



Improving teaching quality through training: Evidence from the Caucasus[☆]



Alejandro Ome^{*}, Alicia Menendez, Huyen Elise Le¹

NORC at the University of Chicago, 1155 East 60th Street, Chicago, IL 60637, United States

ARTICLE INFO

Article history:

Received 16 January 2017

Revised 6 September 2017

Accepted 11 September 2017

Available online 13 September 2017

ABSTRACT

Teacher training constitutes a promising policy area for improving education quality in developing countries. While there is mixed empirical evidence on whether teacher training improves student achievement, some interventions that follow a comprehensive approach on teacher training show positive impacts. In this study we analyze the effect of the Georgian Primary Education Project, an initiative that provided teacher training and other teacher support activities in 122 schools in the Republic of Georgia between 2013 and 2015. We use a quasi-experimental design, specifically a Value-Added model, to estimate the effect of the program on math and Georgian test scores of students that were in grades 1–4 in 2013. We find that the program increased math test scores by 0.27 standard deviations; these gains were observed mostly in students that were in grades 1–3 in 2013, while no effects are observed for students that were in grade 4 in 2013. For Georgian we analyze the results for students that speak Georgian as their native language and for students in minority schools that speak Georgian as a second language. For native speakers we find an average effect of 0.15 standard deviations, in this case, the observed gains are also concentrated in students that were in grades 1–3 in 2013, and no impact is observed on students that were in grade 4 in 2013. We do not find any significant effects on reading Georgian as a second language. This study contributes to the growing literature on comprehensive teacher training as a strategy to improve students' achievement in developing countries.

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1. Introduction

Several school-based factors can contribute to the production of students' knowledge. These factors ranged from materials and infrastructure to school organization.² Teacher quality is arguably the most important determinant of student achievement. Recent evidence also shows its importance as a determinant of long term outcomes (Chetty, Friedman, & Rockoff, 2014). Teaching quality can be modified via three channels: improving the type of teachers

working in schools; providing incentives to exert greater teacher effort (monetary or non-monetary); and improving the quality of teaching through training and professional development. Between 2013 and 2015, a program conducted in the Republic of Georgia followed the third channel – teacher training – to improve teaching quality. In this study, we use Value-Added models to analyze the effect of this program on student achievement, measured by math and reading test scores.

We contribute to the growing literature on comprehensive teacher training as a strategy to improve students' achievement in developing countries. To the best of our knowledge, this is the first rigorous evaluation of a teacher training program in Eastern Europe, so the results from this study may be especially relevant for countries in the region that are trying to improve school quality.

Most of the evidence from the US indicates that in-service teacher training has little to no impact on student achievement. Studies by *Garet et al. (2008, 2010)*, *Harris and Sass (2011)*, *Jacob and Lefgren (2004)* and *Randel et al. (2011)* fail to find significant impacts of teacher training on student test scores. In contrast, a recent meta-analysis conducted by *Kraft, Blazar, and Hogan (2016)* focusing on studies investigating the impact of

[☆] The authors would like to express their appreciation to USAID/Georgia for funding the original evaluation from which this work is based (IQC AID-114-I-13-00001), to the NORC Working Paper Series for partial funding, to two reviewers from NORC that provided valuable comments and suggestions to the paper, and to participants at seminars at the Ministry of Education and Science of Georgia, the Georgian US-AID Mission, NORC at the University of Chicago and the American Evaluation Association. We would also like to thank Medea Kakachia and Lela Kerashvili from USAID/Georgia and Nancy Parks and Indira Amiranashvili from G-PriEd for valuable information about the implementation of the program.

^{*} Corresponding author.

E-mail address: ome-alejandro@norc.org (A. Ome).

¹ Current affiliation: The Fuqua School of Business, Duke University.

² *Glewwe, Hanushek, Humpage, & Ravina, (2013)* review recent literature on the impact of schools' resources on student achievement in developing countries.

teacher coaching finds an average impact of 0.15 of a standard deviation on student achievement.

In developing countries the evidence on the impact of teacher training is relatively more mixed than in the US. In particular, interventions that follow a comprehensive approach on teacher training show promising results. For example, [Chay, McEwan, and Urquiola \(2005\)](#) use a regression discontinuity design to evaluate the Chilean P-900, an intervention targeting low performing schools that provided teacher training, infrastructure improvement, textbooks and other instruction materials, and tutoring for low performing students. The evaluation documents positive effects on students' test scores of 0.2 standard deviations. More recently, [Piper and Korda \(2011\)](#) evaluate a program in Liberia that provided teacher training through a combination of capacity building workshops, on-going regular feedback, as well as other community outreach activities. Using randomization as their identification strategy, the authors find that the program improves reading scores by 0.79 standard deviations. [Menendez and Dayaratna \(2016\)](#) evaluate a similar intervention in Uganda using an experimental design but find relatively small effects on reading fluency among third graders exposed to the program since the beginning of their primary education. [Lucas, McEwan, Ngware, and Oketch \(2014\)](#) compare the effect of teacher training interventions in Uganda and Kenya. They use experimental designs in each country to evaluate programs that included teacher training, instruction materials, and ongoing mentoring for teachers. Lucas and her coauthors find significant effects for Uganda of approximately 0.2 standard deviation, but much smaller effects for Kenya. [Oliveira and Carnoy \(2015\)](#) use a triple difference approach to evaluate *Pacto pela Alfabetização na Idade Certa*, an early grade reading program in Brazil that provided teacher training and reading materials to schools, combined with monetary incentives based on student performance in standardized exams; they find effects of 0.08 and 0.14 standard deviations for Portuguese and math, respectively. A recent meta-analysis by [Popova, Evans, and Arancibia \(2016\)](#) of teacher training programs in developing countries finds that programs that in addition to training teachers provide reading materials for students are more likely to have positive impacts on student achievement.

What these programs have in common is a comprehensive approach to teacher professional development. These interventions do not simply provide teacher training but also offer a series of teacher support resources, including regular feedback and teaching materials.

Similarly, the Georgia Primary Education Project (G-PriEd) took a comprehensive approach to teacher professional development. In addition to teacher training, the program provided in-service training and ongoing support for teachers and principals. It supplied instructional materials including leveled supplementary readers, students' newspapers, and math manipulatives. In addition, to help teacher check their own teaching quality and inform them on their students' performance, the program equipped teachers with students' formative assessments tools. Finally, to foster accountability and transparency as an external check on teaching quality, the program created school report cards for principals with information from school performance on training participation, teacher tests, use of project methodology in the classroom, and other project activities.

The main challenge in evaluating G-PriEd is that schools self-selected into the program. Specifically, the Georgian Ministry of Education and Science (MES) invited schools to apply to the program through a promotional campaign. Of a total of 817 applications received, 122 pilot schools were then chosen on a first-come first-served basis to participate. As a comparison group, 119 schools were randomly chosen from the pool of schools that did not apply. Because the schools that self-selected into applying might be different from those that did not, it is difficult to isolate the ef-

fects of G-PriEd from other potential differences. For example, the schools that applied might be the ones that were most interested in improving students test scores. In such scenario, differences in the school quality of the treatment group may be due to their own efforts instead of G-PriEd.

To tackle this selection problem, we exploit the fact that data on the same students was collected at baseline and endline, and estimate a Value-Added Model (VAM) to evaluate the impact of the program. The key feature of VAM is the inclusion of a lagged student achievement measure (baseline) as a control variable. For VAM to identify the causal impact of the program, the underlying assumption is that baseline test scores are sufficient to characterize the cognitive ability of students at that moment (for a discussion on this type of models see [Todd & Wolpin, 2003](#)). While we cannot test whether this assumption holds in the context of G-PriEd, a growing literature shows that VAM can replicate experimental parameters of schooling interventions, specifically in the context of schools in the US ([Abdulkadiroglu, Angrist, Dynarski, Kane, & Pathak, 2011](#); [Deming, 2014](#) and [Deutsch, 2012](#)).

We find that G-PriEd has significant positive effects on students' achievement. For math, we estimate an average impact of 0.27 standard deviations and for reading Georgian as a native language an effect of 0.15 standard deviations. For Georgian as a Second Language (GSL) no significant effects are found. The lack of significant results for GSL students may be due to the fact that these teachers received less training than planned due to budgetary restrictions. We also explore treatment heterogeneity across gender and baseline test scores. We do not find strong evidence that the program had differential effects across these dimensions.

This paper has seven sections including this introduction. In the next section, we describe the G-PriEd program. [Section 3](#) presents the data and our methodological approach in detail. [Section 4](#) describes the main results and [Section 5](#) presents the heterogeneity analyses. In [Section 6](#), we discuss the results. [Section 7](#) concludes.

2. The G-PriEd program

Georgia is a country located east to the Black Sea, with a population of 3.7 million and a per capita GDP of US 9,163 in 2014 (PPP). Primary education is compulsory in Georgia (grades 1–6). The public education system covers approximately 91% of pupils in primary education and the rest is served by private institutions. Public schools are centrally funded but management is decentralized. Public schools receive from MES an amount per pupil that varies according to the location of the school. Each school has a board of trustees that defines the budget and elects the school director. Representatives from parents, teachers, students and the local government compose the boards of trustees ([Unesco, 2011](#)).

Despite being a middle-income country, Georgia struggles to improve the quality of the education provided and students' outcomes. For example, the results of the Program for International Student Assessment (PISA) 2009 indicates that less than 40% of 15 year-old students reach reading proficiency levels. Georgia compares very poorly to most nations participating in PISA, not only on reading but also on mathematics and science ([Walker, 2011](#)).

G-PriEd was a pilot project funded by USAID and implemented by Chemonics International in collaboration with the MES that aimed to improve primary students' skills in reading and mathematics. The program took a comprehensive approach providing multiple services to teachers and schools. First, principals and teachers were trained in instructional practices in reading and math. Furthermore, teachers received continuous support through school-based Teacher Learning Circles (TLC). During these sessions, teachers discussed student progress, test scores and brainstormed solutions to any challenges. Also, teachers received support through classroom visits from national trainers who gave

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