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## **Improvement of a mathematics teacher’s methodological competence – modern school requirement**

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### **Abstract**

A teacher’s methodological competence is a system integrated at the functional level and occupies a significant place in professional activities. The improvement of a maths teacher’s methodological competence is influenced by many factors.

**Key words:** maths teacher’s methodological competence; levels of methodological competence; factors affecting the improvement of methodological competence.

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### **Introduction**

The world we live in changes very fast, and knowledge becomes obsolete even faster. Leadership positions belong to those countries, organizations and people that possess the latest achievements of science, the most recent information, know how to receive, efficiently process and use them. This in general defines the new goals of education.

Educational strategy in Ukraine, as an integral part of the European educational space, assumes such collective educational activities that will ensure both a teacher’s self-realization and a student’s self-realization, promoting to the harmonious interaction with the highly technologized society that is developing very quickly. The aim and objective of modern school is to develop a well-educated person, who in modern society is not just a person with knowledge but a personality able to gain, acquire knowledge, do it purposefully, and if necessary, use it in any situation. The implementation of these goals and objectives can be provided by a teacher possessing high professional competence, one of the essential components of which is methodological competence. In pedagogy there is a well-known principle: intelligence is made by intelligence, character is brought up by character, personality is created by personality, successful students are educated by successful teachers. Continuous education of any teacher during his/her educational activities is designated to make a significant contribu-

tion to the formation of his/her professional competence based on knowledge, experience, abilities and his/her own activity. Activity as a personality feature implies that the teacher is a subject of activity and manages his/her own development taking into consideration common values and society needs. Many different factors encourage a teacher to do activities and they in particular provide education, professional and methodological competence. Implementation of methodological competence development system provides the formation of a certain level of a teacher's creative potential.

### **The main material**

The model of a teacher's methodological competence, which is an integrated system at the functional level, reflects the semantic basis of his/her professional activity. The main components of a teacher's methodological competence are: a) motivation – a set of needs, motivations, interests, value orientations, attitudes, adequate to the goals of teaching activity and their integrative systems (cognitive needs and interests, humanistic orientation, love for children, desire for personal self-realization in teaching activities, etc.):

- cognitive – a set of knowledge required to carry out teaching activities (subject knowledge, pedagogical, psychological basis for the organization and management of educational process, etc.);
- operational – a set of skills and abilities required to solve in practice teaching objectives and educational problems (ability to establish interpersonal contact, organize interpersonal interaction, organize and deliver teaching information, etc.);
- personal – a set of personal qualities important for professional teaching activity (communicativeness, responsibility, empathy, readiness for reflection, ability to self-examination and self-management) [Vezetiu 2012: 1].

Achieving pre-planned results enables the implementation of general practical questions: “Theoretical and practical preparedness as components of maths teachers’ methodological competence” [Skvortsov 2010: 2], “Formation of methodological competence of future teachers in the field of teaching mathematics in elementary school” was studied by Skvortsova [2010: 3], “Theoretical and methodological principles of forming methodological competence of a future mathematics teacher when teaching geometry to students” [Matias 2013: 4].

However, the improvement of a maths teacher's methodological competence during his/her professional activity is understudied.

In most researches the competence is defined as the degree of mastery of certain activities [Matias 2013: 4]. In a teacher's professional work the major place is given to methodological competence, under which in modern pedagogical studies we understand the degree of methodological work mastery, the es-

sence of which is the formulation and solution of methodological problems, which helps students to learn mathematics and provide their development in learning mathematics. “Methodological competence has a strongly pronounced applied nature and combines a system of specially-scientific, psychological, pedagogical, didactic and methodological knowledge, skills and personal experience in their application in mathematics teaching” [Skvortsova 2009: 5].

Analysis of professional publications of both Ukrainian and foreign scientists allows to draw the following conclusion: there is no single interpretation of the concepts “a teacher’s professional competence” and “a maths teacher’s methodological competence”. Different approaches to the disclosure of the concept content of “a maths teacher’s methodological competence” can be traced in scientific works by Akulenko, Kuzminskyi, Skvortsova, Tarasenkova and others [Akulenko 2013: 6]. The study of scientific sources gives an opportunity to draw attention to the fact that there is a difference between methodological competence of mathematics teachers and methodological competence of future maths teachers, the difference of which consists in available teaching practice of maths teachers and the lack of it of the others. Analysis of conducted researches showed that there is no consensus among scientists to determine the levels of methodological competence of both a teacher and a future teacher. In our opinion we have to distinguish the levels of maths teachers’ methodological competence of a small school, educational institution, teachers who work in specialized classes and classes with in-depth study of mathematics and teachers with the highest level of methodological competence who prepare students for different levels of competition, tournaments etc.

Since, according to scientists, there are different levels of a maths teacher’s methodological competence, then, in our opinion, it is advisable to study the following: what factors influence the formation of methodological competence of a maths teacher throughout his/her teaching activities. Since a maths teacher’s methodological competence is based on a certain level of theoretical and mathematical, psychological and pedagogical competence formation, then it is advisable to allocate a special aspect as one of the main factors that provides the presence of both mathematical training, and knowledge of teaching methods as separate questions taught at the courses of plane geometry, solid geometry, various sections of algebra as well as skills and their application. The second factor that forms methodological competence is the formed communicative competence, which includes the following: stable demand for systematic communication with students and capabilities for teaching communication and a teacher of mathematics should know the language of mathematics. The third factor that significantly influences the formation of methodological competence is the application of modern information technologies by a mathematics teacher that are available in the sense of possibility to obtain necessary information, educational services at

any time and from anywhere, provide individualization of the learning process and take into account previous experience of the teacher and his/her age. Another factor to enrich a maths teacher's methodological competence is his/her interest in the scientific and methodological development. One of the directions of interest and activity implementation is interactive training that prepares teachers for independent design and use of interactive technologies. Enrichment of maths teachers' methodological competence best corresponds to technologies of capacity development for analytical activities, interactive technologies, technologies of problem-based learning, case-method, project method, methods of creative activity encouragement, creative situations, educational and creative tasks. In my opinion, the process of development of maths teachers' methodological competence should involve the advantage to interactive learning technologies because they provide the most effective communication links between the one who teaches and the one who learns. Besides, interactive education to the maximum extent corresponds to psychological features and teaching laws of teachers, generally adults. The purpose to develop a teacher's methodological competence is to master such knowledge, skills, abilities, qualities which he/she lacks in order to achieve the appropriate level of competence. And here the important role is played by self-evaluation and diagnostics of a maths teacher's methodological competence, taking into consideration his/her subjective experience and commitment to self-development, self-learning, self-education. When analyzing the research results it was established that among various factors (motivation, participation in various forms of methodological work, study of prospective teaching experience, interest in the subject, etc.) that influence the formation of a maths teacher's methodological competence, motivation of teaching activity. The basis of motivation consists of needs and interests of the personality and it belongs to the most vital and complex problems of modern psychopedagogy. Analysis of psychological and educational literature gives the reasons to believe that the motivation, motives, incentives in teaching activities of teachers are within educational researches as they are related to competence assessment and certification of teachers in the future. However, motivation to improve a maths teacher's methodological competence requires substantial study. If the teacher has a clear motivation, his/her job satisfaction will necessarily lead to high results of teaching mathematics to students. Motivation is the process of stimulating teachers to carry out teaching activities effectively, and especially, methodological, aimed at achieving the objectives of the educational process. Motivation as a hierarchy of motives, provides purposefulness of teaching activities and is divided into external and internal. External motivation that occurs under the influence and pressure of external impulses such as requirements, orders, compulsions causes external discomfort in teachers.

This motivation is based on encouragements, penalties and other types of stimulation that either stimulate or restrain the improvement of both professional competence in general and methodological, in particular. Internal motivation that occurs, “originates” under the influence of internal discomfort (the teacher acts in order to get inner satisfaction from the process of teaching mathematics, get high appraisal from colleagues and a positive final result, the teacher himself/herself likes mathematics and raises interest in students to this subject) to a greater extent than external motivation contributes to the improvement of methodological competence. Internal motivation promotes to obtain satisfaction from the teaching activities, provokes interest, excitement, enhances self-esteem of teacher’s personality. Motivation, internal motives and incentives are largely dependent on psychological and educational atmosphere of educational environment in which the teacher works and communicates. High motivation of methodological competence development determines the purposefulness and responsible attitude of the teacher to training activities.

In modern education system the development of a maths teacher’s methodological competence loses its unsystematic nature and skills and abilities in teaching mathematics acquired at a higher educational institution become insufficient with the appearance of a young specialist at school, and when a teacher analyzes his/her activities, and compares its results with the achievements of his/her colleagues, especially with the experienced ones it gives him/her the grounds to draw the following conclusions: only continuous education throughout his/her professional career guarantees self-realization as a specialist.

Many years of experience and practice of working with teachers of mathematics, study and analysis of the experience of many of them lead to the conclusion that all the above mentioned factors contribute to the improvement of a teacher’s methodological competence. Everything a teacher achieves in his/her professional activity is prompted by the motivation.

Therefore, we can assume that the process of improvement of maths teachers’ mathematical competence as educational activities in general and the methodological in particular is exposed to both internal and external determination. The teacher of mathematics in terms of reforming education in the realities of modern life taking into account the requirements of methodological competence should pay attention to self-criticism, which characterizes the personality capable of self-realization, self-determination, self-consciousness.

Education of a teacher, his/her professional and methodological level of training should create, on the one hand, the possibilities, on the other, motivations to constant self-improvement throughout his/her life.

## Conclusions

The studies conducted showed the following: the problem of improving maths teachers' methodological competence will be solved efficiently only under the conditions of implementation of the above mentioned factors. Taking into consideration the importance of this problem in a mathematics teacher's teaching activities, its study is the main direction of methodological science and andragogics and motivational sphere of a maths teacher is a regulator of his/her activities.

Further study of the examined problem concerns the development of models improving a maths teacher's methodological competence at different periods of his/her professional activity.

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