The European Proceedings of
Social & Behavioural Sciences
EpSBS

Future Academy

ISSN: 2357-1330

http://dx.doi.org/10.15405/epsbs.2017.08.02.96

IFTE 2017
III International Forum on Teacher Education

SELF-ESTEEM AND EVALUATION OF FUTURE MATH TEACHERS FOR PROFESSIONAL DEVELOPMENT

N.V. Timerbayeva* (a), E.I. Fazleeva (b), K.B. Shakirova (c)
*Corresponding author

(a) N.V. Timerbayeva, Kazan Federal University, Kazan, Russia, timnell@yandex.ru, +79503237498
(b) E.I. Fazleeva, Kazan Federal University, Kazan, Russia, elmira.fazleeva@mail.ru, +79375293229
(c) K.B. Shakirova, Kazan Federal University, Kazan, Russia, shakirova_ka@mail.ru, +79503190897

Abstract

The relevance of the problem stated in the article is determined by the fact that success in professional teaching activities depend on skills to analyze and evaluate pedagogical activity and based on this to plan, and organize further actions.

The purpose of the article is to identify ways to improve professional development of future mathematics teachers at the Institute of Mathematics and Mechanics of KFU, based on a comparative analysis of students' self-esteem and expert evaluation of professional skills necessary to organize teaching activities.

The development of meaningful comprehension of his pedagogical capabilities and qualities plays a significant role in the formation of professional self-awareness in future teachers. Adequate self-evaluation of professional training becomes the basis for successful future teaching activities.

The leading methods of research of this problem are questionnaires, written interviews, conversations, testing, and studying of 4-5th year students' teaching practice documents from 2012 to 2017.

The study has showed that students' self-esteem and evaluation differ before and after teaching practice, they depend on the level of their subject and methodological training. If 4th year students are optimistic about their opportunities in organizing pupils' educational and cognitive activities since they have not faced a real teaching situation yet, then 5th year students' self-esteem becomes more adequate, real.

The main results of the research consist in revealing the unambiguity of the conformity of future mathematics teachers' self-esteem, and evaluating the professional preparation and constructing of individual plans for their further development.

Keywords: Professional development, future math teacher, evaluation and self-esteem of professional development.

http://dx.doi.org/10.15405/epsbs.2017.08.02.96
Corresponding Author: N.V. Timerbayeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

1. Introduction

Successful professional development in any sphere of human activity, including pedagogical activity, directly depends on the ability to analyze and evaluate results of the work, plan and correct further actions. Improving training of future teachers is based on self-esteem and self-analysis of the existing level of professional competencies, identifying professional deficiencies as 'dropping' of any pedagogical functions, and forming an individual plan for professional development.

Self-analysis can be considered as a means of creatively developing the personality. In this process, a student reflects on his own activity, determines features of this activity, and identifies methods, forms and means of achieving results, he further outlines ways and prospects for development of pedagogical experience (Kaverin, 2009).

Teachers and psychologists have always been interested in the question of self-esteem. Well-known researchers (Ananiev, Petrovsky, Rubinshtein, Shibutani, and others.) in their works have described constituent elements, functions, and conditions for the formation of adequate self-esteem in the development of a person. In their opinion, self-esteem performs a regulative function, affects the level of personal activity, determines its behavior and manages its activities. Researchers define self-esteem as a person's assessment of his capabilities and personal qualities. Petrovsky emphasizes that self-esteem is the result of the real I projection into the ideal I (Petrovsky, 1996).

Self-esteem is formed with the direct participation of a person, influences the person's behavior, and reflects inner content. Shibutani notes that if a person is an organization of values, then the core of this functional unity is self-esteem (Shibutani, 2000).

Rytchenko writes that based on self-knowledge, a person develops a certain emotional and value attitude toward himself which is expressed in self-esteem. Self-esteem involves evaluating abilities, psychological qualities, deeds, and life goals and opportunities for achieving them. It also evaluates the place of a person among other people (Rytchenko, 2000).

We define professional self-esteem of the future teacher as the student's outlook of himself as a specialist by juxtapositioning the real and ideal image of the model 'I am a teacher', formed in the process of teaching and professional activity in comparison with professors, teachers, other students and student himself.

2. Problem Statement

The review of psychological, pedagogical, and methodological literature, and pedagogical experience show that in the process of future teachers' professional training there is no qualitative self-analysis of the results of their teaching practice. First of all, we are talking about laboratory classes on the methodology of teaching mathematics and on active teaching practice. In our opinion, the main reasons for the absence of students' self-esteem is the lack of motivation and ignorance of techniques for its implementation. Consequently, students do not adequately estimate the level of development of their professional skills.

3. Research Questions

Improvement of the future teacher's conscious understanding of his professional capabilities and qualities plays a significant role in the formation of his professional self-awareness. Adequate self-esteem in professionally significant skills is the basis for the successful process of teaching. In this regard, our work is

http://dx.doi.org/10.15405/epsbs.2017.08.02.96
Corresponding Author: N.V. Timerbayeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

aimed at investigating the unambiguity of the conformity of self-esteem and evaluation of future mathematics teachers' professional training.

4. Purpose of the Study

The purpose of our research is to identify ways to improve professional development of future mathematics teachers at the Institute of Mathematics and Mechanics of KFU using comparative analysis of students' self-esteem and expert evaluation of professional skills necessary for the implementation of teaching activity.

5. Research Methods

To determine the self-esteem of the level of future mathematics teachers' professional skills, we organized questionnaires, written interviews, conversations, testing, studying the documents of 4-5th year students' teaching practices from 2012 to 2017. The questionnaire was made on the lists of self-esteem, evaluation and self-analysis. In addition, the first list was filled before students' teaching practice, the second was filled after given lessons off hand under the supervision of teachers, and the third list was completed at home with the help of lesson notes.

The first list was offered to students to identify their self-esteem in the formation of professional skills during the preparation for lessons, and during lessons, as the main form of organization of students' educational process. The results of answers are presented in list 1.

Table 01. List 1 Student's self-esteem

	Answers (%)	
Can you…?	4 курс Yes/ No	5 курс Yes / No
formulate the objectives of the lesson	80 / 20	70 /30
choose teaching methods in accordance with the objectives of the lesson	70 / 30	60 / 40
plan the lesson	100 / 0	90 /10
choose forms of organization of teaching at a particular stage of the lesson	70 / 30	80 / 20
rationally distribute time during a lesson	80 / 20	95 /5
create a problem situation and organize its solution in a lesson	80 / 20	60 / 40
objectively control pupils' knowledge and skills at different stages of the lesson	80 / 20	80 / 20
maintain discipline in the class	100 / 0	83 / 17
sum up results of the lesson	100 / 0	65 /35
formulate homework and explain it	100 / 0	90 / 10
Do you know how…?		
to provide the stage for the actualization of a lesson	100 / 0	70 / 30
to move from previously studied material to new material	74 / 26	95 / 5
to choose tasks for learning new material	65 / 35	86 / 14
to choose tasks for learning new material	100 / 0	100 / 0
to choose tasks for concomitant repetition	80 / 20	80 / 20
to prepare a test (dictation) in order to test the understanding of a new concept (mode of action, theorem, rule, algorithm)	87 / 13	100 / 0

http://dx.doi.org/10.15405/epsbs.2017.08.02.96
Corresponding Author: N.V. Timerbayeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

to analyze mistakes made in this test	80 / 20	90 / 10
to outline a plan for correcting mistakes made by pupils	80 / 20	75 / 25

List II tested the formation of professional skills in preparing a lesson on a given topic.

Table 02. List II Student's evaluation

Topics, type of the lesson	Answers
1. Formulate educational objectives of the lesson	
2. Enumerate teaching methods	
3. Plan the course of the lesson	
4. Give examples of tasks or questions for updating	
5. Think about the problem situation that can be created by introducing a new material on the topic	
6. Choose tasks or questions to move from old material to new	
7. Choose tasks to learn new material	
8. Choose tasks for concomitant repetition	
9. Give examples of tasks (dictations, etc) in order to test the understanding of a new concept (mode of action, theorem, rule, algorithm)	
10. Solve one of the situation tasks. 1) During the lesson one of the pupils disturbs a teacher (shouts from his place, comment on comrades' actions, plays with the phone, etc.). 2) A pupil tells the teacher that he did not understand a new topic. 3) A pupil quickly fulfilled all teacher's tasks and was distracted. What are your actions in this situation?	
11. Summarize the lesson	
12. How is the homework given and explained?	

List III was given to estimate the ability to make self-analysis after a lesson.

Table 03. List III Student's self-analysis

Topics, type of the lesson	Answers
1. Objectives of the lesson on the topic. Expected results of the lesson. Correspondence of content, methods, ways, means of the goal.	
2. What methods and ways of teaching are used in the lesson? Comment on your choice. Wha problem situations can be created from introducing a new material?	
3. What methods of activating cognitive activity of pupils are used in the lesson?	
4. Motivation of educational activity of pupils. Formation of cognitive interest. Use of inter-subject communications, historical material, computer technologies in a lesson.	
5. Stage of actualization of knowledge, skills in a lesson on the topic.	
6. To define the stage of introducing new material in the lesson according to the following components: expected results, teaching methods, teaching forms, concrete ways to achieve results.	
7. Independent activity of pupils in a lesson. Forms of organization of independent work. Homework, instructions. Link between class and homework. Methods and ways for checking homework.	
8. Develop tasks of four level: A) the level of knowledge; B) the level of understanding; C) level of application; D) creative level.	
9. Stage of consolidation of the studied material. Establishing relationships with other concept with other topics, systematization of knowledge.	
10. A system for estimation of pupils in a lesson. Types, goals, functions, forms and means of control.	

There is an example of one of the points of self-analysis of a 5th year student on the topic "Function of the form $y = ax^2 + bx + c$, its features and graph'.

http://dx.doi.org/10.15405/epsbs.2017.08.02.96
Corresponding Author: N.V. Timerbayeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

№ 8. Developed tasks of four levels.

A) Level of knowledge

1) Which of the following functions is quadratic?

$а)\ y = 3x^2 + 5x - 2;$ б) $y = 3x - 2\ ;$ в)$y = 5x^2 - 7x;$ г)$y = 9x.$

2) Name coefficients *a*, *b*, *c*.

$а)\ y = x^2 - x + 2;$ б)$y = 2 - 5x^2 - 7x;$ в) $y = x^2 + 2x;$ г)$y = -2x^2 - x.$

3) Create a square trinomial $ax^2 + bx + c$, where

$а)\ a = 2,\ b = -3,\ c = 4;$ б) $a = 1,\ b = 0,\ c = 4.$

B) level of understanding

1) Without construction, answer the question, where (up or down) the branches of the parabola are directed?

$а)\ y = x^2 - 3x - 2;$ б)$y = 2 - 5x^2 - 7x\ ;$ в)$y = -3x^2 + x.$

2) Write down the equation of the straight line which is the axis of symmetry of the parabola.

$а)\ y = 2x^2 - x + 1;$ б) $y = -5x^2 + 2x - 2;$ в) $y = -11x^2 + 2x + 1.$

3) Find the coordinates of the vertex of the parabola.

$а)\ y = 4x^2 + 8x + 1;$ б) $y = -3x^2 - 6x + 2;$ г)$y = 5x^2 - 10x + 4.$

C) level of application

1) Construct a function graph.

$а)\ y = x^2 + 4x + 5;$ б)$y = -x^2 + 2x - 1;$

в) $y = -x^2 - 3;$ г)$y = 2x^2 + 3x.$

2) Find the coefficient *c* and make the graph of the function$y = x^2 - 6x + c$, knowing that the least value of the function is 1.

D) creative level.

Make a report on the genesis of a quadratic function.

As you can see, tasks proposed by the student show that the student methodically knows how to choose appropriate material for the required competences. But at the same time, it is necessary to strengthen creative component. For example, to propose the following tasks.

1) make graphs of a quadratic function containing modules

а) $y = x^2 - 5|x| + 6;$ б) $y = |x^2 - 5x + 6|;$ в) $y = |x^2 - 5|x| + 6|;$

2) graphical solution of problems containing the parameter: Is parameter *a* from the zeros of the function $y = ax^2 - (a + 1)x + 2$ modulo less than 1?

6. Findings

As Table I shows (see Table 01), most 4th year students are quite optimistic about their ability to organize educational and cognitive activities of pupils because they have not experienced real teaching situations yet. This situation is different for 5th year students. They understand that they are not quite able to formulate the objectives of the lesson, to choose methods and forms of organization of education. It is complicated for them to create and resolve problem situations, and keep discipline. They cope badly with important elements of the lesson organization such as, actualization of knowledge and summarizing. All this proves that self-esteem of 5th year students are more adequate, more real.

Despite generally affirmative answers in list I, when students filled out list II (see Tables 01, 02) immediately after teaching practice, students did not formulate the objectives of the lesson correctly. Thus, some students usde the word '*to formulate'* (for example, to formulate skills in solving systems of equations, to formulate an algorithm for solving inequalities, to formulate the concept of the volume for a rectangular parallelepiped and etc.) instead of the necessary '*to form'*. Some students simply list the main educational results as '*to know'* (for example, to know how to make a multiplier for the root sign, to know what a root is, etc.) instead of '*to learn how to take a multiplier'*, etc.

Most students offered methods of teaching only by the source of knowledge (verbal, visual, practical). Methods on the nature of pupils' cognitive activity (explanatory-illustrative, partially-search-heuristic,

http://dx.doi.org/10.15405/epsbs.2017.08.02.96
Corresponding Author: N.V. Timerbayeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

problematic, research) were partially not reflected in many lists. Some students mixed teaching methods with the teaching forms (for example, a front-line survey) or with the ways of working in the lesson (for example, repetition of the learned material, work with the book, individual method of work in notebooks, work at the blackboard and etc.).

The stage of actualization is understood by many students as the repetition or consolidation of previously learned material without concretizing concepts and methods of action necessary for the lesson.

Some students did not understand what a problem situation was and did not know how to apply the method of expedient tasks. Meanwhile the need to create and use problem situations is determined by the possibility of forming positive motivation for learning and, accordingly, deep knowledge evolves. For example, it is possible to use a problem in mathematics (tasks with missing or surplus data, tasks with erroneous data, tasks with several solutions, etc.). Using problem situations in the teaching of mathematics is closely connected with the method of expedient tasks consisting the possibility to discover studied connections and regularities in the most rational way. With the help of expedient tasks, it is possible to demonstrate the necessity of introducing a new concept, feature or mode of action (Timerbaeva, Fazleeva, & Shakirova, 2017).

Some students wasted time, choosing a large amount of theoretical material without planning to regard practical applications. They did not pay enough attention to summarizing and formulating home works.

To solve the proposed situation problems, most students chose the simplest, the third given answer (to give a pupil a new, more complicated task from the textbook, explain the decision to the neighbor or follow pupils' work at the board and find their mistakes). Students believed that it is necessary to prepare an amount of additional interesting tasks for each lesson. Only a few students considered the second situation, supposing to explain misunderstood material after the lessons.

Thus, students of both courses, despite considered answers to the questions in List II, illustrated by good examples and problems, still demonstrated an overestimated self-esteem of professional skills that did not correspond to reality.

Further, let us single out mistakes revealed by the processing of List III (see Table 03). Students during the lessons and subsequent self-analysis of the lessons:

- did not think of staging interconnections between lesson;
- did not know how to organize the lesson in accordance with the goals;
- irrationally spent time at different stages of the lesson;
- made methodical and theoretical mistakes in explanation of the material;
- rarely used methods of activating pupils' cognitive activity;
- paid little attention to the motivation of pupils' educational activity and the formation of their cognitive interest;
- did not know how to lead students to an independent 'discovery' of new knowledge and methods of activity;
- did not know how to use explicit 'problem points', tried to explain everything themselves, hurried to point out mistakes, did not know how to see 'other's' ways of solving;
- did not use multi-level tasks, often focusing only on the pupils' level of understanding of the topic;
- ignored intermediate and final conclusions in the lesson;

http://dx.doi.org/10.15405/epsbs.2017.08.02.96
Corresponding Author: N.V. Timerbayeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

- did not have time to control and evaluate the activity of students;

- did not know how to create pupils' mood, etc.

It can be noted that self-esteem and evaluation differ among 4-5th year students, before and after teaching practice, they depend on the level of their subject and methodological training.

7. Conclusion

Based on the study of lists of self-esteem evaluation and self-analysis of students, individual plans for their professional development were developed.

We give some main methodological recommendations for professional qualities' development of the future teachers in the process of studying the discipline *The Methodology of Teaching Mathematics*.

1. Teach students to work professionally with the objectives of the lesson. To draw their attention to the fact that it is necessary to think of the goals of all levels: objectives of teaching this subject, objectives of unit, of the entire lesson, its parts, individual tasks, etc. Give an algorithm for formulating objectives of the lesson because a competently formulated goal is an optimal model of the expected result. We recommend regular reporting (deducing) of goals for pupils and formulating them together with pupils. Start all important parts of the lesson with clear goals and complete them with concise summaries which should be done with pupils.

2. Teach correctly to create problem situations and use expedient tasks, so as to deal with methodical ways of creating problem situations, such as knowing a contradiction and solving difficulties, presentation of different points of view on the same issue, encouraging pupils to make comparisons, generalizations, situation conclusion, comparing facts, and the formulation of problems (with conflicting data, with deliberately mistakes, with limited time given and etc.) or non-traditional tasks (with insufficient or excessive initial data, entertaining, practice-oriented, research and etc.).

3. More thoroughly, study the classification of teaching methods available in modern didactics and apply them correctly, depending on the purpose and type of the lesson. At the same time, special attention should be paid to methods of activating the educational and cognitive activity of pupils (Timerbaeva, Fazleeva, & Shakirova, 2016) as well as developing self-study skills.

4. Teach to find rational, methodically correct ways of solving problem situations proposed by teachers and pupils themselves. Development of various didactic or business games with different roles plays an important role. (Timerbaeva, & Fazleeva, 2016).

5. Teach to analyze and correctly choose specific material for a particular topic based on the methods of activity (for example, tasks for actualizing knowledge, for initial consolidation of knowledge, for repetition, for integrated application of knowledge, for propaedeutic, etc.), and different levels (for example, reproductive, productive, creative). Teach to determine the number of differentiated homework. Teach to give pupils advice about the most rational methods and time required to do their homework (Fazleeva, & Timerbaeva, 2017).

6. Analyze the process and results of teaching activity, to correct and improve them. Develop methodological materials for the implementation of self-esteem, self-analysis and analysis of lessons. Teach

http://dx.doi.org/10.15405/epsbs.2017.08.02.96
Corresponding Author: N.V. Timerbayeva
Selection and peer-review under responsibility of the Organizing Committee of the conference
eISSN: 2357-1330

to develop lists of reflections on each lesson of the methodology of teaching mathematics. Teach to create a methodological portfolio of personal professional achievements (Timerbaeva, Fazleeva, & Shakirova, 2016).

Realization of individual plans and data of methodological recommendations was done during 4-5th year teaching practice. Comparative results of students' self-esteem and teachers' evaluation of some students' professional skills are presented in Table 4.

Table 04. Self-esteem and evaluation of professional skills

Professional skills	4 year students		5year students	
	Self-esteem (5 points)	Teachers' evaluatic (5 points)	Self-esteem (5 points)	Teachers' evaluatic (5 points)
Planning lessons	5,0	3,7	4,5	4,2
Teaching	4,7	3,8	4,2	4,0
Maintaining discipline	5	3,6	4,1	4,0
Adequate control and pupils' knowledge evaluation	4,0	3,2	4,0	3,8
Analysis and self-analysis of lessons	2,5	2,0	3,3	3,0

Data given in the table show that 5th year students' formation of pedagogical skills are lower than 4th year students' because they have a higher quality (objectivity) of self-esteem. But the degree of coincidence of self-esteem and evaluation demonstrates growth and dynamics of adequacy of self-esteem.

Thus, it is obvious that self-analysis and self-esteem of the level of competence helps to identify problems in training and outline individual plans for professional development. The overriding objective of this research is to encourage students to determine the level of their professional development, and skillfully organize and control the process of self-development.

Acknowledgments

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

References

Fazleeva E..I, Timerbaeva N.V. (2017) Problems as a means of forming students' readiness for future professional activity. // Problems in teaching mathematics, physics and computer science: theory, experience of innovation. Materials of II International Scientific and Practical Conference dedicated to the 125th anniversary of P.A. Laricheva(2017) .Vologda, 155-159.

Kaverin Y.A. (2009) Technology of organization of teacher's creative self-development // Journal of TSPU / Volume 8, 36-40.

Petrovsky A.V. (1996) Introduction to psychology. Moscow: Academy, 496 .

Rytchenko T.A. (2000) Psychology and pedagogy: Educational practical guide. Moscow: MESI, 85.

Shibutani T. (2000) I-concept and self-esteem. Self-consciousness and protective mechanisms of personality. Samara: Bakhrakh. Moscow, 220-231.

Study on Willingness of Future Math Teachers to Enhance the Learning and Cognitive Activity of Students (2016) / Nailya V. Timerbaeva, Elmira I. Fazleeva, & Kadriya B. Shakirova // International Electronic Journal of Mathematics Education, vol. 11, NO. 6, 1901-1909.

Timerbaeva N.V., Fazleeva E.I., Shakirova K.B. (2016) Methodical portfolio of the future teacher of mathematics // Mathematical education in school and university: theory and practice (MATHEDU -

2016). Materials of VI International Scientific and Practical Conference, November 25 - 26, 2016 /. Kazan: Publishing house of Kazan University, 165-169.

Timerbaeva N.V., Fazleeva E.I., Shakirova K.B. (2017). Preparation of students for creating problem situations and use of expedient tasks in mathematics lessons. // 21st century: fundamental science and technology: a collection of materials of XI international scientific and practical conference. North Charleston, USA, Volume 1, 98-101.

Timerbaeva N.V., Fazleeva E.I. (2016). Development of students' creative activity on the methodology of teaching mathematics. Standardization of mathematical education: the problem of implementation and evaluation of effectiveness: Proceedings of the XXXV International Scientific Seminar of Teachers of Mathematics and Informatics of Universities and Pedagogical Institutes of Higher Education. Ulyanovsk: USPU, 109-116.