TYPES OF FORMATIVE FEEDBACK THAT TECHNOLOGY TEACHERS GIVE TO LEARNERS DURING PROBLEM STRUCTURING

Prof. **Willem Rauscher, & Nelé Loubser**
University of Pretoria (South Africa)

Abstract

The South African Department of Basic Education highlights the importance of the Design process in Technology education. The Curriculum and Assessment Policy Statement (CAPS) indicates that all teaching and learning activities in Technology must be structured around the design process, with Practical Assessment Tasks (PATs) serving as the primary mode of assessment. At the beginning of the PAT learners receive ill-structured, open-ended problems that require the development of innovative solutions. The ability to structure design problems is fundamental to solving such problems. Problem structuring is an inquiry process during which the scope, requirements, and boundaries of the design problem are identified. Although technology learners often rely on formative feedback from their teachers to support the structuring of design problems, they tend to focus their formative feedback on teamwork and the managerial aspects of the design process. Without formative feedback that supports learners in their problem structuring, learners often do not explore sub-problems and are inclined to reproduce known and existing solutions. The purpose of this study was to investigate the types of formative feedback teachers provide to learners during the problem-structuring phase of the design process. This qualitative case study used Schut's design feedback model to analyse the formative feedback given by five technology teachers who supported their learners with problem structuring as they solved ill-structured design problems. The findings of this study indicate that teachers primarily use Low-Level Questions (LLQs) as formative feedback, with Low-Level comments being the least observed. Verification, concept completion and example-type questions were the most frequent LLQ used to support learners' problem structuring. Additionally, compliments and direct recommendations were the most commonly used formative feedback comments. Deep Reasoning Questions (DRQs) and Generative Design Questions (DRQs) were also observed, taking the form of interpretation and method generation questions. Overall, the findings show that teachers do not adequately support learners in exploring sub-problems but instead direct learners to identify problems that have known solutions. These findings have implications for the education of pre-service technology teachers, who should be made aware of and supported by formative feedback types that can support learners' problem structuring activities. Findings from this study could inform the curriculum development and education of pre-service teachers regarding the formative feedback types they use to guide learners' problem-structuring processes. Further research is necessary to explore the impact of the types of formative feedback during problem structuring on the quality and creativity of learners' design solutions.

Keywords: Design problem solving, problem structuring, formative feedback, technology teachers.