

# Using Process Mining to Analyze Time-Distribution of Self-Assessment and Formative Assessment Exercises on an Online Learning Tool

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## Abstract

The study of the relationships between self-regulated learning and formative assessment is an active line of research in the educational community. A recent review of the literature highlights that the study of these connections has been mainly unidirectional, focusing on how formative assessment helps students to self-regulate their learning, being much less explored the effect of self-regulated learning strategies on formative assessment. In this context, analyzing automatically captured students' activities within online learning tools can provide us further insights on the interactions between these two topics. More specifically, this article examines the activity traces of 382 students who used an online tool to learn a programming language. The tool incorporates review exercises for promoting self-assessment (an important self-regulated learning strategy). Furthermore, the tool is used in supervised laboratories where students receive formative assessment. This study uses process mining techniques to analyze the temporal component of student behavior in both types of activities, their interaction, and how self-assessment relates to formative assessment. Some key lessons are learned: activities promoting self-assessment significantly improved students' involvement in formative assessment activities; increasing self-assessment cannot compensate for a lack of effort in formative assessment. We also underline that, to the best of our knowledge, to date no research has used process mining to consider the time component in the analysis of the relationships between formative assessment and self-assessment.