

The relationships between problem characteristics, achievement-related behaviors, and academic achievement in problem-based learning

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Abstract This study investigated the influence of five problem characteristics on students' achievement-related classroom behaviors and academic achievement. Data from 5,949 polytechnic students in PBL curricula across 170 courses were analyzed by means of path analysis. The five problem characteristics were: (1) problem clarity, (2) problem familiarity, (3) the extent to which the problem stimulated group discussion, (4) self-study, and (5) identification of learning goals. The results showed that problem clarity led to more group discussion, identification of learning goals, and self-study than problem familiarity. On the other hand, problem familiarity had a stronger and direct impact on academic achievement.

Keywords Problem-based learning · Problem characteristics · Achievement-related classroom behaviors · Academic achievement

Introduction

There are three key elements that characterize problem-based learning (PBL): (1) problems, (2) tutors, and (3) students (Majoor et al. 1990). To gain more in-depth understanding of how and why PBL works, generally two research approaches are taken. One approach is to focus on one specific element of PBL. For instance, various studies have been carried out to understand the role of the tutor (e.g., Schmidt et al. 1993). Another approach is to look at more than one element of PBL such as the relationships between problems, tutors, and students (Gijssels and Schmidt 1990). Both approaches are useful in their own right; while the first approach provides more detailed information about one specific element of PBL, the second approach provides insights on the interrelationship between the different

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