Effectiveness of Kazakhstan education reforms through the lenses of PISA 2009-2018

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Introduction

In the last decade Kazakhstan showed in four cycles of PISA's Programme for International Student Assessment (PISA). Overall Kazakh students showed low performance in PISA in comparison to other students, such as TIMSS and PIRLS. Kazakh students scored 536 points in PIRLS 2016, which is the same result that students from Germany, Canada and Austria showed. In TIMSS 2015, Kazakh students performed well, with 50 points above the average. In PISA 2012 Kazakhstan mathematics performance was among the lowest: 432 score points compared to the OECD average of 494 score points. In 2009 and 2012, mathematics and science performance improved, while performance in reading remained unchanged. Kazakhstan's share of low performers decreased by 13.9% between 2009 and 2012. However, at 45.2% in PISA 2012, it remained nearly twice as high as the OECD average (23.1%).

The overall goal of this paper is to assess the effectiveness of education strategies in Kazakhstan by means of PISA data from 2009, 2012, 2015 and 2018. This is achieved by evaluating the main indicators of education strategies at the level of secondary education. State Program for 2011-2015 was monitored and evaluated by the achievement of major indicators and implementation of key events in the action plan internally.

Research Questions

Research questions that guide the data analysis are:

• What PISA variables can be predictors for education reform indicators?
• How do these proxy PISA variables (strategy indicators) explain the achievement of Kazakhstani students in math, reading and science, if student SES is taken into consideration?
• Are there any changes that occurred during the timeline of reform implementation?

Method

Combining the available data, the datasets for Kazakhstan for 2009, 2012, 2015, 2018 were built. The datasets combine the student test scores in reading, math and science with students' characteristics (plausible values), family-background data (ECS) and school related variables of resource use and institutional settings. All the variables are taken from the school questionnaire data.

In the paper, data were calculated using multivariate analysis, hierarchal regression analysis, which implies that the independent variables will be entered in the specified order. In the analysis the student SES will be controlled.

Results

To sum up results, the most contributing variables in Kazakhstan in all cycles of PISA are number of computers, connection to the Internet and quality of school education resources. The effect of these variables on reading and science grows in each cycle. This can be interpreted as the importance of technology in the modern world and, especially, in education system. Thus, the access to Internet provides a huge amount of education opportunities to teachers as well as students. Although, during the reform, the student-computer ratio decreased almost twofold - from 18 to 10 students per computer. From 2015 to 2018, the average student-computer ratio in the country is 10. Less contributing variables are a proportion of qualified and certified teachers, shortage of teaching staff and shortage of educational materials.

Teacher variables have very low effect or no effect on student performance. During the reform the public institutions of professional development changed their organizational structure, which, in the end, developed decentralized system of professional development institutes. That all caused complexity in the system of professional development. This could be a reason to the negative relationship between proportion of certified teachers and student achievement.

Overall, school resources explanation strength for math from 2009 to 2018 lenssed threefold (from 0.062 to 0.024). In reading, the R square change increased almost twice (from 0.045 to 0.071) and, in science, R square change also increased one and half time (from 0.041 to 0.061).

These changes in general lie in the interval of 6-10% variance explained by school resources, which correspond to earlier findings (Jencks et al. 1972, Coleman et al. 1966 cited in OECD 2005). Comparing the explained variance between cycles, it is observable that the explanation strength of SES at the student level has gradually decreased. The variance explained by the school resource variables proportion is between 6% to 2%, with some fluctuations. These changes are significant over the cycles.

Conclusions

PISA is designed not only to access and compare students’ performance across the countries, but also to provide empirical outcomes to inform educational leaders and influence strategies at the national level (e.g. Beese, 2010). Overall, the approach for reform evaluation is complete and feasible. PISA variables can be a proxy for education reform indicators, and it is possible to find a reliable set of variables to represent reform indicators. The results and strength of variance explanation is comparable at the international level (about 6%). Changes occurred in the effect of student SES on achievement and individual variables such as availability of computers and connection to the Internet.

Reforms are necessary to develop and improve further the educational system, as better prepared students provide sustainable economic development. New education program for 2025 continues the implementation of initiatives started in the SPED 2016-2019: further operation of the new curriculum, teacher’s status, overall quality of rural schools, construction of new schools, assessment system and others. Implementation of education reform is still in progress, yet many changes are to be seen in some upcoming decades. As Hanushek and Woessmann (2015) predict it will take about 40 years until the full labor force will have advanced skill level. It is early to draw conclusions on reform implementations.

Based on the results it is recommended reviewing the teacher training and certification systems. It is necessary to increase the investment in modern IT technologies in schools. Kazakhstan needs to achieve the student-computer ratio of 2 to 1. The lack of connectivity could be an obstacle to obtain the benefits of educational resources available through the Internet. It is important to continue effective investment into school equipment. This mostly relates to schools with Kazakh language of instruction.

It is notable to also pay attention to capacity building, complex governance and dissemination of responsibility by implementing the reform. It is essential to have an overall governmental support in order to carry out large and costly initiatives.

References


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