

## Adaptive teaching and individualization for K-12 students improves academic achievement



*The teacher's role has a significantly positive impact on student achievement. More student-centered instruction produces better achievement.*

### What is the aim of this review?

This Campbell systematic review assesses the overall impact on student achievement of processes and methods that are more student-centered versus less student-centered. It also considers the strength of student-centered practices in four teaching domains.

**Flexibility:** degree to which students can contribute to course design, selecting study materials and stating learning objectives.

**Pacing of instruction:** students can decide how fast to progress through course content and whether this progression is linear or iterative.

**Teacher's role:** ranging from authority figure and sole source of information, to teacher as equal partner in the learning process.

**Adaptability:** degrees of manipulating learning environments, materials and activities to make them more student-centered.

**Teaching methods that individualize and adapt instructional conditions to K-12 learners' needs, abilities and interests help improve learning achievement. The most important variables are the teacher's role in the classroom as a guide and mentor and the adaptability of learning activities and materials.**

### What is this review about?

Teaching in K-12 classrooms involves many decisions about the appropriateness of methods and materials that both provide content and encourage learning.

This review assesses the overall impact on student achievement of processes and methods that are more student-centered versus less student-centered (and thus more teacher-centered, i.e., more under direct control of a teacher). It also considers in which instructional dimensions the application of more of these student-centered practices is most appropriate, and the strength of student-centered practices in each of four teaching domains.

### What studies are included?

This review presents evidence from 299 studies (covering 43,175 students in a formal school setting) yielding 365 estimates of the impact of teaching practices. The studies spanned the period 2000 to 2017 and were mostly carried out in the USA, Europe and Australia.

### What are the findings of this review?

*What is the overall average effect of more versus less student-centered instruction on achievement outcomes? Which demographic variables moderate the overall results?*

More student-centered instructional conditions have a moderate positive effect on student achievement compared to less student-centered.



### How up-to-date is this review?

This meta-analysis contains studies that date from 2000 to 2017.

### What is the Campbell Collaboration?

Campbell is an international, voluntary, non-profit research network that publishes systematic reviews. We summarise and evaluate the quality of evidence about programmes in the social and behavioural sciences. Our aim is to help people make better choices and better policy decisions.

### About this summary

This summary was prepared by Howard White (Campbell Collaboration) based on the Campbell systematic review '21st century adaptive teaching and individualized learning operationalized as specific blends of student-centered instructional events: a systematic review and meta-analysis' by Robert M. Bernard, Eugene Borokhovski, Richard F. Schmid, David I. Waddington and David I. Pickup.

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*Which dimensions of instruction are most important in promoting better achievement through the application of more versus less student-centered instruction? Do these dimensions interact?*

The teacher's role has a significantly positive impact on student achievement; more student-centered instruction produces better achievement. Pacing of instruction/learning – where learners have more choice over setting the pace and content navigation of learning activities – has a significant effect in the opposite direction; i.e., a significantly negative relationship. There is no relationship between adaptability and flexibility and student achievement.

There are interactive effects. The teacher's role combined with adaptability produces stronger effects, whereas flexibility (greater involvement of students in course design and selection of learning materials and objectives) has the opposite effect; it reduces the effectiveness of teacher's role on learning outcomes.

Special education students perform significantly better in achievement compared to the general population.

Three other factors – grade level; STEM (science, technology, engineering, and mathematics) vs non-STEM subjects; individual subjects – do not have any effect on the impact of the intervention.

### What do the findings of the review mean?

This review confirms previous research on the effectiveness of student-centered and active learning. It goes further in suggesting the teacher's role promotes effective student-centered learning, and excessive student control over pacing appears to inhibit it.

An important element of these findings relates to the significant combination of teacher's role and adaptability, in that it suggests the domain in which the teacher's role should focus.

Since adaptability relates to increasing the involvement of students in more student-centered activities, the evidence suggests that instruction that involves activity-based learning, either individually or in groups, increases learning beyond the overall effect found for more student-centered versus less student-centered activities.

Various student-centered approaches, such as cooperative learning and peer-tutoring, have been found to accomplish this goal.