

## A Programming Assessment Software Artefact Enhanced with the Help of Learners

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**Abstract :** The demands of an ever changing and complex higher education environment, along with the profile of modern learners challenge current approaches to assessment and feedback. More learners enter the education system every year. The younger generation expects immediate feedback. At the same time, feedback should be meaningful. The assessment of practical activities in programming poses a particular problem, since both lecturers and learners in the information and computer science discipline acknowledge that paper-based assessment for programming subjects lacks meaningful real-life testing. At the same time, feedback lacks promptness, consistency, comprehensiveness and individualisation. Most of these aspects may be addressed by modern, technology-assisted assessment. The focus of this paper is the continuous development of an artefact that is used to assist the lecturer in the assessment and feedback of practical programming activities in a senior database programming class. The artefact was developed using three Design Science Research cycles. The first implementation allowed one programming activity submission per assessment intervention. This pilot provided valuable insight into the obstacles regarding the implementation of this type of assessment tool. A second implementation improved the initial version to allow multiple programming activity submissions per assessment. The focus of this version is on providing scaffold feedback to the learner – allowing improvement with each subsequent submission. It also has a built-in capability to provide the lecturer with information regarding the key problem areas of each assessment intervention.

**Keywords :** programming, computer-aided assessment, technology-assisted assessment, programming assessment software, design science research, mixed-method

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