The introduction of the theoretical model created by us into a educational process has made it possible to increase the level of the creative, projective components of teacher's readiness for innovative activity. It's reflected in the productive nature of the educational students' achievements and activation of cognitive activity. The conducted research proved the didactic value of practical application this program on the learning motivation in the context of teacher's readiness for innovative activity. The positive impact of the practical implementation of this program has been empirically confirmed on the learning students' motivation.

It has been established that the implementation of the Cambridge three-level program is methodically accessible and has a positive effect on the motivational sphere of both teachers and students, which affects the effectiveness of the educational process. Theoretical and practical knowledge helped to transform teaching style, a change in a teacher's attitude and work style takes place in a collaborative environment, corresponding to the direction of changes in thinking, teaching style and expansion of his methodological arsenal.

Keywords :innovation; teacher's readiness, professional competence, new approaches; cognitive activity

Introduction

Successful experiences in reforming of the OECD countries confirm that the update of the education's content is guided by the challenges

of government priorities, international experience and domestic practices.

Kazakhstan, integrated into the world educational community, adheres to the main directions of the world-wide trends in the school system, where the transition from the

traditional reproductive method of education to a new constructive, competent model of education (UNESCO, 2016)

The quality of educational services depends to a large extent on the vocational training and teacher's qualifications and consequently the content of secondary education cannot be renewed without the professional development of teaching staff (Ruddock,1995).

Improving the quality of school teaching staff is more urgent today than ever, as global threats are threefold projected into the teaching profession and update the content of secondary education is impossible without the professional development of teaching staff. The competitiveness of the future teacher is determined by the high demands of the developing labour market.

The updating of the content of education is, first of all, the revision of the model of secondary education itself, its structure, content, approaches and methods of education and upbringing, the introduction of a fundamentally new system of evaluation of the achievement of pupils in the system of relationships "teacher – pupil". The whole range of measures taken to update the content of education is aimed at creating an educational environment conducive to the harmonious development and development of the individual.

The results of the renewal of the content of education should be that the educational achievements will be productive, and the actual learning process will be characterized by the active students' activity themselves in "obtaining" knowledge at each lesson. In these conditions, "...the student is the subject of his knowledge". The central figure of the educational process and its cognitive activities are the focus of the educational researchers (Barber, and Murshead,2008). To solve problems, where "...emphasis in education is shifted towards the "4c" model - development of creativity, critical thinking communication and cooperation skills"(Elorda, 2017).

Since September 2016, schools in Kazakhstan have transferred to the updated content of education. To change mindset,

professional understanding, practical teaching skills in 2012-2015 years has been successfully implemented a three-level program for the further teachers' training, developed by "Nazarbaev Intellectual Schools" in cooperation with the Faculty of Education of Cambridge University. Strategic Partner, University of Cambridge (UK) is the world's largest internationally renowned and world-renowned scholar. The content of the program was consistent with the Objectives of the Strategy for the Development of Kazakh Education and the recommendations of UNESCO and OECD. The updated syllabus of the courses is adapted to the specific subject matter and allows teachers to apply the knowledge and skills acquired in the course more effectively.

According to this program, teachers who have mastered the third (basic line) level implement the ideas of the seven modules within the classroom. Second (basic) level teachers implement ideas not only in the classroom, but also at the school level. Teachers of the first (advanced) level implement changes not only in the school, but also in network professional interaction. An innovative aspect of the project is a level approach to learning. The level-based approach involved a change in thinking, working methods and tools (Teacher's guide "Nazarbayev Intellectual Schools", 2014).

Discussion

Successful teaching, a system of constituent teacher's characteristics becomes possible when certain conditions are created on which the teacher is equally dependent. According to Shulman's theory, quality teaching can be presented as a symbiosis of learners, the environment and the conditions for teaching and learning. The characteristics of a successful teacher are professional understanding, practical teaching skills, professional and moral integrity. In order to translate change into school development, we will focus on key factors in level program (Shulman,2007).

Table 1. School development promotion factors

Key factors	Teacher's Leadership in classroom	Teacher's Leadership in School	Teacher's Leadership in School and school networks

	Third (basic line) level	Second (basic) level	Level 1(advanced)
Mindset	How do we learn? Learning to think critically. Identifying talented and gifted students	Learning how to learn Teamwork in groups	Networking and networking School Development planning
Methods of work	Methods of Work Dialogue learning Reflections on the practice	Coaching and mentoring Lesson Study Action Research	Leadership at school Network Professional Associations
Tools for the work	Peer review and self-evolution Medium-term planning (series of incremental lessons) and evolution.	Plans for coaching and mentoring processes. Action planning	School Development Planning Research practice

It is known fact and international experience had shown the importance of the quality of education in the innovative development of the economy, both in the training of highly qualified specialists and in the development of knowledge-intensive technologies in various sectors of production. According to the recommendations of international and official documents, innovation is understood as the end result of innovation in the form of a new or improved product (process) used in practice. Innovation is defined as a change in any area of societal development aimed at achieving a positive effect, expressed as the competitive advantage of the object of the change (Alexeeva,2017).

The Law of the Republic of Kazakhstan "On Innovation" defines as follows: "Innovation activity - activity aimed at the introduction of new ideas, scientific knowledge, technologies and types of products in different areas of production and management of society. The results of which are used for economic growth and competitiveness"(Elorda, 2006).

The issues of the teacher's professional development and readiness for innovative activity are reflected in the works of Kazakhstan's scientists –Zhaitopova A.A, Taubaeva S.T, Karaeva J.A, Kobdikova J. In understanding the essence of innovative processes in education, professor Kosherbaeva A.N sums up, "...there are two major problems of pedagogy – the problem of studying, generalizing and disseminating the best pedagogical practices and the problem of implementing the achievements

of psychology-science, teaching science in practice" (Kosherbaeva,2018).

The professional development by A. Zhaitopova is considered as a process of change, transformation of pedagogical activity, leading to sustainable development of professionalism, based on competence of personal development. The author distinguishes three levels of professional development: level of change, level of transformation, level of sustainable development. The innovative performance of a teacher is an indicator of the development of his professional competence, where professional self-knowledge leads to a teacher's need for professional self-improvement (Zhaitapova,2006).

According to professor Kolymbayeva S., teacher's professional self-improvement is a conscious, purposeful process of increasing his professional competence, developing professional qualities in accordance with external social requirements, pedagogical and personal development's program (Kolumbaeva,2016).

In the research of the Russian scientists, the readiness to innovation is understood as a set of qualities that determine its orientation towards the development of its own pedagogical activity and the activity of the entire school staff, its ability to identify current problems in the pupils' education to find and implement effective solutions.

Innovation is a set of scientific, technical and organizational actions aimed at creating and exploiting innovations by introducing them into the educational process.

The result itself is in the form of improved research methods, new results obtained. the creation of new products, principles (Grevtseva, Shvachko, and Osipova,2019).

The conceptual basis of the teacher's readiness is the results of the research of V.A. Slastenin and L.C. Podymova. They identify the structural components of innovation:

- Motivational - the personal significance of innovation, the desire for self-actualization;
- The ability to plan, the ability to create a concept of innovation;
- Cognitive knowledge of the theoretical and methodological basis of innovation;
- The ability to organize pedagogical experiments and the ability to combine traditional and innovative teaching methods;
- Creative openness to pedagogical innovation;
- Regulatory - the ability to manage the innovation process, to control the introduction and diffusion of innovation.

They are noted the following criteria for a teacher's willingness to innovate:

- Teachers' awareness of the need for innovation;
- Willingness to engage in creative innovation;
- Confidence that the innovation will yield a positive result;
- Coherence between personal goals and innovation;
- Readiness to overcome creative failures;
- The level of technological readiness for innovation;
- Positive evaluation of its past experience in the light of innovation;
- Capacity for professional reflection (Slastenin, and Podymova 1997).

According to V.A. Slastenin and L.Podymova four levels characterized teacher's willingness to engage in creative innovation.

The first level or an unstructured adaptive level that is characterized by an unsustainable attitude towards innovation. The new indifference, knowledge system and readiness to use it are lacking. Technological readiness is associated with the use of experience

Teacher's pedagogical activity is based on a preconceived scheme, algorithm, creative activity does not occur, innovation is mastered under the pressure of the social environment, At this level, innovation is not used in practice

The second profit level is characterized by a more stable attitude to pedagogical innovations, a desire to establish contacts with innovative pedagogues, and a higher degree of satisfaction with pedagogical activities. Creativity manifests itself in reproduction activities, but in the spirit of finding new solutions in standard conditions. A positive orientation of needs and interests is emerging towards the study of alternative approaches to the education and upbringing of children; thinking is characterised by copying ready methodological developments with little change in the use of working methods. Teachers are aware of the need for self-improvement.

The third level of heuristic innovation is generally characterized by greater focus, sustainability, awareness of the ways and means of innovation. Significant changes are taking place in the structure of the technological component, which reflects the development of the personality of the teacher as the subject of an alternative concept, technology or content of education. With a fairly reliable technology, the teacher continues to seek and discover new ways of pedagogical solutions.

Reflection, empathy that ensures the success of innovation, reduces risk and the rejection of innovation by the pedagogical community, occupy an important place in the structure of pedagogical thinking. Teachers at this level are new, learning new information from other groups

The fourth level creative is differed by highly effective sensitive, creative activity to problems. The positive emotional orientation of the activity stimulates the transition to sustainable transformative, active-creative and self-supporting work. The technological readiness of teachers is becoming holistic, methodological and analytical and reflexive. (Slastenin, and Podymova,1997).

Within of her research G.P. Novikova (Novikova,2016) identifies that "...components of the teacher's readiness for innovation are motivational and ethical, technological, organizational, cognitive".

The indicator of the motivational and ethical component is the degree of participation of the teacher in the tasks of

improving the educational activities of the school. The technology component is characterized by the degree of awareness of the means and technologies and their experience in dealing with the challenges of innovation management.

The organizational component is characterized by the degree of participation of the teacher in the division of responsibilities in the group, in the coordination and action of the group, in the resolution of differences between teachers, in the control and decision-making of the group. The cognitive component identifies primary information on the availability of the teacher's knowledge needed to implement innovation management functions.

Foreign researchers understand the teacher's development a competence as the development of the teacher's creative personality, the preparation for the adoption of a new one, the development of receptivity to pedagogical innovations. The pedagogical competence of a teacher is a continuous process which is constantly evaluated through interaction with colleagues, students (Kunter and Klustman, 2013).

The studies of H.Elrehail, O.E.Emegwali, A.Asaad, A.Alzghout consider innovations that require major changes in the organization, where the transformational management style is the most effective in the promoting innovations (Elrehail H, 2018)

The analysis of scientific research by R. Khatri, C. Henderson, R. Cole, D. Friedrichsen, C. Stan-ford allows to study the problem of adoption of scientifically based educational innovations. According to scientists, long-term thinking is relevant for the widespread introduction of new pedagogical innovations (Khatri, Henderson, Cole, Froyd, Friedrichsen and Stanford, 2017).

According to E.M.Sutanto, the creation of a creative environment, an atmosphere of universal desire for learning, development will lead to the emergence of new ideas. Leaders must demonstrate a strategy of cooperation, expansion of freedom, which creates a favorable climate (Sutanto E. M, 2017). F.Guay allows us to consider a conceptual model based on the theory of self-determination in order to study the motivation (external and internal) of teachers to use advanced technologies in practice (F.Guay, 2018).

The study of M.G.M. Koeslag-Kreunen, Marcel R.Van der Klink, Van den Bossche Piet, Gijsselaers Wim H. showed that teachers prefer to work in an atmosphere of exchange of ideas, experience and knowledge. They expect management not to control, but to cooperate (Koeslag-Kreunen M.G.M,2018).

Kauffman D, U.Diaz-Orueta, Y.Kauffman believe that introduction of innovations has become a challenge for the professional academic environment, as it has led to the emergence of completely new qualification requirements (Kauffman D,2018).

C.L.Weitze considers the problem of creating conditions in the teaching staff for successful innovation(WeitzeC,L,2018). Theoretical analysis of research of R.H.Stupnisky, A.BrckaLorenz, B.Yuha,F.Guay allows us to consider a conceptual model based on the theory of self-determination in order to study the teachers' motivation (external and internal) to use advanced technologies in practice (R.H.Stupnisky, A.BrckaLorenz, B.Yuha,F.Guay, 2018)

One of the leaders of the world's education rating, Singapore, offers 5 desired qualities to a teacher of the 21st century; an ethical educator, a competent and cooperative professional, a transformational leader and an active participant in community development (Almukhambetov,2018).

We share the opinion of Avakyan I.B. and Vinogradova G.A that "... innovative readiness is a complex mental state, including understanding of innovation goals, high motivation, evaluation and confidence in innovation performance" (Avakyan, and Vinogradova,2019).

Thus, analysis of the publications of domestic and foreign scientists led to the conclusion that the teacher's willingness to innovate is an indicator of his professional competence, understanding of the goals of innovation, based on the motives of professional self-realization, a set of motivational, cognitive, creative, reflective components that are interdependent and interrelated.

Methods and methodology

An examination of the current experience of the teacher's willingness to innovate, the content analysis of publications on the relevant problem in the academic circles of domestic and foreign scientists led to the

conclusion that the study requires the use of a psycho-diagnostic complex, which can measure the impact of new approaches on the productivity of innovation by teachers in meeting the challenges of improving the educational process. The main method of this research was a set of methods of scientific and pedagogical research, observation and questionnaire to detect changes in the development of teacher's professional competence and its readiness to innovative activities.

The pedagogical experiment took place at the secondary school 14 in Kokshetau from 2017 to 2020. Our conceptual empirical research consisted of the following phases: At the ascertaining stage, students of 7 grades participated as a pilot experimental group (EEG), students of 6 grades as a control group (CG)

The diagnosis of the initial and achieved level of the components, indicators of innovation the teachers' competence of the experimental and control groups was confirmed by the use of:

- “Teacher’s Sensitivity to the New NIS Diagnostic Collection” to identify the creative component (New NIS Diagnostic Collection,2014);
- “Diagnostic map of success” (according to I.V.Nikishina) for definition of projective component (Nikishina L.V,2011) .

The validation of the obtained data from the results of the research was tested by mathematical statistics using t-scientific Student criterion.

The pilot group was conducted using new approaches of Cambridge three-level program, active and interactive learning methods. Lesson Study brought together groups of teachers who jointly plan, teach, observe, analyze learning and teaching, documenting their findings. According to Dudley Pete, this approach allows teachers to be more aware and take into account the needs of each student throughout their practice, while not “overloading” their experience with secondary information (Dudley, P. (2011).

The main advantages of the Lesson Study cycle are:

- to see the students' learning in reality;
- to highlight the problems of children in the classroom and in teaching;

- to find out and understand how education planning can be changed to meet the needs of each pupil;
- the possibility of introducing innovations or improving pedagogical approaches.

In order to enhance professional competencies, culture of teachers' professional development was held coach sessions, master classes, which helped to deepen understanding of key ideas of the program “New Approaches in Learning”.

Correct SMART setting of lesson goals, evaluation methodology, lesson performance criteria, theoretical and practical knowledge helped teachers to transform teaching style in the light of new approaches to the updated content of education.

Mentors took an active part in the teachers' professional development as the attitudes and the teacher's style of work will change when immersed in an environment corresponding to the direction of change. A change in a teacher’s attitude and work style takes place in a collaborative environment, corresponding to the direction of changes in his thinking, teaching style and expansion of his methodological arsenal.

Results

The positive impact of the practical implementation of the new approaches of Cambridge three-level program for the further teachers' training has been empirically confirmed .on the learning motivation of students. Innovative pedagogical approaches to productive thinking are shaped by self-mainstreaming.

Within the framework of our study, the most relevant and reliable indicators will be considered:

- Creative (self-mainstreaming and self-realization, openness and personal relevance of innovation)
- Projective (ability to organise a pedagogical experiment, ability to create a concept of innovation).

In analyzing the empirical data from the teachers' tests, we used as statistical methods the calculation of the Student's t-criterion for 6 pairs and 2 independent samples as a means of assessing their validity and relevance.

At the first stage of the analytical work, empirical values of the Scientific criterion were calculated (table 2).

Table 2. Empirical values of the Student Criterion.

Scale names	Mean value in the control group		Mean value in the pilot group	
	before	after	before	after
Creative	8.45±0.887	10.7±0.865	10.15±0.813	15.9±0.718
Projective	29.3±1.031	37.55±1.986	47.95±1.82	57.6±1.231

The interpretation of the data showed a level of importance $p = 0.024$, which in the given study $p < 0.05$ can lead to a conclusion on the statistical reliability of the results of the teacher testing to confirm the experimental

hypothesis. In the second step, the zero hypothesis we test for normally distributed general populations with equal median values determined the t-criterion formula as follows:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{S_{\bar{x}_1 - \bar{x}_2}} \quad (1)$$

where standard denominator error:

$$S_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \quad (2)$$

On the basis of two independent samples of control group and experimental group, calculation of t-criterion where S_1 and S_2 are sample variance estimates has been carried out. Thus, at $t = 2.024$ the number of degrees of freedom $f = 38$, the resulting coefficient of $p = 0.001621$ indicates the statistical

significance of the measurement of these populations. Without taking into account the zero hypothesis of the equality of data averages, the probability of obtaining an erroneous result is about 0.1%. The true error, with a probability of 95%, is in the range -2.5 to -1.0.

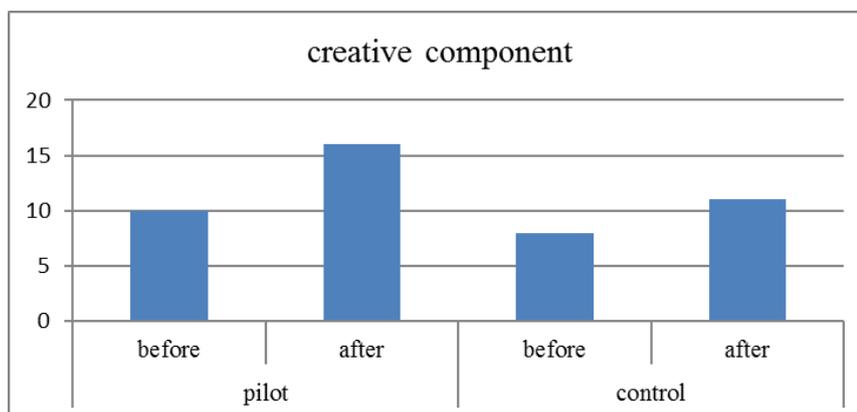


Figure 1. Average value of the creative component of the teacher's readiness to innovation.

The evolution of the average values of the creative component of the teacher's readiness to innovate shows that the results have changed significantly in the pilot group: Receptivity to pedagogical innovation (from 10.15 to 15.9 in the indicator "capacity to

produce many solutions" there is an increase (from 2.78 to 3.36).

With the help of the Student t-criterion it is established reliability of indicators' change of creative component of innovation competence of educators in EEG at high level of statistical significance: $t_{st.} \geq t_{cr.}$ and $\alpha_{cr.} < \alpha$.

Since the creative component of innovation competence is determined by the potential of the teacher's need for new,

intellectual activity and trying to fit abilities to the best of his abilities.

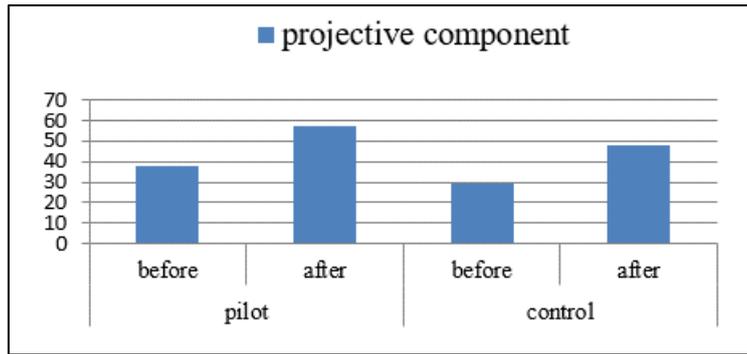


Figure 2. Average indicators of the projective component of teacher's readiness to innovation

components in the pilot group as creative (10.15 to 15.9, projective from 37.7 to 57. It is less pronounced in the control group. .

The results confirm that the most positive changes in the pilot group after the pilot work were in the area of creativity (self-mainstreaming and self-realization, openness and personal relevance of innovation), projective (ability to organize a pedagogical experiment, ability to create a concept of innovation) from 37 to 57.

During the formative and declaring phases of the experiment, we noted an increase in the mean value of such

At the acknowledgement stage, teachers encountered the following difficulties

- (1) Curriculum Planning -23%
- (2) Achievement of SMART Goal-19%
- (3) Introduction of program New Approaches-22%
- (4) Learners Assessment -19%
- (5) Learners of Age 22%
- (6) Building a Collaborative Environment -19%
- (7) Reflex of One's Own Practice-20%

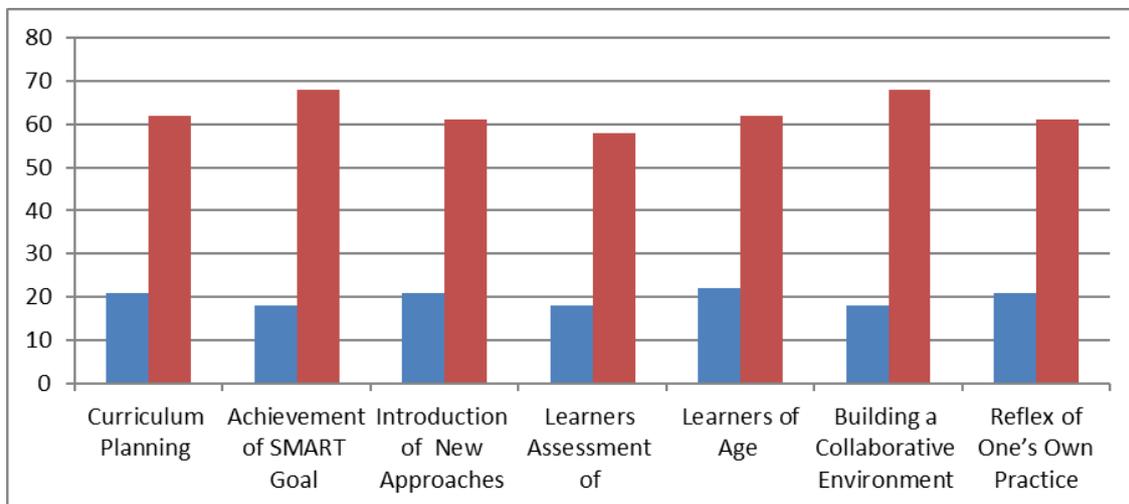


Figure 3. Dynamics of the teachers' competences in the pilot group at exit

The dynamics of the teacher's mastery of professional competences at the exit show that there is a tendency to consciously understanding the effectiveness of the program's implementation the in practice.

- (1) Curriculum Planning -63%
- (2) Achievement of SMART Goal-69%
- (3) Introduction of program New Approaches-52%
- (4) Learners Assessment -59%

- (5) Learners of Age 62%
- (6) Building a Collaborative Environment -69%
- (7) Reflex of One's Own Practice-62%

We have evaluated the evolution of the teachers' professional development in the pilot group according to two criteria: competence in personal development and technological skill.

Indicators such as noted the level of satisfaction of the teachers' pilot team:

- Increasing motivation to learn from pupils;
- Lessons learned using program modules;
- An opportunity for experimentation in class;
- A positive development in pupils' achievements;
- Increasing motivation to teach.

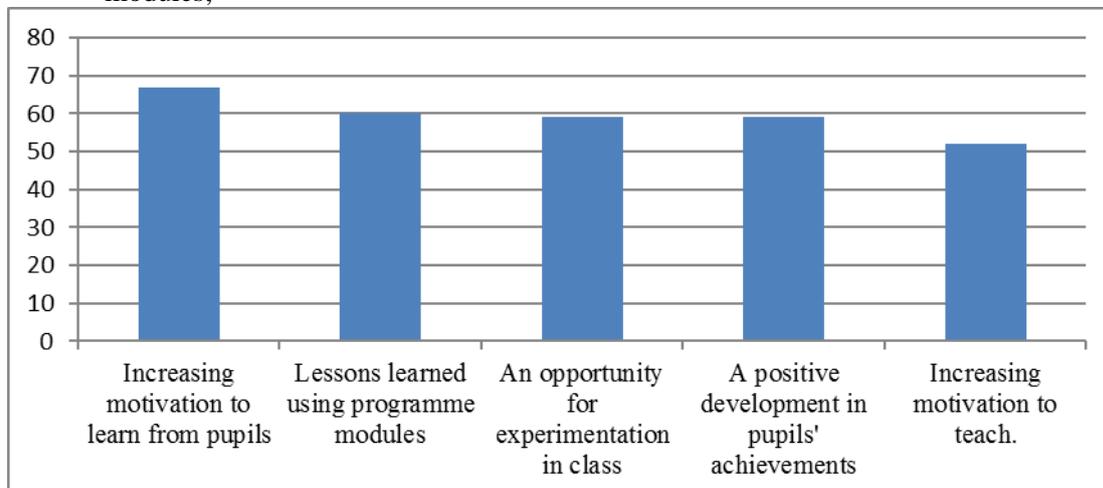


Figure 4. Educational satisfaction of the teachers' pilot group.

Harmonization of curriculum content, teaching methodology and evaluation is one of the most important principles of the updated educational programs, contributing both to the student's progress and to the teacher's methodological excellence. We have considered that the teachers of pilot group are qualified on the level of heuristic innovation. It is generally characterized by greater focus, sustainability, awareness of the ways and means of innovation. Significant changes are taking place in the structure of the technological component, which reflects the development of the personality of the teacher as the subject of an alternative concept, technology or content of education. With a fairly reliable technology, the teacher continues to seek and discover new ways of pedagogical solutions. A characteristic feature of professional motivation is the focus of innovation on the student.

Answering the question "What motivates you to innovate in the pedagogical process?", teachers with professional motivation gave the following answers:

-striving for more stimulation of children (38%);

-the desire to achieve better assimilation of knowledge and skills by students (39%);

-the desire to develop the creative abilities of students (23%)

The motives of self-realization occupy a rather high place in the system of motives for the teacher's innovative activity, they were noted by 27% of teachers.

Conclusion

The introduction of the theoretical model, created into the whole educational process has made it possible to increase the level of creative, projective components of teachers' readiness for innovation.

Positive changes in the teaching practices of the teachers' pilot group through changes in the way of thinking, working methods and working tools have had a positive impact on the motivational aspects of the activities of both pupils and teachers.

Correct SMART setting of lesson goals, evaluation methodology, lesson performance criteria, theoretical and practical knowledge helped teachers to transform teaching style in the light of new approaches to the updated content of education.

A change in a teacher's attitude and work style takes place in a collaborative environment, corresponding to the direction of changes in thinking, teaching style and expansion of his methodological arsenal. Innovative pedagogical approaches to productive thinking are shaped by self-mainstreaming. The use of active and interactive methods, Lesson Study influenced the increase of motivation, the satisfaction of

professional competences. According to the teachers' of pilot group, the lack of readiness to manage and correct innovative activity was one of the most difficult tasks.

The results of the implementation of key ideas of level programs are most obvious in such indicators as

- a positive psychological climate in the classroom;
- motivation for learning;
- opportunities for professional growth and teacher's professional self-realization;
- expanding the methodological arsenal with new competencies

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