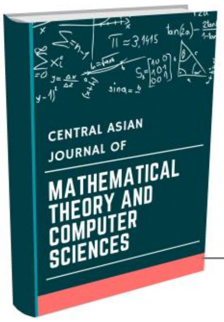

CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES

http://cajmtcs.centralasianstudies.org/index.php/CAJMTCS

Volume: 02 Issue: 12 | Dec 2021 ISSN: 2660-5309

The Role of Tests in Determining the Mathematical Ability of Students

N. X. Yusupova

Teacher, Department of Higher Mathematics, Fergana Polytechnic Institute, Fergana, Uzbekistan

Abstract:

Once the general skills specific to mathematically gifted students have been identified, the task is to create a set of tests that allow them to demonstrate those skills. The article discusses the experimental work on the creation of a set of tests, the development of which is based on the identified general capabilities.

ARTICLEINFO

Article history:
Received 30 Oct 2021
Revised form 22 Nov 2021
Accepted 12 Dec 2021

Keywords: algebraic, geometrical subtests, mathematical ability, a complex of tests.

---***---

Introduction

Once the general skills specific to mathematically gifted students have been identified, the task is to create a set of tests that allow them to demonstrate those skills. Experimental work on the creation of a set of tests will be based on the identified general skills. After a series of tests, a set of tests is created to determine students' mathematical ability. The tests are divided into three main subtests. The first is numerical, the second is algebraic, and the third is geometric subtests. Their total number is 36 and the total number of assignments in 5 variants is 180. Subtests are designed to obtain the information needed to solve them, to process that information during problem-solving, and to memorize the outcome of the solution. Each subtest serves to study some component of the structure of mathematical ability.

The main part

Each subtest takes 40 minutes to complete, which consists of several problems arranged in ascending order of complexity. So, it takes about 2 hours to complete the test. During this time, you should try to solve as many problems as possible. The level of development of certain skills is assessed by the number of problems solved correctly. If an issue is not resolved, you can drop it and move on to the next issue. Only the number of problems solved correctly in the given time is counted. The solution provided may differ from the given solution. The number of problems in each subtest is unlikely to be solved in the allotted 40 minutes, but the more tests you solve, the better.

Each subtest I is worth 1 point, each subtest II is worth 2 points, and each subtest III is worth 2 points. You can score a total of 60 points. The student's talent ratio is calculated as follows:

I_k = earned points / 60

If the student's ability coefficient is in the range of 0-0.55, it is low, if it is in the range of 0.56-0.70, it is medium, if it is in the range of 0.71-0.85, it is good and 0.86- In the range of 1 is considered highly talented. This means that we should try to ensure that students with a GPA of 0.86-1 develop their math skills later. As mentioned, the main goal of our research is to analyze the process of solving test problems of students with different mathematical abilities. Our specially selected or newly created test questions cover various areas of mathematics - algebra, geometry, mathematical analysis, and probability theory, and fully cover and, in a sense, model the student's mathematical performance. The first subtests are numerical subtests that develop students' thinking skills and logical thinking. Numerical questions help students uncover important aspects of their thinking and reasoning skills.

We define the level of difficulty of the issues as follows. To determine which of the two issues is more difficult, it is suggested that they be solved by single-level students. Whichever problem is solved by the majority is easier and the other is more difficult. If both problems are solved by the same number of students in the group, these problems are considered to be equally strong compared to the students in this group. While this method may seem more natural, the result may be different in another group. But if the number of groups is large enough, the result will be closer to reality. We explain our idea with the example of several linear equations:

Solve the equations:

1) $2x=6$;

2) $2x-6=0$, 6 subtracted from both parts of the equation;

3) $1/3\ x=1$, both parts of the equation are divided by 6;

4) $3x-7=x-1$, $x-7$ is added to both parts of the equation;

5) $6x-14=2x-2$, multiplied both parts of the previous equation by 2;

6) $x-7/3=x/3-1/3$, both parts of the previous equation are divided by 6, and so on.

These equations are equally powerful mathematically because the solution of all equations is $x = 3$. But their level of difficulty is different and they are placed in the order of difficulty level above. But in doubtful cases, determining the severity of the problem, as we have said, can be effective only after sufficient testing. We acted on the basis of these considerations in the selection of issues. This made it possible to place the issues in the subtests according to the level of difficulty. Such placement of issues is of great methodological importance. To prove our point, we gave an hour to students in a certain class to solve a subtest consisting of problems arranged in the above order. The next day at the same time we repeated the test again, only the subtest questions suggested the day before were placed randomly. The results were significantly worse on the second day. The test was performed several times in several groups and the above conclusion was confirmed in 90% of cases.

The test questions must meet the requirements of their immediate task, that is, the process of solving them must clarify the structure of the talent. In other words, in the process of solving them, the aspects of mental activity that are related to mathematical activity must be revealed. Our test method serves as a psychological indicator in the study of the phenomenon. Problems are structured in such a way that the process of solving them allows the student to demonstrate ability. It would be almost impossible to achieve this if we created the problems in the form of traditional test problems. This is because when students solve traditional tests, we only see the result, not the thinking process. The results of the tests are similar. In the case of gifted students, it is important to think and observe the problem-solving process. At the same time, it may be more effective to observe the student in a free (self-talking) way. Because this process ensures that the student's talent is manifested naturally.

The student's mathematical ability is also reflected in the written analysis of problem-solving. It is therefore advisable to conduct such experiments during the trial period as well. Several complex factors, including knowledge, skills, and competencies, play a role in problem-solving. And we are exploring talent, not knowledge, skills, or competencies, even though they are inextricably linked. That is why it is difficult to distinguish the talent factor from this very complex. This means that problems should be chosen in such a way that the first to solve them is the ability to show talent.

It is well known that the influence of a student's existing knowledge, skills and abilities cannot be completely excluded from the problem-solving process by choosing a problem. The point is, such knowledge must not be influenced by mathematical knowledge. This is not a mathematical problem, which is contrary to the purpose of the study. Experts have suggested various ways out of this situation. One of them is the suggestion of two types of questions to be included in the test, both of which are in some sense related to the category of ability: 1) a question of knowledge; 2) a matter of intellect. As mentioned here, the second type of math problem is difficult to choose.

Apparently, the attempt to find a mathematical problem that did not depend on knowledge, skills, and competencies at all by identifying only the talents of the students was unsuccessful. Therefore, an attempt was made to create mathematical problems that minimized the impact of the student's knowledge, skills, and abilities.

We achieved this in the following way:

1) The test questions are chosen in such a way that they do not require special knowledge, skills and abilities to solve them, or the necessary knowledge, skills

and skills are available to all students being tested. To do this, using knowledge, skills and competencies

the knowledge, skills, and competencies of the students being tested were identified. If necessary, we repeated the required material with the students in the test group without letting them know that it could be used for further problem solving;

2) Taking test questions from unfamiliar material that is new to students significantly reduces the impact of existing experiences. While some issues are ahead of the program, some are not taught at all in higher education;

3) There were also questions on a new topic, the whole group will have the same opportunity. At the same time, students have the opportunity to monitor their ability to absorb new material;

4) the impact of knowledge, skills and competencies on students has been significantly reduced by offering non-standard issues that require research;

Emphasis was also placed on creating opportunities to assess how quickly a student can achieve, based on knowledge, skills, and competencies in the design of test items. the student's speed of learning new material in the group and problem solving does not coincide with the student's personal speed. Understandably, the professor has a great influence on the group. Therefore, the ability to solve problems in two cases was studied:

1) independently; 2) with the help of an experimenter. The second situation should be understood in such a way that the student has enough knowledge, skills and abilities to solve the given problem, but does not feel any subtle "place" in the process of solving it. can end up paying. Various causes have been encountered here. For example, there may be more than one such "spot" in a problem. That is, a student's ability can be measured by the number of assists in the problem-solving process. In other words, suppose one student solves a given problem independently, the second student completes the same problem under the same instruction of the professor, and the third student completes the same task twice under the instruction of the professor.

Conclusion

Of course the abilities of these students are different. This is especially true when it comes to teaching more math-savvy students. In addition to focusing on quality in the selection of test items, an attempt was made to find quantitative characteristics of the phenomenon under study.

References

1. Kosimov, K., & Mamayusupov, J. (2019). Transitions melline integral of fractional integrodifferential operators. *Scientific Bulletin of Namangan State University*, *1*(1), 12-15.
2. Qosimova, M. Y., & Yusupova, N. X. (2020). On a property of fractional integro-differentiation operators in the kernel of which the meyer function. *Scientific-technical journal*, *24*(4), 48-50.
3. Azizov, M. S., & Rustamova, S. T. (2017). Yuqori tartibli differensial tenglamalarni bernulli tenglamasiga keltirib yechish. *Toshkent shahridagi turin politexnika universiteti*, 61.
4. Мусаева, М. Э., & Шодиева, Г. М. (2015). Замонавий педагогик технология асосида интерфаол дарсларни ташкил этиш. *Современное образование (Узбекистан)*, (7).
5. Azizov, M., & Rustamova, S. (2019). The Task of Koshi for ordinary differential equation of first order which refer to equation of Bernoulli. *Scientific journal of the Fergana State University*, *2*(1), 13-16.
6. Qosimov, H. N. (2019). Mixed fractional order integrals and derivatives which is taken multivariable function from other functionality. *Scientific Bulletin of Namangan State University*, *1*(4), 3-8.
7. Tillabayev, B., & Bahodirov, N. (2021). Solving the boundary problem by the method of green's function for the simple differential equation of the second order linear. *ACADEMICIA: An International Multidisciplinary Research Journal*, *11*(6), 301-304.
8. Sattorov, A. M., & Xujaxonov, Z. Z. (2019). Approach calculation of certain specific integrals by interpolating polynomials. *Scientific Bulletin of Namangan State University*, *1*(3), 10-12.
9. Qosimova, M. Y., Yusupova, N. X., & Qosimova, S. T. (2021). On the uniqueness of the solution of a two-point second boundary value problem for a second-order simple differential equation solved by the bernoulli equation. *ACADEMICIA: An International Multidisciplinary Research Journal*, *11*(9), 969-973.
10. Djuraeva, D. D., & Berdiyeva, Z. M. (2016). Cultural heritage as a factor of human development (on the example of Uzbekistan). *Ученый XXI века*, 23.
11. Qosimova, S. T. (2021). Two-point second boundary value problem for a quadratic simple second-order differential equation solved by the bernoulli equation. *Innovative Technologica: Methodical Research Journal*, *2*(11), 14-19.
12. Shodieva, G. M. (2006). Improving the well-being of the household: problems and their solutions. *Monograph, T.: Fan*.