Research Agenda

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My work centers on educational research, with a particular focus on the relationship between socioeconomic background and educational outcomes among Chilean students in secondary and higher education. In the last decade I have been dedicated to the study of the relationship between personal and family socioeconomic attributes of students and performance in national standardized tests, especially those used in the selection process for higher education. More recently, my work has focused on the application and refinement of multilevel analysis in educational research. Currently, my primary academic interests include using multilevel analysis to examine educational outcomes in Chile and discussing theoretical and practical challenges in the use of multilevel models in educational research. My ultimate goal is to contribute to the refinement of multilevel analysis tools to enhance the robustness of educational research in Chile.

Research into educational outcomes and the socioeconomic attributes of students is part of the discussion on educational segmentation in Chile, as its findings usually show higher levels of performance as the economic and social conditions of students and their families improve. Furthermore, some characteristics of schools, such as the type of administration or admission requirements, can affect the homogeneity or heterogeneity of school communities, which creates a structural segmentation in primary and secondary education that can extend to higher education. Segmentation is a problem for the quality and fairness of education in Chile, as it prevents equal opportunities for the personal and social development of students. In this context, my research has contributed to the understanding of differences in scores in tests measuring educational quality and tests for admission to higher education among students.

The most relevant findings of my research have shown a strong correlation between performance in standardized tests and the socioeconomic characteristics of the student, their family, and their school. For example, the analysis of the results in the SIMCE test that measures learning in mathematics in secondary education and in the mathematics and language tests that are used in the selection of students for higher education has shown significant differences in the average scores and levels of achievement reached among students. These analyses have often shown that students from high-income families whose parents attained higher education achieved better scores in the aforementioned tests. In addition, students from private schools have shown higher scores than their peers from public schools.

The study of educational segmentation can benefit from methodological advances in multilevel analysis, given the data structure is inherently nested: students are nested in schools. Multilevel analysis allows for simultaneous analysis of the relationship between individual and school attributes on educational outcomes, separating differences between students within the same school from differences between schools. This means that modeling and analyzing standardized test scores could evaluate, on the one hand, the unique contribution of the socioeconomic attributes of the student and their family and, on the other hand, the unique contribution of the attributes of the school and the context of the students. Therefore, the application of the multilevel methodology can contribute to advancing our understanding of educational segmentation and its relationship with students' educational results.

To take advantage of multilevel analysis, researchers must be aware of the importance of properly specifying the components of their model (fixed and random effects). Recent research findings have shown that some multilevel models widely used in the social sciences may have problems in the specification of their random effects, which would impair the interpretation and inferences of the model results. This is something I am addressing in my master's thesis in Educational Measurement and Statistics at the University of Iowa. The central idea is that the random slopes in a multilevel model can inadvertently combine different sources of variance, which affects the understanding of differences between clusters (i.e., schools) in the sample.

The methodological advances in the adequate specification of the components of a multilevel model I will develop can help researchers obtain reliable results. My research on random slopes in multilevel analysis can contribute to the improvement of research on segmentation and educational outcomes in Chile. In the future, research on socioeconomic differences in standardized test scores in Chile could identify the unique contribution of individual and school attributes and improve our understanding of the role of families and schools in educational segmentation.