American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Crossref doi Google Scholar METADATA INDEXING WorldCat MENDELEY
Publisher: Oscar Publishing Services

OSCAR PUBLISHING SERVICES

Journal Website: https://theusajournals.com/index.php/ajast

Research Article

DRAWING AND IMAGE MODELS TOOL MATH LEARNING OPTIONS

Submission Date: August 30, 2022, Accepted Date: September 06, 2022,
Published Date: September 30, 2022
Crossref doi: https://doi.org/10.37547/ajast/Volume02Issue09-05

Khonkulov Ulugbek Khursanalievich
Phd, Associate Professor Of Fergana State University, Uzbekistan

Tokhtasinov Tohirjon Shakirjon Ugli
Teacher Of Fergana State University, Uzbekistan

Madrakhimov Askarali
Associate Professor Of Fergana State University, Candidate Of Physical And Mathematical Sciences, Uzbekistan

ABSTRACT

The article provides a classification, compilation and solution methods of descriptive mathematical problems in secondary schools, and also shows the role of an illustrative issue in the development of logical thinking and spatial imagination of students. With the help of illustrative issues, the stages of solving geometric problems have been improved, and the possibilities of effective use of illustrative issues in the process of mathematical education have been clarified.

KEYWORDS

Illustrated matter, geometric matter, algebraic matter, logical matter, mantl matter.

INTRODUCTION

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

In mathematics lessons, it is important to study the didactic capabilities of students in the formation of logical observation skills and practical knowledge by classifying descriptive issues. One of the urgent methodological problems is the improvement of content based on the inclusion of requirements (conceptual, reflexive, Technological) on issues of creative and practical content in the principles of structuring and solving illustrative issues in secondary schools[1,2]. In this, it is desirable that the content of the system of descriptive issues, aimed at ensuring the continuity of gneseological, heuristic directions for the synthesis of mathematical knowledge and skills, be in accordance with the principles of didactic, logicality. This process makes it possible to systematize the mechanism and organizational and functional capabilities of compiling, introducing a methodology for solving illustrative issues aimed at teaching students to logical, non-standard thinking.

Material and Methods. In general secondary schools, mathematical issues can be classified as[3] (Table 1).

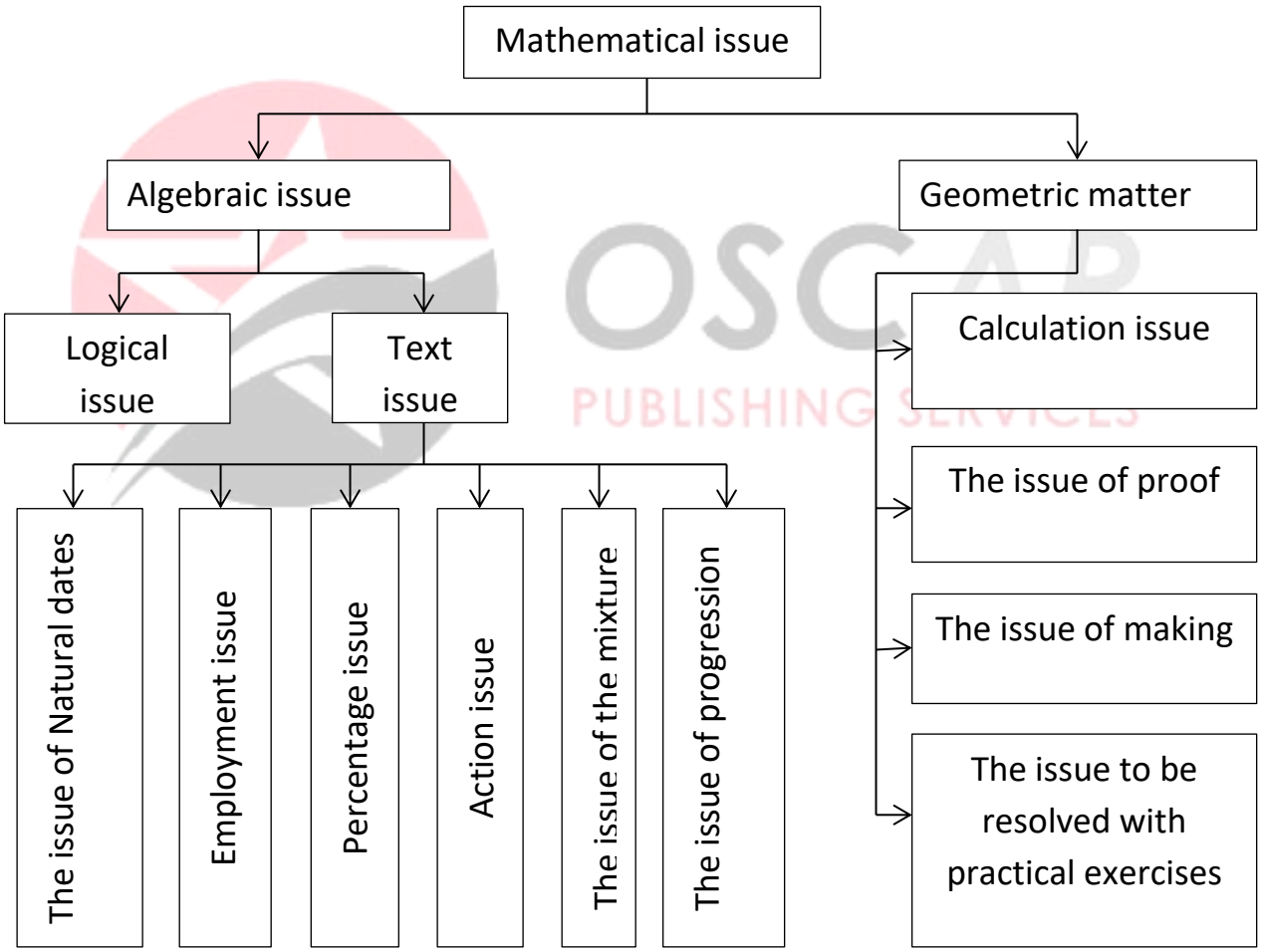

Table 1. Classification of mathematical problems in secondary schools.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

The following information can be cited about the issues encountered in the geometry course and their classification.

Issues to be resolved with practical exercises. Such issues are initially used in the development of an idea of geometric figures. Even without knowing the definition or properties of a geometric figure or figure, its elements can be measured using a ruler or transporter. For example, it is possible to take issues of comparing the lengths of the cuts, determining the type of angle.

Issues concerning computing. Such issues are based on theoretical knowledge learned in the course of geometry, on the basis of the studied texture, theorems and formulas, on finding the magnitude necessary to be determined in geometric figures using the magnitudes of the elements given in the condition of the issue.

Issues concerning proof. Such issues are resolved by inductive and deductive inference. The condition of the issue and the conclusion part are distinguished, and the conclusion part is formed on the basis of the given conditions.

Issues related to making: such issues are solved only with the help of a ruler and a circus. In this case, it is necessary not only to make a geometric shape, but also to indicate that the formed shape satisfies the conditions of the issue, the Made shape is correct and fully fulfilled.

Results. The development of students ' thinking activity has been one of the urgent issues of teaching mathematics. We divided the issues of general secondary education schools in geometry into the following three types, depending on the method of submission: theoretical issues; logical issues; descriptive issues[5].

An Illustrated issue refers to issues given by illustrative means such as form, image, graph, diagram, table.

As a result of the analyzes, we classified the problems with the image in the geometry course according to the degree of complexity as follows (Table 2).

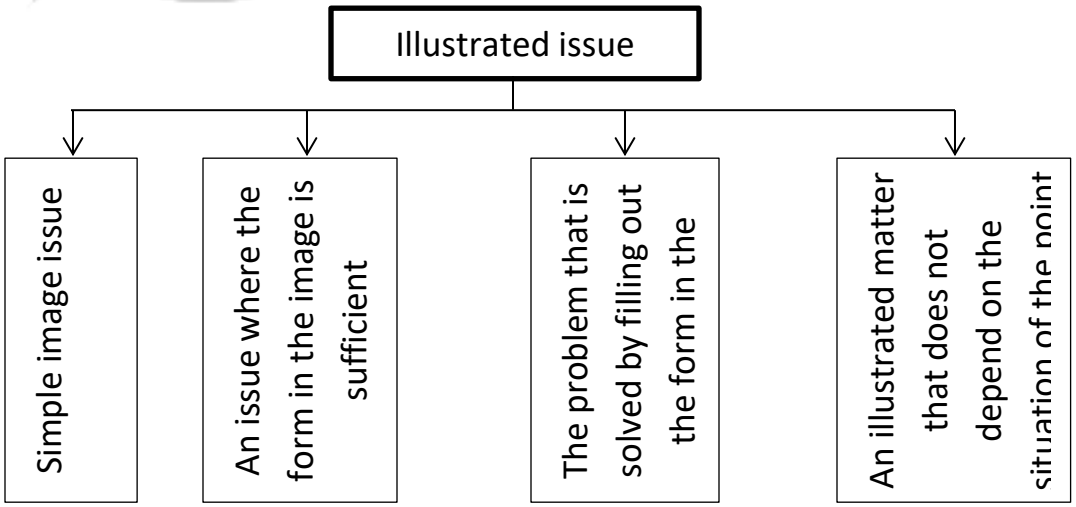

Table 2. Classification of descriptive issues in the geometry course.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

The school has various approaches to improving geometry teaching, one of which we consider to rely on the means of descriptive issues and to teach students to draw up an illustrative issue. In the article, it can be added about the importance of creating an independent descriptive issue by readers with an emphasis on compiling descriptive issues, that while the reader himself creates an independent issue, has complete knowledge of the concepts he is using in the matter, he also conducts research on the existence of ways to solve it, whether it is right or wrong. Drawing up geometric issues is more likely to serve the development of students ' thinking skills than arithmetic problems. Below we will tell about the methods of constructing geometric problems:

Teaching to draw up an issue on the method of analogy. In doing so, the teacher will select an issue suitable for the subject being studied. For example, when the topic" volume of the pyramid "is passed, the teacher reminds students of the issue in the planimetry course" represent the face of an equilateral triangle through its sides" and offers to draw up a stereometric issue that is analogous to this issue. Considering that a regular tetrahedron in space is an analogous figure to an equilateral triangle in the plane, and an analogous quantity to the face of a triangle is the volume of a tetrahedron, the following issue can be formulated: "express the volume of a regular tetrahedron through its edge", "express the volume of a regular tetrahedron through the face of its side fat".

Drawing up a new issue as a result of generalization. In this, aspects of the commonality of a definition, theorem or formulas on one topic with another are found and applied.

For example, the geometric interpretation of Pythagorean's theorem is as follows: the face of a square made on the hypotenuse of a right-angled triangle is equal to the sum of the faces of the squares made on its cathets. Summarizing this theorem, one can teach to draw up an issue as follows:

1) prove that the face edges of a cubic surface whose edge is equal to the hypotenuse of a right-angled triangle are equal to the sum of the faces of the surfaces of cubes equal to its cathets;

2) prove that the face diameters of the surface of the sphere, whose diameter is equal to the hypotenuse of a right-angled triangle, will be equal to the sum of the faces of the spheres equal to its cathets.

Sometimes readers can also formulate incorrect issues regarding analogy and generalization. The reason for their mistake in this will be the following:

- analogical figures or their incorrect selection of analogical quantities (taking a sphere into a circle as an analogical figure);

- incorrect application of generality (prove that the volume of a sphere whose diameter is equal to the hypotenuse of a right-angled triangle is equal to the sum of the volumes of spheres whose diameters are equal to its cathets).

Drawing up an issue by analogy with the studied one. By analogy with the theorem of Sines, the following question can be formulated: the ratio of the side vertices of a triangular prism to the sine of two-sided angles opposite these vertices will be equal among themselves.

Drawing up a new issue. In doing so, it is possible to train to create new issues on a voluntary subject.

Reflect the issue. The reflection of the issue is that the compilation of such issues helps students to better understand the structure of the issue, learn to

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

formulate and prove inverse theorems to the concepts studied in the lesson, to replace the adequate and necessary conditions of the theorem. It should be noted that the content of solutions to inverse problems usually does not differ from solutions to issues given, but the method differs from the point of view. Let's see this in the following Issue[9].

Issue. If the diagonals of the rectangle are perpendicular and are divided by two equal at the point of intersection, then prove that all sides of this rectangle are equal.

Reflected issue. Prove that the diagonals of an equilateral rectangle are divided into equal halves perpendicular and at the point of intersection.

We will improve the existing general requirements for drawing up an issue as follows::

each Illustrated issue must be aimed at a specific purpose;

The Illustrated issue should reveal the essence of the given concept;

the descriptive issue should be in the educational, educational, developmental movement;

the descriptive issue should form in the minds of students knowledge, skills, competencies about the new concept being studied and be aimed at developing mathematical competence. In the formation of knowledge in students, simple illustrative issues are used, in the formation of skills, qualifications and competencies, descriptive ones are used, in which the form in the image is sufficient, which are solved with the help of filling out the form in the image, which does not depend on the situation of the point;

must serve to develop students ' creative thinking and spatial imagination. In the development of students ' creative thinking, pictorial issues are used, which are solved with the help of filling the form in the image, which do not depend on the situation of the point, and pictorial ones in all their forms in the development of spatial representations;

The Illustrated issue must correspond to the types of lessons. In elective classes, extracurricular activities, circles, work with gifted students, descriptive issues are used, which are solved with the help of filling out the form in the image, which do not depend on the situation of the point;

must be structured in accordance with specific stages of the lesson process. In the statement of a new topic, knowledge of the essence of the given theorem or concept, simple descriptive issues are used, which are solved with the help of generalization, repetition, independent work of the lesson, when performing homework, filling out the form in the image, which does not depend on the situation of the point;

must be consistent with the curriculum and age-specific;

must ensure continuity, consistency in the teaching process. The use of issues in which the form in the image is sufficient in ensuring continuity and consistency in the teaching process gives an effective result;

the mathematical magnitudes being entered in the image must match the drawing;

in order to find a solution to an illustrated issue, its condition must be complete, adequate and without excessive additions. The condition of the issue should not contradict mathematical concepts and laws.

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

Discussion and Conclusions. In order for the teacher to have a deeper knowledge of the concept initially given to students, it is necessary to teach to compose simple descriptive issues. Then, on the basis of the formed knowledge, it is necessary to slowly teach students to formulate issues in which the form in the image is sufficient for the formation of skills, qualifications and competencies, issues that are solved with the help of image filling, and illustrative issues that do not depend on the situation of the point. When compiling illustrative issues, we also encounter some problematic situations. Experiments show that the mathematical magnitudes that represent the issue when constructing descriptive issues are simply not included. The magnitudes must correspond to the drawing, the size being determined must be clear both in terms of content and in terms of science. It is advisable to check the issue with a structured image and make sure that it is configured correctly.

Issue 1. ABCD is given trapeze. Find the cosine of angle C (Figure 1).

Solution of the issue: we lower two heights from the points D and C on the upper base of the trapezium and mark its bases with E and F, respectively. The drawing given without it will be in the form of the following (Figure 2).

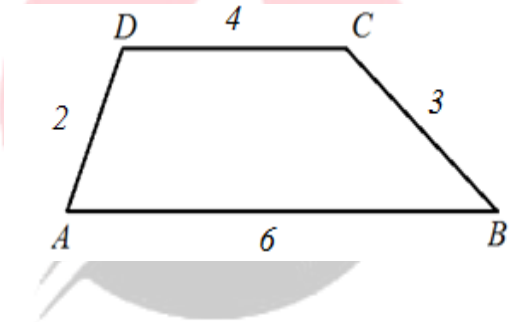

Image-1.

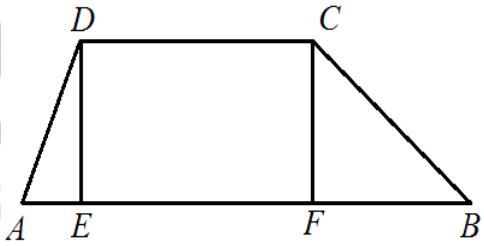

Image-2.

Triangle AED and BCF for triangles We apply the Pythagorean theorem.

$$\begin{cases} AD^2 = AE^2 + ED^2 \\ BC^2 = BF^2 + FC^2 \end{cases}$$

ED = FC and EF = DC, AB = AE + EF + BF according to the fact that it is and the issue is given,

$$\begin{cases} 4 = AE^2 + ED^2 \\ 9 = (2 - AE)^2 + ED^2 \end{cases}$$

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

is formed. Solving a given system, we get a value AE = - 0.25. The fact that the solution to the issue is negative leads to two different results:

the issue is resolved incorrectly;

the terms of the issue are given incorrectly.

But none of these two conclusions is correct. The reason for such a wrong solution to the issue is that the trapeze that satisfies its condition is different from the forms that usually remain a study. When the trapezium that satisfies the condition of the matter is clearly drawn, the small base will be non-projecting one value onto the large base, that is, the perpendicular transferred from the ends of the small base will lie throughout the large base. This situation can result in a result that is out of place for geometric magnitude when solved in an algebraic way. In the above issue, the length of the incision remained negative. The reason for this is the cut sought in the drawing, the direction of which has remained opposite with the cut, which can be the solution to the issue. In order for the student not to face such a problem, the teacher must teach the definition of a trapezoid to draw various drawings by its types. If a drawing is drawn from the definition of trapeze to the given issue as follows, the correct solution to the issue is formed (figure-3). The teacher must explain to the students that the drawing is trapeze and that it corresponds to the definition of trapeze. Now let's come to a solution to the issue. We draw two heights from the points D and C on the upper base of the trapezium and mark its bases with E and F, respectively (see Figure 4).

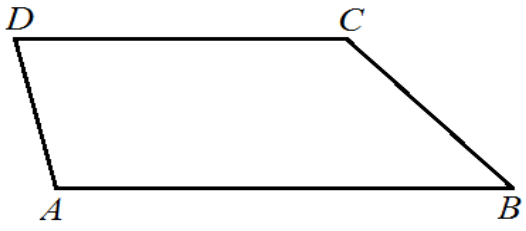

Image-3.

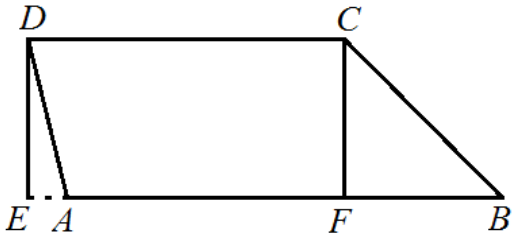

Image-4.

Solving the issue as above, EA=0,25 we will have a value. We will not face any conflict in this. From solving a given issue FB = 2,25 sm comes from. Right-angled triangle from the definition of sine at BFC, $\sin FCB = \frac{FB}{BC} = \frac{2,25}{3} = \frac{3}{4}$. Solving the issue as above, EA=0,25 we will have a value. We will not face any conflict in this. When solving a given problem, FB =2.25 CM will be equal in value. Right-angled triangle BFC at angle from the definition of sine,

$$\sin < FCB = \frac{FB}{BC} = \frac{2,25}{3} = \frac{3}{4}$$

we determine the equivalent of. Cosine of angle C according to the case Gart,

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

$$\cos < C = \cos(90° + < FCB) = -\sin < FCB = -\frac{3}{4}$$

is equal to. Typically, solving geometric problems can be done in four stages:

Stage 1. Understanding the issue. At this stage, the condition and conclusion of the issue are distinguished separately. A drawing is drawn on the issue. All information provided is marked on the drawing.

Stage 2. Planning. At this stage, the method of solving the issue is selected. It is determined what additional information is needed for its application. Auxiliary lines are drawn, the solution plan is determined.

Stage 3. Solve. At this stage, the issue is resolved according to the intended plan.

Stage 4. Check. At this stage, The found solution to the issue is checked directly. A critical look at the solution process is taken. If an error is detected, it will be corrected. If there is no way to fix, the issue will return to the initial part of the solution, and all work will start again.

When solving illustrative issues, it is necessary to pay attention to:

Know and keep in mind the basic concepts of mathematics, definitions, properties well.

Know different ways to prove theorems.

To understand the essence of the issue with a given image and determine whether it is necessary to draw additional lines.

Acknowledgement. We will improve the solution of geometric problems using illustrative problems as follows:

Stage 1. Understanding the issue. At this stage, the issue is brought to the appearance of the text, when the information can be read depending on the image and conditions given, that is, the type of shape or body referenced and the name of the magnitudes are determined and the condition and conclusion of the issue are distinguished separately.

Stage 2. Planning. When the image given at this stage is sufficient to solve the problem, the method of solving it is selected. If the given image is not enough to solve the problem, auxiliary forms are drawn into the image or the image view without changing the condition of the issue is adapted to solving it, and a solution plan is drawn up, determining what additional information is needed.

Stage 3. Solve. At this stage, the issue is resolved according to the intended plan.

Stage 4. Check. At this stage, The found solution to the issue is checked directly. If an error is detected or defects are detected in the image, it is corrected. If there is no way to fix, the issue will return to the initial part of the solution, and all work will start again. Usually the lesson begins not with the rule of solving a new type of issue, but directly with the solution of an unfamiliar issue. Readers will intuitively try to solve the issue based on their previous knowledge and skills. Together, they reason, make mistakes and correct it by trying, making mistakes, and work on these mistakes and, on the basis of this, gradually approach the correct solution. At this point, students understand that making mistakes is not such a bad thing, it is precisely on the basis of their own experience that the process of analyzing and verifying various error

American Journal Of Applied Science And Technology
(ISSN – 2771-2745)
VOLUME 02 ISSUE 09 Pages: 26-34
SJIF IMPACT FACTOR (2021: 5. 705) (2022: 5. 705)
OCLC – 1121105677 METADATA IF – 5.582
Publisher: Oscar Publishing Services

solutions (small research) gradually leads them to the right solution.

REFERENCES

1. Khankulov U.Kh. About the principles of selection of teaching content of stochastic elements of mathematics. Science and world. –Volgograd, Russia, 2018. № . –P. 56-57. (Impact Factor 0,325).
2. Khankulov U.Kh. Description of methodical system of teaching the line of stochastics elements of mathematics by using computer technologies. Eastern European Scientific Journal. № 6. - Dusseldorf, Germany, 2016. -pp. 200-206.
3. Khankulov U.Kh. Statistical analyzing of efficiency and methodological features of teaching stochastic elements based on electronic. Актуальные проблемы науки XXI века. Международная научно-практическая конференция. Международная исследовательская организация "Cognitio" - Москва, Россия: 2015. -С.71-74.
4. У.Х. Хонқулов. Математика ўқув фани амалий машғулотларини такомиллаштиришнинг айрим масалалари.Наманган давлат университети илмий ахборотномаси. - Наманган, 2019. -№ 7. - Б.256-262.
5. У.Х. Хонқулов. Эҳтимолий статистик тушунчаларни ўқитишнинг методик имкониятларини такомиллаштириш масалалари. Наманган давлат университети илмий ахборотномаси. - Наманган, 2020. -№ 5. - Б.410-416.
6. Thompson, P. W., Carlson, M. P., & Silverman, J. (2007). The design of tasks in support of teachers' development of coherent mathematical meanings. Journal of Mathematics Teacher Education, 10, 415-432.
7. Wood, W. E. (2011). Squigonometry. Mathematics Magazine, 84(4), 257–265. doi:10.4169/math.mag.84.4.257.
8. Хонқулов У.Х. Применение электронные таблицы MS EXCEL в обучении элементов стохастики // Научные перспективы ⍰⍰I века. Достижения и перспективы нового столетия: Халқаро илмий-амалий анжуман.-Россия: Новосибирск шаҳри, 2014.-Б. 46-48.
9. Хонкулов У.Х. О статистическом методе в педагогическом эксперименте и современный учебный процесс // Вестник- МГОУ. –Москва, 2011. -№3. Б. 104–111.
10. Sidney R. Probability Path. School of Operations Research and Industrial Engineering Cornell University. -USA.: Boston • Basel • Berlin.1999.- 454 p.