



## **Individual differences in learning and education: an overview of approaches in different sectors**

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### ***The fitting study choice: A review of individual factors determining a match between student and program***

A good fit between student and study program is thought to be critical to academic success, but it is still unclear what this fit entails. We adapted an organizational psychology model (Barrick et al., 2013) to examine the effects of personality, vocational interests, needs, values and goals on students' study choice, motivation, achievement, satisfaction, and persistence. In this systematic review, we bring together these student factors to investigate their joint and interactive effect on study choice and academic success in order to gain insight into the predictive validity of these student factors. The preliminary findings highlight the research focus from the past two decades on some student factors, but not others.

### ***Struggling or succeeding in science and technology education: Elementary school students' individual differences during inquiry- and design-based learning***

The primary aim of this study was to identify how students' individual differences are related to learning outcomes and learning process in science and technology (S&T) education. We assessed the reading comprehension, math skills, science skills, executive functions, coherence of speech, science curiosity and attitude towards S&T of 73 fifth and sixth graders. The students then received a four-lesson inquiry- and design-based learning unit on the concept of sound. Our results show how different types of students succeed or struggle within S&T education. This knowledge is essential for teachers to differentiate instruction and guidance and to provide the most optimal learning conditions for each student.

### ***Computer or teacher; who predicts dropout best?***

To try to reduce dropout rates, more and more studies propose using machine learning techniques to identify at-risk students as soon as possible. On the other hand, many teachers use

their own practical theories (using observed and unobserved factors) for signaling at-risk students. Do these practical theories allow teachers to identify actual at-risk students, and can these predictions increase predictive performance of the algorithms as well? This study puts 9 teachers to the test in a context of upper secondary vocational education. Teachers provided predictions for 95 freshmen students at the start of the program, after the first period and after the second period of the freshman year. We show that some teachers are capable of making better predictions than the algorithms at the start of the program. After the first period, the machine learning algorithms outperform the teachers, even though their predictions also increase in accuracy.

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