

Algorithmic Feedback in Vocational Education: Implications for Academic Self-concept and Self-efficacy

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Abstract

Understanding the impact of algorithmic feedback on learners' self-perception is of growing importance, particularly in the context of increasingly digitalised educational environments. In vocational education, where the development of both theoretical knowledge and practical competence is essential, the integration of automated feedback systems raises questions about their influence on key psychological constructs such as academic self-concept and self-efficacy.

This paper provides a theoretical exploration of how algorithmically generated feedback may affect these constructs. Grounded in Bandura's social cognitive theory and the multidimensional model of academic self-concept by Marsh and Shavelson, the study critically analyses the mechanisms through which feedback contributes to learners' motivation, resilience, and academic development. A review of current research suggests that algorithmic feedback, when task-specific and constructive, can promote learners' confidence and support self-regulated learning. However, challenges remain, particularly in addressing emotional and contextual dimensions that such systems may not fully capture.

The findings highlight the dual nature of algorithmic feedback: while it can offer scalable and objective support for learning, its educational value depends on its integration within pedagogically sound frameworks and the continued presence of human interaction. Further empirical research is required to assess long-term effects and to inform the responsible implementation of such technologies in vocational training.

Keywords: Algorithmic Feedback · Academic Selfconcept-Concept · Selfefficacy-Efficacy · Vocational Education · Digital Learning Environments · Educational Psychology · Ai in Education · Learner Motivation · Selfregulated-Regulated Learning · Feedback Theory