

## ABSTRACT

Problem support is an important part of learning that will help student when students face difficulties in doing exercise of question. The teacher has strategy to every single student to give appropriate help for student who face struggling. But teacher is hard to conduct one-on-one giving help to students. To solve this problem an Intelligent Tutoring System (ITS) offers adaptive help for handling diversities students in classroom. To offer help which is personalized to student's condition based on feedback [1], hint [1, 43] and worked example [3, 44, 45, 47, 55]. One of the important things in building adaptive help is the existence of student model. The adaptive will be running because of the existing of student model. In creating student model is used Performance Factor Analysis (PFA), yet in this study the PFA just as to measure the performance of students. When a student tries to solve a problem and could not answer correctly, the first help would be given to student is feedback. This feedback gives a sign to student which being solved means true of false. If student still could not answer correctly after re-attempt question, the second support is giving hint. These hints based on the probability of student's error from one question. The more he/she almost answers perfectly the question, the more specific the hint will be given to student. The third support is giving worked example. Worked example consist of step by step crafted answer by expert. The method to generate worked example is webbing matrix, which is a selection worked example by connected between question and worked example to the same competences. The evaluation for webbing matrix reaches 93%. The proposed has been implemented in grade 8 secondary level takes two group, control group and experimental group. The comparison between control group and experimental group is used N-gain score. The final N-gain score prove that student which use adaptive help (feedback, hint and worked example) is five times bigger than students who do not use adaptive help in their learning.

**Keywords:** Intelligent Tutoring System, knowledge level, Ontology, Performance Factor Analysis, recommender system, webbing matrix, adaptive help.