
Technical Appendix

Within-class attainment groupingⁱ

Moderate impact for very low cost, based on limited evidence.



+3

Definition

Within-class attainment grouping involves organising pupils within their usual class for specific activities or topics, such as literacy. Pupils with similar levels of current attainment are grouped together, for example, on specific tables, but all pupils are taught by their usual teacher and support staff, and they usually all follow the same curriculum.

The aim of this type of grouping is to match tasks, activities and support to pupils' current capabilities, so that all pupils have an appropriate level of challenge.

There are other forms of grouping, not included in this Toolkit entry, which also use current academic performance to organise pupils for teaching.

- Setting: pupils in a given year group are grouped by attainment into classes for specific subjects, such as mathematics and English, but not across the whole curriculum.
- 'Streaming' (also known as 'tracking' in some countries): pupils are grouped by attainment into classes for all or most of their lessons, so that a pupil is in the same group regardless of the subject being taught.
- Cross-age grouping: pupils from different year groups are formed into classes of similar current attainment for specific lessons (usually reading and mathematics), but then return to their same-age classes for other lessons.
- Gifted and talented provision: high attaining pupils are taught in separate groups or classes.
- Acceleration: pupils considered to be of exceptional ability receive separate lessons with a different curriculum (or the same curriculum at a faster pace) or join older learners for more advanced study.

The Toolkit has a separate entry on Setting or streaming. Cross-age grouping, gifted and talented provision, and acceleration are not currently covered in the Toolkit.

Although these practices are sometimes described as 'ability grouping', we refer here to 'attainment' rather than 'ability', as schools generally use measures of current performance, rather than measures of ability, to group pupils.

Search Terms: ability grouping, within class ability grouping, homogeneous/ heterogeneous grouping, (setting, streaming, tracking, regrouping, gifted and talented)

Note: a combined search was run for the 'setting or streaming' and 'within-class attainment grouping' strands. Different inclusion criteria were then applied to identify the information relevant to each strand as some reviews contained data for Setting or streaming, or for Within class attainment grouping, or for both. Brackets indicate search terms which are less relevant to this strand. See the Toolkit Manual for more detail on search and inclusion procedures.

Evidence Rating

There are four meta-analyses of within-class grouping studies included in the analysis for this strand, once duplication has been taken into account. These suggest that within-class attainment grouping appears to benefit pupils by about three months on average (a weighted mean of 0.21). Overall the pooled effects from these meta-analyses are similar, ranging from 0.12 to 0.32. Only one meta-analysis has been conducted in the last ten years. Only two of the meta-analyses explore the variation in effects. Many of the designs of the included studies have limited causal inference.

The majority of the experimental evidence comes from the USA, and there are few rigorous studies from other countries.

Overall the evidence is rated as limited.

Cost Information

Within class grouping is an organisational strategy which has few, if any, financial costs associated with it. Additional resources may be needed to support different groups. Overall the costs are estimated as very low.

Additional Impact Information

There are a number of challenges involved in evaluating the impact of attainment grouping interventions which make evaluating and synthesising this literature challenging.

One is who should be included in the analysis. For interventions in which all pupils are grouped, it is possible to consider the overall impact, and the impact for each group. However, for interventions such as acceleration, which involve only some pupils from a year group, it is necessary to consider whether the impact should be measured just for those who receive the intervention (for whom the evidence suggests we will observe a positive impact), or for the whole cohort. The latter is often necessary, because there is evidence that the attainment of the 'non-accelerated' pupils may be detrimentally affected if higher achieving pupils are removed from some classes, both in the straightforward sense that the overall average for the class will come down if the results for higher attainers are not included, and in terms of the subsequent progress made once any positive peer effect of having the higher attainers in the class is removed.

Another is how to take account of the curriculum that pupils follow. If a grouping intervention involves different pupils studying different curriculum content, finding a test which can be used to assess the progress of all the pupils can be difficult. This is particularly the case for subjects like mathematics where questions on a test may relate to different mathematical content. The additional progress made by pupils who have been taught this additional content is compared to that made by pupils who have not been taught the material. This comparison may overstate the impact. This issue is often referred to as bias resulting from 'treatment inherent' measures (Slavin & Madden, 2011).

Two other important points to consider, in the context of impact, are misallocation to attainment groups, and impacts on non-attainment outcomes. In line with every other Toolkit entry, the meta-analysis we present here considers impact on attainment outcomes only. However, these two issues arise repeatedly in the literature around attainment grouping and so warrant brief further discussion.

Misallocation: There is some evidence from the UK that misallocation to 'ability groups' is a particular problem for pupils from disadvantaged backgrounds. These pupils appear to be at greater risk of misallocation to lower attaining groups, and the impact of setting or streaming on pupils in lower attaining groups is negative on average. See, for example Wiliam and Bartholomew (2004), Tereshchenko et al. (2017) and Archer et al. (2018).

Impact on other outcomes: It is possible that attainment grouping also has an impact on wider outcomes such as confidence. A number of studies conclude that grouping pupils on the basis of attainment may have longer term negative effects on the attitudes and engagement of low attaining pupils, and discourage the belief that their attainment can be improved through effort. See, for example Hallam and Ireson (2007) and Tereshchenko et al. (2017).

Differential impacts of within-class attainment grouping on low, middle and high attaining pupils

Three of the four meta-analyses included in the analysis for this Toolkit entry also provided separate estimates of the impact of within-class attainment grouping on low, middle and high attaining pupils. These results are presented below. These results should be treated with caution: the evidence for the overall impact estimate is rated as limited, and these estimates are likely to be more limited, as they are based on sub-group estimates.

Summary of differential effects for subgroups

| Meta-analysis | Low attaining pupils | Mid-range attaining pupils | High attaining pupils | All pupils |
|----------------------------------|----------------------|----------------------------|-----------------------|-------------|
| Kulik & Kulik 1992 | 0.16 | 0.18 | 0.30 | 0.25 |
| Lou et al. 1996 | -0.60 | 0.51 | 0.09 | 0.12 |
| Puzio & Colby, 2010 | N/A | N/A | N/A | 0.22 |
| Slavin 1987 | 0.65 | 0.27 | 0.41 | 0.32 |
| Weighted mean effect size | N/A | N/A | N/A | 0.21 |
| Mean | 0.07 | 0.32 | 0.27 | 0.22 |
| Median | 0.16 | 0.27 | 0.30 | 0.24 |

It is important to note that we can only present these figures for the subset of studies for which differential impact figures were available. This means that if a weighted mean was calculated of the overall effect sizes from each of the studies which provided subgroup estimates, it may not be the same as the weighted mean for all the studies included in the previous 'Summary of effects' table.

Note about 2018 update

Steenbergen-Hu and colleagues (2016) undertook a meta-analytic review of the evidence over the past 100 years on grouping by attainment and acceleration. This was a tertiary review where they identified studies from existing meta-analyses and then recalculated overall effects. As described in the [Toolkit Manual](#), our analysis includes the relevant meta-analyses included in this tertiary review, but not the meta-meta-analysis itself. In their review they estimated standard errors from some

studies to be able to weight studies more appropriately. We have used their review to check the effect sizes from the meta-analyses included in the Toolkit and we have adopted their weighting approach, as this is consistent with the Toolkit methodology. We differ from Steenbergen-Hu et al. (2016) in that, for the effect size from Lou et al. (1996), we think they used the combined average for small group and homogeneous grouping of 0.17, whereas we think 0.12 is the estimate comparing homogeneous and heterogeneous groups.

References

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What one hundred years of research says about the effects of ability grouping and acceleration on K–12 students' academic achievement: Findings of two second-order meta-analyses. *Review of Educational Research*, 86(4), 849-899.

(2016)

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Learners' attitudes to mixed-attainment grouping: examining the views of students of high, middle and low attainment.

Research Papers in Education, 1-20.

(2018)

Summary of effects

| Meta-analyses | Effect size | FSM effect size |
|--|-------------|-----------------|
| Kulik, J. A., & Kulik, C. C. (1992) | 0.25 | - |
| Lou, Y., Abrami, P. C., Spence, J. C., Poulsen, C., Chambers, B., & d'Apollonia, S. (1996) | 0.12 | - |
| Puzio, K., & Colby, G. (2010) | 0.22 | - |
| Slavin, R. E. (1987) | 0.32 | - |
| Single Studies | | |
| Effect size (weighted mean) | 0.21 | |

Meta-analyses abstracts

1

Kulik, J. A., & Kulik, C. C. (1992)

Meta-analytic reviews have focused on five distinct instructional programs that separate students by ability: multilevel classes, cross-grade programs, within-class grouping, enriched classes for the gifted and talented, and accelerated classes. The reviews show that effects are a function of program type. Multilevel classes, which entail only minor adjustment of course content for ability groups, usually have little or no effect on student achievement. Programs that entail more substantial adjustment of curriculum to ability, such as cross-grade and within-class programs, produce clear positive effects. Programs of enrichment and acceleration, which usually involve the greatest amount of curricular adjustment, have the largest effects on student learning. These results do not support recent claims that no one benefits from grouping or that students in the lower groups are harmed academically and emotionally by grouping.

3

Lou, Y., Abrami, P. C., Spence, J. C., Poulsen, C., Chambers, B., & d'Apollonia, S. (1996)

The effects of within-class grouping on student achievement and other outcomes were quantitatively integrated using two sets of study findings. The first set included 145 effect sizes and explored the effects of grouping versus no grouping on several outcomes. Overall, the average achievement effect size was +0.17, favoring small-group learning. The second set included 20 effect sizes which directly compared the achievement effects of homogeneous versus heterogeneous ability grouping. Overall, the results favored homogeneous grouping; the average effect size was +0.12. The variability in both sets of study findings was heterogeneous, and the effects were explored further. To be maximally effective, within-class grouping practices require the adaptation of instruction methods and materials for small-group learning.

6

Puzio, K., & Colby, G. (2010)

Although some literacy researchers consider grouping students for reading instruction to be a proven educational practice, the support for this belief is lacking from a research synthesis perspective. With this idea in mind, Slavin comments in the middle of his review on the effects of grouping: "there is not enough research on within-class ability grouping in reading to permit any conclusions" (Slavin,

1987, p. 320). Because of this, the question of whether "and" how to group students is often cast and answered ideologically rather than empirically. This review attempts to see if the empirical research available can answer either or both of these questions. It will contribute to the literacy field by focusing specifically on reading outcomes for classroom teachers, who instruct a wide variety of students. Informed by previous research on within-class grouping, the following three research questions guide the present study: (1) To what extent does within-class grouping impact student achievement in reading?; (2) For which grade(s) or which students is within-class grouping most or least beneficial?; and (3) Do any moderators, especially those identified by previous research (measurement source, teacher development, and grouping type), help explain this effect?

8

Slavin, R. E. (1987)

This article reviews research on the effects of between- and within-class ability grouping on the achievement of elementary school students. The review technique- best-evidence synthesis-combines features of meta-analytic and narrative reviews. Overall, evidence does not support assignment of students to self-contained classes according to ability (median effect size [ES] = .00), but grouping plans involving cross-grade assignment for selected subjects can increase student achievement. Research particularly supports the Joplin Plan, cross-grade ability grouping for reading only (median ES = +.45). Within-class ability grouping in mathematics is also found to be instructionally effective (median ES = +.34). Analysis of effects of alternative grouping methods suggests that ability grouping is maximally effective when done for only one or two subjects, with students remaining in heterogeneous classes most of the day; when it greatly reduces student heterogeneity in a specific skill; when group assignments are frequently reassessed; and when teachers vary the level and pace of instruction according to students' needs.

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