

Composite classes, class size and human capital accumulation

Introduction and background

Composite classes – where children from different year groups are taught together – are widespread in Scotland in both urban and rural areas, with one in 5 primary school pupils in Scotland attending a composite class. The issue of composite classes has received ample attention from academics, practitioners, and policy makers. Yet, due to a lack of data and robust empirical methods, evidence on peer effects and the impact of composite classes has been limited. In this project, researchers from the Fraser Allen Institute at the University of Strathclyde studied the effects of composite classes and class size on pupils' attainment in primary schools. Anonymised data from the Scottish Pupil Census was used to code each pupil's school, grade, and class and compare outcomes over a period of 12 years between 2007-08 and 2018-19. The primary outcome data used for the analysis is from the Scottish Government's "Curriculum for Excellence" (CfE) program, which was first introduced in 2010. Since 2015-16, each pupil's progress has been assessed in both numeracy and literacy as either "Below Early Level", "Early Level", or at "1st/2nd/3rd/4th" level. These assessments are teacher-based but informed by standardised test scores. Assessments are taken at the end of P1 when pupils are expected to perform at early level, and at the end of P4, P7, and S3 when students are expected to perform at the first, second, and third level, respectively. The SCN (Scottish Candidate Number) is used to link each pupil from the pupil census to their CfE assessments and create indicators for whether they are performing at the expected level at a given stage.

Key Findings

Context and previous research

- This is a developing, but small amount of literature on composite classes. Leuven and Rønning (2014) have studied multigrade classrooms in Norway whereas Barbetta et al. (2019) and Checchi and De Paola (2018) explored composite classes in Italy. One common finding was that the lower-graders benefit from this set-up at expenses of their older classmates. Another common factor is that they deal with classroom allocation policies which are typical of rural contexts, where cohorts tend to be particularly small - at times so small that pupils across 3 stages are taught together. In Scotland, on the other hand, composite classes are a widespread phenomenon used in urban as well as rural settings. The findings in this study therefore fill an important research gap.
- Composite classes are a widespread feature of Scottish primary education. The maximum class size for composite classes is 25 and each grade needs to contribute a minimum of five pupils. They typically stretch across 2 grades. As mentioned above, they are not confined to rural areas. For example, in 2018, 84 per cent of primary

schools in the city of Glasgow featured at least one composite class.

Key findings of the current research

- For first-graders, exposure to an additional older peer (i.e., exposure to an additional second grader) raises the probability of performing at the expected level or better in numeracy by 0.8 to 1.1 percentage points. On average, P1/P2 classes contain about 10 P2 pupils, so this translates into an average composite class boost of 9-11 percentage points.
- The effects are slightly larger for literacy. Each older peer here increases performance by 1.3 to 1.5 percentage points. This translates into a 15-16 percentage point composite class boost in the probability of performing at least at the expected level in literacy.
- The large benefits of P1/P2 composite classes for P1 pupils revealed in this research are in line with the previous literature. For instance, Leuven and Rønning (2014) find that multi-grade classes in Norway increase younger



- pupils' performance by 0.4 standard deviations. The point estimates in this study suggest improvements of 0.28 standard deviations for numeracy and 0.35 standard deviations for literacy.
- A key question is whether the benefits for first graders come at the expense of second graders. While second graders are not tested at the end of 2nd grade, they are tested 2 years later at the end of 4th grade. In other words, the data allow researchers to see whether there are any medium-run adverse effects on pupils who made up the P2 component of a P1/P2 composite class. Analysis of the data shows that this is not the case- 1st graders are likely to benefit from exposure to 2nd graders by way of composite classes without there being evidence of a detrimental impact on the second graders who are in the same class.
 - However, it should be noted that there do not appear to be any persistent benefits for composite P1 pupils when tested in P4. This suggests that costs and benefits are either short-lived and wash out over time, or that the current statistical models do not have the precision to detect long-run effects.
 - Additional evidence for the findings is provided by the analysis of fourth- and seventh graders. Analysis for these grades was impacted by lower compliance, so results are generally less precise. However, the data does yield results that are consistent with the other main findings. Exposure to older peers is associated with improvements in numeracy and there is no evidence for a statistically significant negative impact on pupils who make up the older component of a P3/P4 or a P6/P7 composite class.
 - No other positive or negative effects of composite classes were observed beyond attainment, for example in relation to attendance, suspension rates or attitudes to learning.
 - Even though composite classes tend to be smaller than single-year classes, the research showed that class size was not a driving factor. The results suggest that further reductions in class size in Scottish schools offer little return, at least in terms of attainment.
 - Although the research did not find evidence for adverse effects of composite classes on older peers, such effects cannot be ruled out. There is a chance that adverse effects of composite classes on older peers - which had been identified by previous studies - have simply remained undetected in this study. Composite classes should thus not be considered a panacea, but rather appear to be a useful addition to school administrators' and head teachers' toolboxes.
 - Future research should attempt to better understand the mechanisms through which composite classes and peer effects generate benefits. This study suggests that composite classes may feature particular models of learning, classroom management techniques, or pupil interactions that are conducive to learning. How exactly these benefits accrue is important and shedding more light on mechanisms is likely to offer lessons that generalise beyond the role of composite classes.
 - Despite the apparent cost savings of composite classes, anecdotal evidence suggests that there is also a hidden cost of composite classes to teachers in the form of longer preparation times. Uncovering all costs and benefits will require more or better data, qualitative approaches, or policy experimentation that allows for robust evaluation.

Conclusions and recommendations

- This project yielded new data on the Scottish pupil population from 2007-08 until 2018-19 which allows researchers to follow each Scottish pupil's educational career and trajectory from first grade until 1 year after high school graduation. The project has shown that it is feasible to link data from different sources, and to use these data to gain insights into what works in education. The Scottish Government and third party organisations should consider utilising this new data to evaluate existing or future policies and interventions, and to add new waves of existing data sets as they become available. They should also consider adding new data building blocks that allow for even further-reaching research.
- This research has shown that peer effects matter and can be generated by way of composite classes. It may help alleviate parental concerns about pupil attainment in composite classes. It will also be reassuring for Scottish local authorities that the cost savings that composite classes can provide do not appear to come at the expense of lower instructional quality.

The full document can be downloaded from:

<https://mk0nuffieldfounpg9ee.kinstacdn.com/wp-content/uploads/2021/03/Composite-classes.pdf>