Mathematic Guide-Learning System to the Misconception of Elementary Students

Yuan-Chen Liu, Hong-Yan Lee, and Wei-Kai Wang
Graduate School of Mathematics and Science Education, National Taipei Teachers College

ABSTRACT

In the process of mathematics learning, most elementary students never think but receive all the methods their teachers have taught. In other word, they don’t catch the basic concept in every unit. Based on the Petri-Net theory, this paper designs a guided learning system to correct the misconception of elementary students. We expect to achieve the best effect of computer-assisted instruction through the internet.

Key words: Petri-Net, misconception

1. Background

In recent years, the application of the CAI plays an important role to guide students’ study and resolve traditional problems of teaching [1],[2]. However, students might produce many misconceptions, which would lead them to neglect present hints that need to be used when they solve problems. They might lose interests and confidence for mathematics. How to develop the CAI tool and help students to study become the most important research lesson of CAI. Accordingly, to understand students’ misconceptions and to draft out the project of the solutions are the main keys that mathematics CAI can smoothly accomplish [3]-[6]

2. Purposes of the paper

• We Apply Petri-Net theories to record the learners’ solution process and analyze learners’ mistake types [7], [8], [9]. By making use of instant sketch, we promote the student's study results since the application produce a solving system of mathematics that is adapted to the individual difference.

3. System application

We can analyze the mistake and misconception of the student. Figure 1 is an example: “How big do you think is the area of the triangle in?” The correct answer is “6 $\times 5\div 2=15$.”

The calculation process can be inputted by students and analyzes its mistake type through this system, then give appropriate guidance and feedback further. However Petri-Net recorded the solution process and guidance of the students. It will make the study process of the students much more clear. When student input computation, the system not only analyze their study condition, but also provide the instant diagram. That make the student can control their solving condition and sense of vision to study results. And give them appropriate help and feedback at appropriate time will make the student acquire the study result that is like the classroom teaching. Figure 2 shows for its instant graphic assisted tools.

If students input the false calculating type, system will immediately generate graph that students input equations by the graphic assisted tools. Students then could understand their misconceptions of the equations they input: triangle area miscalculated rectangular area, and then they will further understand the basic concept and know how to revise the mistake type. More co-operate with the appropriate teaching hint inside system, student acquire the correct and basic concept from mistake type.

4. Conclusion

The main purpose of this paper is based on Petri-Net theories to record the solving process and to analyze the mistake types of students. It designs a fitting pupil mathematic system that have guide functions to correct the wrong thinking and misconception of pupils. It will make them understand mathematic idea and study targets. Through the convenient network environment, we can attain the best result of CAI. By applying Petri-Net theory, the system provides guiding and solving functions. It uses the instant graphic assisted tools to promote the student's learning.

References

[5] Ning Jun T.(1995), the area concept study, the nation educate, volume 35, 7,8 period, P.14~19


Figure 1: the example of the area of the sideways triangle

Figure 2: Instant graphic assisted tools.