

Cooperative Learning in the Classroom: New Findings Substantiate the Effectiveness of this Method

There has been an abundance of empirical evidence which demonstrates that cooperative learning leads to better learning performance. Based on new findings, the study, "A meta-analysis of the effects of face-to-face cooperative learning: Do recent studies falsify or verify earlier findings?" by Kyndt and colleagues (2013) summarizes the effects that cooperative learning has in the classroom. The authors also considered it important to investigate how cooperative learning affects learners' attitudes toward this type of learning method and how the findings differ between school subjects, age groups, and different cultural contexts.

INTRODUCTION. Previous research findings show that students can achieve better learning outcomes when they learn cooperatively. In cooperative learning, students work together in small groups on a pre-structured learning task¹. Empirical studies have repeatedly shown that the effectiveness of cooperative learning, for example, depends on the individual responsibility that each learner takes for completing the task and on a clearly defined common group goal. However, the majority of primary studies to date were conducted before 1995, in laboratory settings, and with adults. In contrast, the meta-analysis by Kyndt and colleagues summarizes the most recent

META-ANALYSIS AT A GLANCE

| | |
|----------------------------|--|
| Focus of the study | Effectiveness of cooperative learning compared to traditional instruction in terms of achievement as well as attitudes toward cooperative learning |
| Target group | Primary and secondary school learners |
| Average effect size | Positive effect for cooperative learning on achievement ($ES = 0.54$) and attitudes ($ES = 0.15$). |
| Further findings | Cooperative learning is particularly beneficial for achievement in science and mathematics |

¹This sentence defines cooperative learning for the present meta-analysis. One may consider cooperative learning and collaborative learning to mean similar things. However, for further clarification in the context of instructional strategies, there are some minor differences which distinguish them from one another. According to Bruffee (1995), cooperative learning focuses on the joint outcome of the group work and learning process wherein each individual member is accountable for contributing a partial aspect toward this goal. By contrast, collaborative learning primarily focuses on the joint group working and learning process interactions between learners toward a common goal. Further characterizations of collaborative learning can be found in the meta-analysis of Kyndt and colleagues (2013).

research findings on classroom studies across a range of grade levels. In addition to examining the effect of cooperative learning on achievement, it also examines how learners' attitudes toward this type of learning method change. It is hypothesized that more positive attitudes also have a favorable effect on learning in future cooperative learning. The authors go on to examine the extent to which findings for achievement differ by school subject, age group, and cultural context.

WHAT IS THIS STUDY ABOUT? The meta-analysis summarizes the effectiveness of cooperative learning (intervention group) in comparison to normal, whole-class instruction (control group) in terms of achievement and learners' attitudes toward cooperative learning. Achievement in the meta-analysis refers to the knowledge and skills that a learner acquires. Learner attitude refers to learners' perceptions, motivations, and behavioral attitudes towards cooperative learning. In addition, the authors examine the extent to which four moderator variables affect learner performance (see Table 1). A total of 59 primary studies with quasi-experimental designs were included in the analysis.

Table 1: Moderator Variables and Description of Levels.

| MODERATOR | Description |
|---|--|
| Type of Reward After Completed Cooperation | Reward for the whole group |
| | Individual reward |
| School Subjects | Natural sciences / Mathematics |
| | Social sciences / Languages |
| | University students (ages >18) |
| Age Group | Primary school students (ages 6-12) |
| | Secondary school students (ages 12-18) |
| Cultural Context | Western culture |
| | non-Western culture |

WHAT DID THIS STUDY FIND? The meta-analysis showed cooperative learning to have a positive effect on achievement ($ES = 0.54$, medium effect) and learner attitudes ($ES = 0.15$) compared to normal instruction. Moderator analyses showed that school subject, age group, and cultural context play a role in the effects cooperative learning has on achievement.

- Cooperative learning had a stronger positive effect on achievement in science and mathematics (23 studies) compared to social sciences and languages (18 studies; difference between school subjects: $g = 0.32$).
- In terms of achievement, cooperative learning was less effective for secondary level students (12 studies) than for students at the primary level (11 studies; difference: $g = -0.20$) or university level (22 studies; difference: $g = -0.18$).
- In addition, findings indicate that cooperative learning was less effective for achievement in Western cultures (19 studies) in contrast to learners in non-Western cultures (23 studies; difference: $g = -0.38$).

- After students completed cooperative learning, the different types of rewards (group or individual) did not have an effect on achievement.

HOW DOES THE CLEARING HOUSE UNTERRICHT EVALUATE THIS STUDY? The *Clearing House Unterricht Research Group* evaluates the meta-analysis using the following five questions, guided by the Abelson criteria (1995):

How substantial are the effects? Findings indicate that the average effect sizes are in the small to medium range across all primary studies according to the classification by Cohen (1988). Overall, more learning occurs in cooperative learning than in normal classes ($ES = 0.54$). This effect means that approximately 71% of cooperative learning students have better learning achievement than the average of the control group. The effect of cooperative learning on the attitude towards this method is $ES = 0.15$, which is below the threshold for a small effect ($ES = 0.2$).

How differentiated are the results? The differentiated nature of the reported effects is estimated by the *Clearing House Unterricht Research Group* based on the school subjects, grade levels, and dependent variables examined. For example, the effect of cooperative learning with respect to achievement is found to be significantly stronger in science and mathematics than in social studies and languages. Moreover, the object of investigation in the meta-analysis not only includes achievement, but also students' attitudes toward cooperative learning.

How generalizable are the findings? The authors use moderator analyses to examine the extent to which the findings are generalizable. The respective effect sizes systematically differ for age groups, subjects, and different cultural contexts. It follows that the effects from this meta-analysis are influenced by their respective conditions and therefore cannot be generalized in the sense of a uniform overall effect.

What makes this meta-analysis scientifically relevant? In contrast to previous meta-analyses, the present meta-analysis only examines findings from primary studies that were conducted in the classroom and that were not computer-based. Accordingly, they are highly likely to be transferable to actual classroom teaching. Another innovative aspect of the meta-analysis is the additional investigation of the influence from different cultural contexts on the effects of cooperative learning.

How methodologically reliable are the findings? The disclosure and justification of the methodological approach partly meets the standards criteria of common requirement guides (e.g. APA Meta-Analysis Reporting Standards). The steps in the search, selection, and coding of primary studies are largely transparent. However, to understand the individual steps in the preparation of the meta-analysis, relevant information is missing in some cases. For example, in the area of statistical analysis, steps and decisions are not consistently described in a transparent and comprehensible manner.

Further information on the methodological assessment can be found in our [rating sheet](#).

CONCLUSION FOR CLASSROOM PRACTICE. The meta-analysis focuses on primary studies conducted in the classroom and thus allows conclusions to be drawn about effective classroom practice. The findings indicate that cooperative learning generally has a positive impact on achievement as well as on students' attitudes toward engaging in cooperative learning opportunities. Thus, teachers can use this learning method, for example, in the form of structured small group work, to effectively increase learning outcomes, especially in science and mathematics subjects wherein cooperative learning is particularly beneficial.

Moreover, students up to age twelve (i.e., up to sixth grade), as well as university students seem to benefit the most from cooperative learning in terms of achievement. Therefore, the cooperative learning method seems well suited for teaching younger students and its' increased use is recommended for this age group. The study by Krol and colleagues (2004) illustrates the positive effects of cooperative learning on achievement in languages and mathematics for sixth grade students (see example study).

EXAMPLE STUDY

Cooperative learning can lead to deeper understanding of learning content, which in turn, has a positive impact on the quality of learners responses (elaborations) in class. In their intervention study, Krol and colleagues (2004) examine the effectiveness of cooperative learning on learning outcomes (elaborations) and the number of student utterances in mathematics and languages courses among sixth-grade students.

For this study, teachers were trained in an intervention consisting of ten workshop sessions on the topic of promoting cooperative learning among students. For study implementation, students were divided into pairs, consisting of one lower-performing and one higher-performing student, and with mixed genders. Under the guidance of the teacher, the student pairs either worked cooperatively (intervention group) or non-cooperatively (control group). They engaged in a logical reasoning task in mathematics or in reading comprehension for 30 minutes.

Learners in the intervention group showed significantly better elaborations in the language task ($d = 0.70$, medium-size effect) than learners in the control group. Moreover, in mathematics, students made more utterances associated with affect (e.g., positive or negative emotional reactions) and self-regulation (e.g., when planning a task; $d = 0.66$; $d = 0.39$; both medium-size but not significant effects), compared to learners in the control group.

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<https://doi.org/10.1016/j.edurev.2013.02.002>

LINKS.

To the meta-analysis from [Kyndt and colleagues \(2013\)](#).

To the study example from [Krol and colleagues \(2004\)](#).

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