

# Debunking the Semestering Myth: *A Reply to Mr. Budden*

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I reviewed with great interest Budden's comments concerning our paper "Debunking the Semestering Myth." Since most of his comments were not concerned with methodological flaws in our research but rather with the interpretation of our findings, I will briefly comment on some design issues before discussing the meaning of the results and implications for the study of semestering and the teaching and learning of secondary level mathematics.

Budden suggested that a longitudinal rather than a cross-sectional approach would have provided a more valid examination of the effects of semestering. While a cross-sectional approach is not without its problems, one problem which cross-sectional studies avoid and longitudinal studies do not is the non-equivalence of samples due to factors associated with time of testing. Termed *historical* or *cultural effects* (Baltes, Reese, & Nesselroade, 1977), a simple illustration would be interpretation of changes in scores due to imposition of an educational innovation such as semestering when the effects were more likely due to changes in student composition (declining and now apparently rising SAT scores in the United States would be a case in point). Furthermore, studying schools opting for a change in school organization could lead to spuriously high (reflecting greater enthusiasm for a new system – the Hawthorne effect) or low (disruption due to a new system) achievement scores. Causes suggested by Budden as possibly impinging on the validity of cross-sectional study (e.g., ability of students, past performance of students, past performance of teachers, time allocated to mathematics) would be just as serious, if not more so, within a longitudinal study.

SIMS data, however, were gathered from a large stratified random sample representative of Ontario secondary schools. Additionally, the proportions of semestered and non-semestered schools in the sample were what would be expected from the province as a whole. Being aware of the potential sampling bias mentioned in our article, we made every

attempt to examine possible biasing factors. We were concerned that semestered schools may have been overrepresenting particular strata (e.g., rural or particular geographical locations), but analysis of strata contributions of semestered and non-semestered schools revealed that virtually all strata contributed both types of schools and most did so in proportions similar to the sample as a whole. Concerning students, only those who had completed two or more of the three Grade 13 courses of interest were selected, and analyses ascertained that student socio-economic status did not differ between groups at either the Grade 12 or 13 levels. We therefore had, and still have, no reason to feel that the samples of schools were not comparable.

Finally, teachers were asked to test as near the end of the course as possible, and our analysis of teachers' responses to the question whether the mathematics required to answer each item correctly had been taught (opportunity-to-learn) indicated content coverage did not differ between teachers in semestered and non-semestered schools.

We were somewhat surprised at the magnitude of achievement differences; most mathematics co-ordinators and teachers we consulted were not. Indeed, we had conducted our analyses at the request of members of the Ontario Association of Mathematics Coordinators who felt that semestered classes did not allow time for advanced level material "to sink in" and that the frequent breaks many students experienced between mathematics courses did not promote continuity. The greater length of classroom periods was also seen as taxing students' attention spans. Our presentations of findings to teaching associations and boards of education have been well received.

Our results were consistent with King, Warren, Moore, Bryans and Pirie's (1977) findings as we summarized them: "... of teachers in semestered advanced level Grade 11, 12, and 13 [mathematics] courses, 20% felt they could not adequately cover the course content and an additional 43% had reservations. Thirty-one per cent felt students were forced to cover material too quickly, and an additional 32% agreed that the problem occurred to some extent."

Our findings drew attention to possible problems in mathematics teaching among schools with semestered organizations, and the numerous factors suggested by Budden as mediating these effects seem well worth investigating. Indeed, we have suggested the need for such studies to the Ontario Association of Educational Administrative Officials. Since the great majority of Ontario secondary schools have now been semestered, the need to examine the issues raised by Budden seems of greater importance than ever.

## REFERENCES

- Baltes, P. B., Reese, H. W., & Nesselroade, J. R. (1977). *Life-span developmental psychology: Introduction to research methods*. Monterey, CA: Brooks Cole.
- King, A. J. C., Warren, W., Moore, J., Bryans, G., & Pirie, J. (1977). *Approaches to semestering*. Toronto: Ontario Ministry of Education.

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