

ACADEMIC SKILLS IN TEACHING MATH – SKILLS FOR IMPLEMENTING CERTAIN METHODS TO SOLVE PROBLEMS

Abstract: In this article are discussing learning skills in teaching Math and classification skills. Determine the location of ability to implement certain methods to solve problems in the general system of skills.

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Learning skills and habits are formed and manifested in the educational activity. Thus is formed them form the personality of the student in all its complexity and multiplicity. In the scientific literature various classifications of learning skills are published according to the base accepted by the corresponding author. We will look at some of the proposed classifications of teaching skills in teaching Math and will determine the location of the methods of problem solving and skills to implement them.

Usova classified learning skills according to the nature of cognitive; organizational; skills for self-control; evaluative skills. The author defines as primary cognitive skills, namely:

- 1). Ability to work with academic and scientific literature and on this basis to acquire knowledge alone;
- 2). Ability to conduct observations and on this basis to form conclusions;
- 3). Ability to independently model and build hypotheses;
- 4). Ability to independently perform an experiment and on this basis to obtain new knowledge.

We can take those cognitive skills above in 1) and 3) to learning math. N.F Talizina [2] classifies the types of skills-based cognitive activity and separates two main groups - general and specific. To the general skills she applies the following skills:

- skills to plan own work in all the techniques of logical thinking; To the specific skills she concerns such that are used in specific research activity/
- V.A.Kulko examined levels of skills development and defines [5]:
- The first level: the ability to act in a known pattern already in a familiar situation;
- The second level skill to operate in a modified situation on the basis of the selection of the previously known ways by a process of trial and error;
- The third level skills for productive activities with implementation of analysis by reference.

Mathematics education is realized as compulsory and specialized training in Bulgarian schools. It is aimed at mastering a certain system of knowledge and competences. Skills in mathematics education are classified according to activity and knowledge, which are associated. We will look at some of these classifications:

I. Iv. Tonov and D. Milkov [3] determine the following skills:

- Skills for calculations;
- Skills for understanding;
- Skills for “translation” of the mathematical condition;

- Skills for work on algorithms;
- Skills for sequence of reasoning;
- Skills for analytical-synthetically reasoning;
- Skills for proof of allegations;
- Skills for creation hypothesis and summaries.

II. The article “System of targets of mathematical education” of Ir. Mikulchat [4] defines skills as learning activities:

- Skills for calculations;
 - Skills for use algorithms;
 - Skills for geometric representation;
 - Skills for tasks solving;
- The skills for tasks solving includes:
- Knowledge of methods of solving tasks (deductive; analytical-synthetic, etc.);
 - Systematical approach in solving tasks (parsing, completeness examining, discussion);
 - Mastering the requirements of practice in problem solving (defining the necessary data, evaluation, control, etc.)
 - Ability to develop strategies in solving problems.

The classifications of skills in mathematics education stand the ability to solve problems, which is a genuine and determining the effectiveness of the training.

Skills in mathematics education are considered as a combination of composing skills, ie each skill is seen in a combination with other skills as a prerequisite to consciously and continuously forming a specific skill. Therefore, the formation of a particular skill in teaching mathematics should be determined the skills influencing its formation, that contribute for its effectiveness in its realization.

The sources analyzed [7], [8], [9], [10] and [11] regarding the skills of solving tasks, reveal its complexity and duration of many-composability formation. The main factors determining the ability to solve tasks, apply knowledge about methods of solving tasks. This confirms the thesis that the ability to implement methods to solve problems is composite and determining the effectiveness of training. The ability to apply the methods to solve tasks results from the system of targeted actions implemented over the concrete mathematical object (task).

Understanding the methods for solving problems and its implementation depends on:

- The skills to perform arithmetic operations;
- The ability to perform identical transformations;
- The ability to use drawing and its proper interpretation;
- The ability to properly implement studied mathematical objects;
- The ability to compile accurate inferences; the ability for analysis and synthesis.

On the other hand any skill incorporates individual habits, called by B.Minchev [12] “skilful habits”.

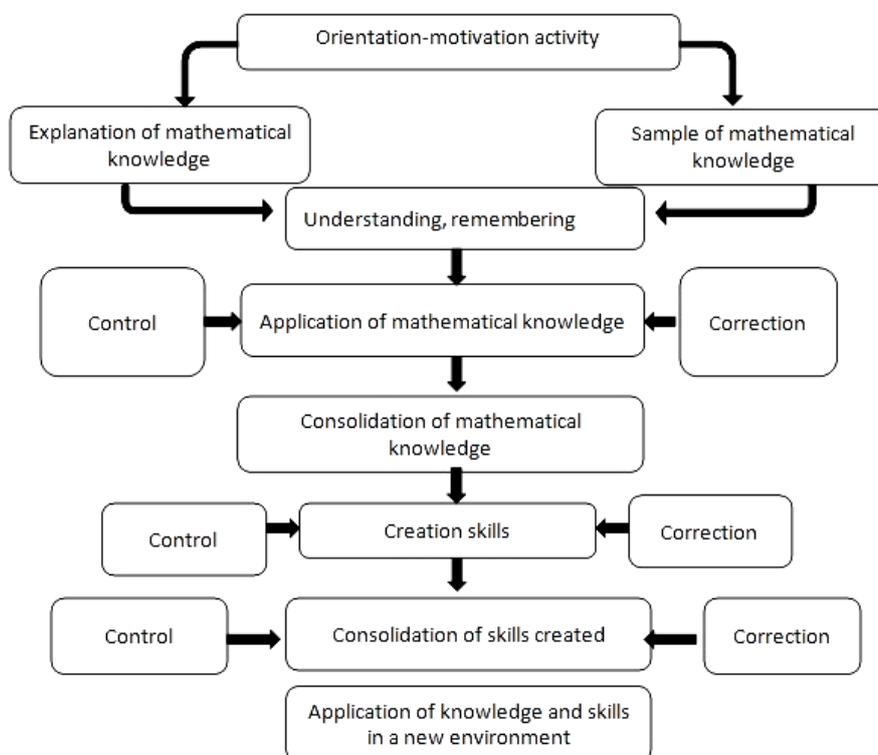
According to B. Minchev “skilful habits” are more flexible compared to learning habits because they remained conscious control.

In our opinion the structure of the ability to implement the methods of solving tasks can not identify these “skilful habits”:

- Determination of given and conclusion in the task;
- Understanding of the relationship between the given components;
- Ability to determine each set implication $A \Leftrightarrow B$ and opening of starting points for discovery of the decision;
- Detection of so-called “starting” ⁽¹⁾ knowledge in the condition of the task orientated method for solving;
- Use of didactic systems of properties and signs of studied mathematical concepts.

Learning methods to solve tasks and their application in teaching mathematics is long, purposeful process that depends on individual factors referred to in [13], [14] and “constituent skills and “skilful habits”, formed in unity with others and in relative autonomy.

Learning of any particular knowledge depends on the level of training and obuchаемостта students. The formation of knowledge in mathematics education and their relationship will be demonstrated in the following scheme:



Every stage has a control and correction of knowledge or skill in a classroom environment. To achieve this purpose it is necessary to ensure a sufficient number of teaching situations with the appropriate skill.

The structural diagram corresponds to the formation of skills and “skilful habits” determining the application of methods for solving tasks. The scheme contributes to the consistent formation of skills in mathematics education.

The process of formation of knowledge about methods of tasks solving and skills to implement is a long and purposeful, consistent with psychological and pedagogical development of students. The formation of knowledge about methods for solving tasks adds a complete system of knowledge and skill to solve tasks, leading to efficiency and durability in the utilization of mathematical knowledge.

References

1. **Usova, A., V., A., A., Bobrov, 1987:** Formirovanie u uchashhikhsya uchebnyk humenij. Moskva. Znanie, 1987, 80 s.
2. **Panajotov, A., N., Talyzina, N., Kiskinova, I., Volodarskaya, 1991:** Modeli na uchebno-poznavatelna dejnost po zoologiya. Universitetsko izdatelstvo “Sv. Kliment Okhridski”, Sofiya, 1991, 378 s.
3. **Milkov, D., Iv., Tonev., 1989:** Didakticheski testove po matematika. V: Obuchenie po matematika. Kn.2. Sofiya, 1989, s. 4-9.
4. **Mikulchat, Ir., 1985:** Sistemi ot tseli na matematicheskoto obrazovanie. V: Obuchenie po matematika. Kn. 2., Sofiya, 1985.
5. **Desev, L., 1986:** Pedagogicheska psikhologiya. CH. 2, SU, Sofiya, 1986.

6. **Ganchev, Iv., 1999:** Osnovni dejnosti na uroka po matematika. IF. Modul 96, Sofiya, 1999.
7. **Ganchev, Iv., 1976:** Za matematcheska zadacha. N.P. Sofiya, 1976.
8. **Esipova, P., B., 1976:** Osnovy didaktiki. Moskva, 1967, 234 s.
9. **Milushev, V., 2007:** Konstruirane na uchebno-poznavatelna dejnost po reshavane na matematcheski zadachi. Plovdiv, 2007.
10. **Petrov, P., 2003:** Formirane na umenie za reshavane na zadaachi. Kota, Starazagora, 2003.
11. **Pota, D., 1976:** Kak da se reshava zadacha. NP, Sofiya, 1976.
12. **Minchev, B., Stoyanova, R., 2003:** Psikhologiya na choveka. Plovdiv, KHermes. 2003.
13. **Trajchev, T., 2005:** Umenie za prilagane na nyakoi metodi za reshavane na zadachi. Etapi na formirane. V: Obrazovanie i kvalifikatsiya na pedagogicheski kadri – razvitie i proektsii prez XXI vek, Yubilejna nauchna konferentsiya – gr. Varna. Universitetsko izdatelstvo „Episkop Konstantin Preslavski“, Shumen, 2005, 139-145 s.
14. **Trajchev, T. :** Vidy deyatelnosti, karakteri zuyushie ehtap Formirovaniya umeniya prilozheniya nekotorkh metodov resheniya zadach. Matematichna osvita v Ukraini: minule, s'godeniya, manbume, Kiiv, 276-277 s.