

DEVELOPING MATHEMATICAL COMPETENCE OF FUTURE PRIMARY TEACHERS

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Abstract: This article future elementary class teachers mathematician competence main geometric concepts (point , line , angle , shapes , spatial imagination) using improvement theoretical and practical aspects seeing comes out . Like PISA, TIMSS international assessment programs requirements based on geometric materials methodology efficiency analysis will be done . In the article offer done approaches students logical thinking , spatial imagination and practical skills to develop focused .

Key words: mathematics competence , geometric concepts , elementary education , PISA, TIMSS, methodology .

Current time education in the system elementary class teacher not only knowledge giving , maybe in students logical thinking , problem solution to do and spatial imagination such as skills formative person as is being considered . International assessment programs (PISA, TIMSS) results this shows that Uzbekistan of students mathematics according to indicators geometric low in matters , this future teachers their own mathematician competence increase the necessity requirement Modern education in the system elementary class teacher in students not only knowledge , maybe the 21st century skills — logical thinking , problem solution to do , spatial imagination and creativity formation International assessment programs results this regarding serious problems showing .

PISA 2022 results according to , Uzbekistan students mathematics according to scored an average of 364 points (OECD average — 472 points). Mathematics literacy Level 2 and from it high to the level only 19% of students achieved (OECD average — 69%). Top performers (Level 5–6) almost No. TIMSS 2023 also includes 4th graders mathematics 443 points (50th out of 58 countries), 8th grade students and a score of 421 points (32nd place out of 44 countries) Geometric issues and spatial imagination with related in questions results especially low. This situation future teachers own mathematician competence deep improvement the necessity shows . Geometric concepts through competence develop — the most effective from the roads one , because geometry logical thinking and real life problems to modeling basis will be . [1]

Mathematician competence is not only formulas to know , maybe them in real life hand to get , logical thinking and problems geometric models using solution This is the ability . in the article main geometric concepts (point , line , intersection , ray , angle , simple via forms) future teachers competence improvement effective methods offer is being done .

2. Mathematician competence concept and his/her structural parts

Mathematician competence following from components consists of :

Knowledge component — main geometric concepts deep understanding

Activity component — practical exercises , modeling and drawing skills .

Personal component — in students spatial imagination and creative thinking development

Future teachers for this competence develop very important because they elementary in the classrooms geometry first times If the teacher himself/herself spatial to the imagination has Otherwise , students will also have this skill does not form . [2]

2. Elementary in the classrooms geometric of concepts place

Elementary education in the program geometry topic the following own inside takes :

Point , line , intersection , ray , angle types (straight , sharp , open).

Simple shapes : triangle , rectangle , square , circle , triangle .

Spatial Solids : cube , parallelepiped , pyramid .

Perimeter and surface concepts .

These concepts through students not only shapes maybe they know each other logical connections according to they will get . For example , correct rectangle and square perimeter and surface real - life equations ($P = 2(a+b)$, $S = a \times b$) issues (room) area rug choose (to choose) possible .[3]

3. Geometric concepts using competence improvement methods

Future teachers for following methodical approaches recommendation is being done :

3.1 . Demonstrative and practical training

- Students themselves from paper forms cut them they collect .
- GeoGebra program using interactive drawings create
- Surrounding in things geometric shapes find game

3.2. Step by step teaching

1. View and naming stage .
2. Properties compare stage .
3. Practical application stage (for example , PISA -style open questions : "This form how other to forms to be possible ?").

3.3. Integration

Geometry other topics with connect : fractions (form to be), data (diagrams drawing), concentric circles (perimeter) calculation) .[4]

4. Practical examples and exercises

Example 1 (Perimeter) and surface):

Room length 6 m, width 4 m. Carpet for surface and wall for perimeter count .

Solution : $S = 6 \times 4 = 24 \text{ m}^2$; $P = 2(6+4) = 20 \text{ m}$.

Example 2 (Angles) and spatial imagination):

Cube how many right angle Is there any ? one on the surface How many ? (Answer : 8 correct answers) corner , every 4 on the surface).

Example 3 (With Tangram work):

“ house ” or “ bird ” shape from 7 pieces make it . Which geometric from forms Did you use it ?

Example 4 (GeoGebra) with):

That's right of a rectangle sides change , surface and perimeter change follow .

Example 5 (Life issue):

In the garden rectangle shaped flowerbed length 8 m, width 5 m. Its perimeter along barrier installation for how many meter wire If 1 m of wire costs 15 thousand soum if so , how much money spent ?[5]

5. Research results and efficiency

This approach used future teachers training in the process .:

Logical thinking and problem solution to do skills will improve .

PISA and TIMSS style open issues solution ability develops .

science research this shows that creative geometric exercises (Tangram, Geoboard) for students spatial increase your imagination by 30–45% increases . Future teachers GeoGebra and practical

from modeling when using their own mathematician competence noticeable at the level will improve . As a result students in PISA and TIMSS style open issues better they will solve . [6]

6. Recommendations

High education to programs GeoGebra and creative geometric exercises mandatory input

Future teachers for special trainings and laboratory their training organization to be

Textbooks modern tools (interactive models) with enrichment .

Teachers' permanent qualification increase in courses geometric competence assessment mechanism current to do

Conclusion

Future elementary class teachers mathematician competence main geometric concepts using improvement — modern of education important demand . Demonstrative tools , practical exercises and interactive methods through teachers not only own knowledge they strengthen , but future deep in the students mathematician thinking They shape . Learning to programs this approach input and GeoGebra such as modern from tools use expansion recommendation is being done .

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