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Individualized Mathematics Instruction for Adults

The Prison Education Context

Linda Marie Ahl

Abstract

Individualized instruction tailors content, instructional technology and pace to the abilities and interests of each student. Carrying out individualized instruction for adults returning to mathematics after some years away from schooling entail special challenges. Adults have, to a greater extent than children and adolescents, various prior knowledge from former schooling. Their rationales for learning mathematics differ from children and adolescents. The main triggers for adults to study mathematics are to get qualification for further studies; to prove that they can succeed in a subject where they have previously experienced failure; to help their children and to experience understanding and enjoyment. Adults also struggle with negative affective feelings against mathematics as a subject and with mathematics anxiety to a greater extent than children and adolescent learners.

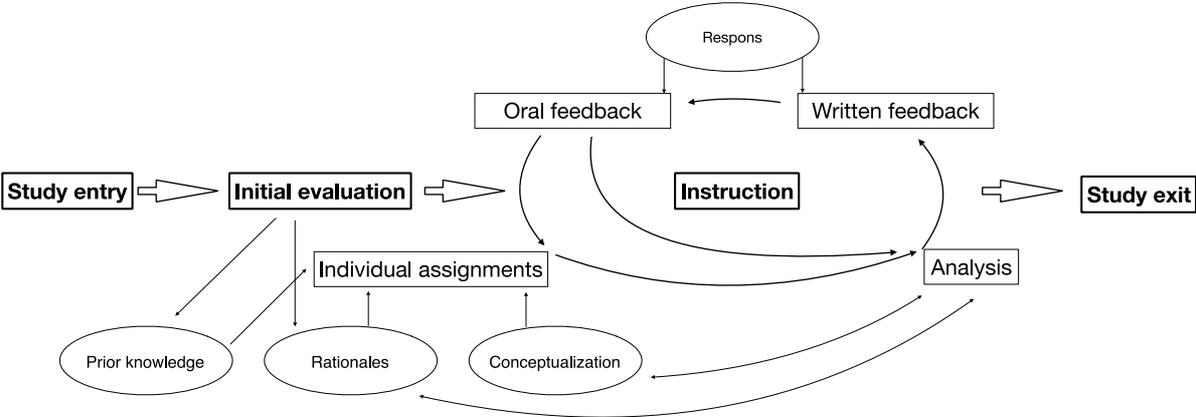
Much is known about the special challenges in teaching adults but less is known of how to adapt this knowledge into teaching practice. This thesis addresses the aim of how to organize individual mathematics instruction for adult students without an upper secondary diploma, so that they are given opportunities to succeed with their studies and reach their individual goals.

In the context of the Swedish prison education program four case studies were conducted to address the aim. The methods used were: development and evaluation of a student test of prior knowledge on proportional reasoning combined with clinical interviews; interviews focusing on a student's rationales for learning; a retrospective analysis of events in relation to feedback situations; an analysis of a common student error in relation to the role of language representation as a signifier for triggering students' schemes.

The results showed, first, that the test together with the clinical interview elicited students' prior knowledge on proportional reasoning well and that different students could be classified in qualitatively different ways. Second, that the theoretical construct of instrumental- and social rationales for learning was useful for understanding a student's initial and changing motivation in relation to the teaching and to the practice of mathematics the teaching entails. Third, that a delay between written and oral feedback worked as a mechanism that gave the receiver time and space to reflect on the feedback, which led to circumventing situations where the student ended up in affect that hindered him from receiving the teacher's message. Forth, that a linguistic representation in the problem formulation led to a common error, triggering two separate schemes. As a result of the analysis, a theoretical extension of Vergnaud's theory was suggested by detailing the relationship between schemes and semiotics.

The results are transformed into a model for individualized mathematics instruction of adults, MIMIA, in the Swedish prison education program. MIMIA consist of a flowchart for using practical- and thinking tools for individualizing instruction. The practical tools are used to elicit students' prior knowledge and organize feedback situations for adults with negative affective feelings towards mathematics. The thinking tools are used to understand and classify

adult students' rationales for learning and to analyze students' solution schemes in relation to language representations in the problem statements.



MIMIA – A Model for Individualized Mathematics Instruction for Adults