

## **ABSTRACT**

*Introductory programming courses tend to have lower pass rates compared to other STEM subjects, with a global average of 75% between 2014 and 2018 across 17 universities in eight countries. Although students are able to understand basic programming concepts, they struggle to apply them effectively. However, the learning management systems currently used for self-paced practice in universities, including the one implemented at Telkom University, lack adaptive features that can personalize questions based on each student's ability. This thesis presents the development of an adaptive practice system that addresses these shortcomings. This book explains the dataset, domain model, student model, and their integration into Moodle. An experiment was conducted to compare the proposed system with a system similar to the one currently used for self-paced practice at Telkom University, which delivers questions randomly. The results show that the adaptive practice system effectively utilizes students' prior knowledge, current ability, effort, and feedback to deliver more appropriate questions. The system is also capable of gradually adjusting question difficulty. Survey results support these findings, with the majority of students stating that the adaptive practice system is better than the random system, especially in terms of increasing their motivation to keep practicing.*

**Keywords:** *adaptive practice, introductory programming, moodle, recommender system, student modelling, domain modelling.*