Learning, Marginalization, and Improving the Quality of Education in Low-income Countries

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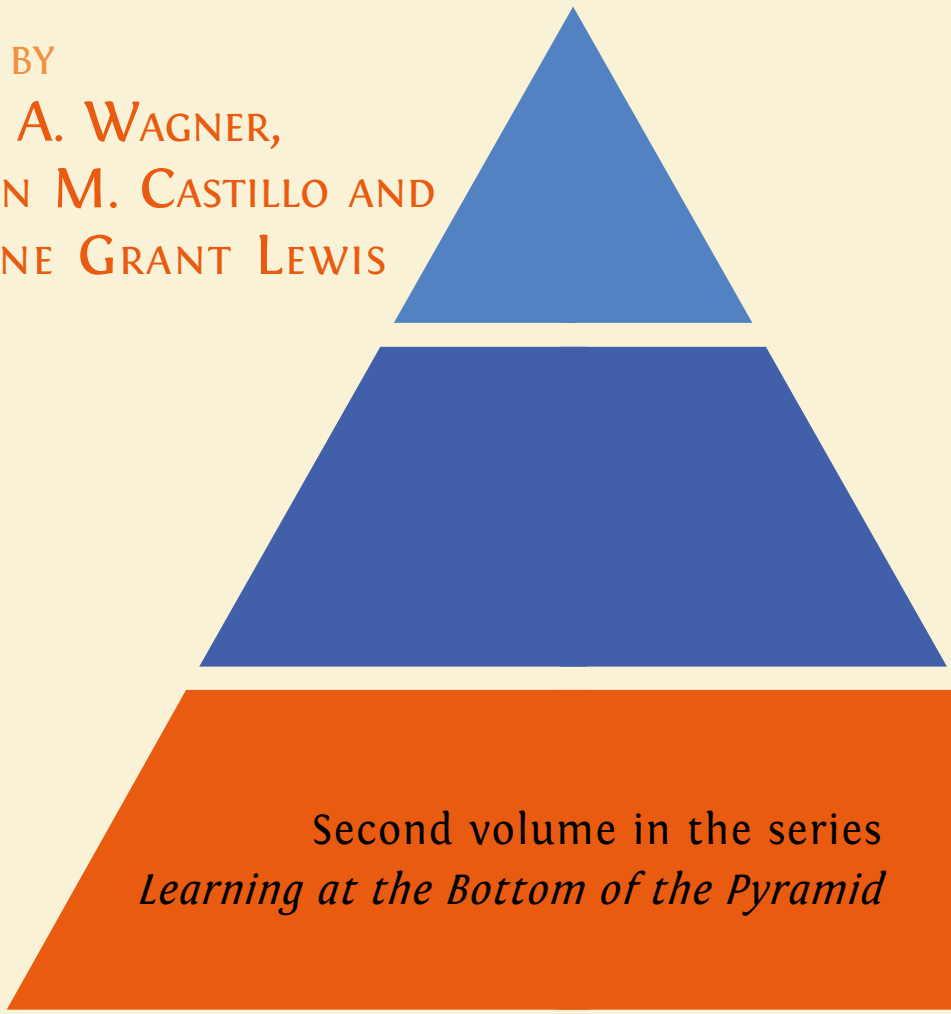

Second volume in the series
Learning at the Bottom of the Pyramid

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6. Not All Pyramids Are the Same

Relative Learning Exclusion and Its Evolution Over Time

Dirk Van Damme, Tijana Prokic-Breuer, and Stan Vermeulen

Introduction

We can achieve a better understanding of the learning opportunities and outcomes of poor and marginalized populations at "the bottom of the pyramid" (Wagner & Castillo, 2014; Wagner, Wolf, & Boruch, 2018) through two different approaches. The first approach is an "absolute" assessment of the learning of a population, performed by calculating how many learners meet a certain benchmark performance. This is the approach taken, for example, by the World Bank in measuring "learning poverty": "Learning poverty means being unable to read and understand a simple text by age 10".[1] According to that definition, 53 percent of children in low- and middle-income countries are "learning poor". Other examples of absolute learning benchmarks include the usage of Level 2 as the minimal threshold level in OECD's PISA assessment framework. According to the most recent PISA survey of 2018, 77.4 percent of 15-year-olds in OECD countries have a reading proficiency of Level 2 or above, but in middle- and low-income non-OECD countries participating in PISA, this figure can drop to around 20 percent, as is the case for the Philippines or the Dominican Republic (OECD, 2019).

1 https://www.worldbank.org/en/topic/education/brief/learning-poverty.

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These benchmark-oriented measures are important for understanding the global learning crisis relative to the achievement of SDG4. It is important to know the size of the population of learners "at the bottom of the pyramid". However, SDG4 also speaks about ensuring "inclusive and equitable quality education". An absolute approach to learning poverty does not say much about the inclusiveness of education, nor in itself about the equity in learning opportunities and outcomes. Inclusiveness and equity refer to the specific context in which learning happens and how learners at the bottom of the pyramid relate to other learners in their social environment. In other words, not all pyramids are the same. A certain level of proficiency can provide access to the resources that ensure a good life in a specific context, but can be dramatically insufficient in another context.

As a second, alternative approach, this paper advances the concept of "learning exclusion" as a relative measure to better understand the relationship between learners at the bottom with those in the rest of the pyramid. We define "learning exclusion" as the relative distance in learning outcomes between the lowest 10 percent of performers and the median in a country's population. A higher gap suggests that learners at the bottom are relatively more excluded from what a nation's population considers to be the norm. A smaller gap suggests that learners at the bottom are more integrated into the skill profile of a nation's population. The level of "learning exclusion" is independent from the absolute learning threshold. The performance of the lowest 10 percent can indeed be quite high in comparative terms, suggesting a relatively low level of learning poverty. But at the same time, the lowest 10 percent can still experience a high degree of exclusion within their social environment. And in a country with a relatively low median, a relatively small gap between the median and the lowest 10 percent can still point to a comparatively low degree of exclusion of the learners at the bottom.

This approach of "learning exclusion" is inspired by relative definitions of poverty (Eskelinen, 2011). This relative definition is based on the assumption that whether a person or household is considered poor depends on their income share *relative* to the income shares of other people who are living in the same society. We apply the same reasoning to learning. The exclusion of an individual or group in terms of skills

depends not so much on the absolute level of proficiency, but on the relative gap with what a given society considers to be the median level of proficiency. As in sociology, relative scarcity or poverty has a major impact on an individual's perception of self-worth (Lamont, 2019).

The concept of "learning exclusion" should be distinguished from learning inequality, although there are connections between the two. Measuring educational inequality has been the purpose, for example, of attempts to measure the Gini coefficient of education (Thomas et al., 2001). Societies with wider variation in learning outcomes tend to be societies with higher levels of learning exclusion. Yet it all depends on where in the learning distribution the variance is located. A society with a large gap between the median and 90th percentile and a relatively milder gap between the median and 10th percentile has a lower level of learning exclusion than a society where the gap is concentrated in the bottom half of the distribution, even if both societies have a similar level of overall inequality. For learners at the bottom of the pyramid, it all depends on how the distribution of learning opportunities and outcomes in their society is shaped.

This distinction has important policy implications. From an inequality perspective, a compressed distribution of learning outcomes looks desirable. But is it desirable for countries to have the upper part of the distribution situated at a relatively low level? Countries also benefit from high levels of learning excellence, which potentially permeate the whole of society. On the other hand, a learning distribution with a relatively high upper part and a relatively high median—but with a long tail of low-performing learners—is far from being inclusive. For inclusive learning, the shape of the pyramid matters.

Measuring learning exclusion

In this study, we used the OECD PISA database for the six rounds of PISA scores between 2000 and 2018. We measured learning exclusion as the relative distance between the median and 10th percentile. In Figure 1, we have mapped countries in a two-dimensional chart according to their average learning exclusion in the PISA cycles 2009 to 2018 compared to the median learning exclusion (X-axis) and their average median score in these cycles relative to the overall median PISA score in reading for all countries (Y-axis).

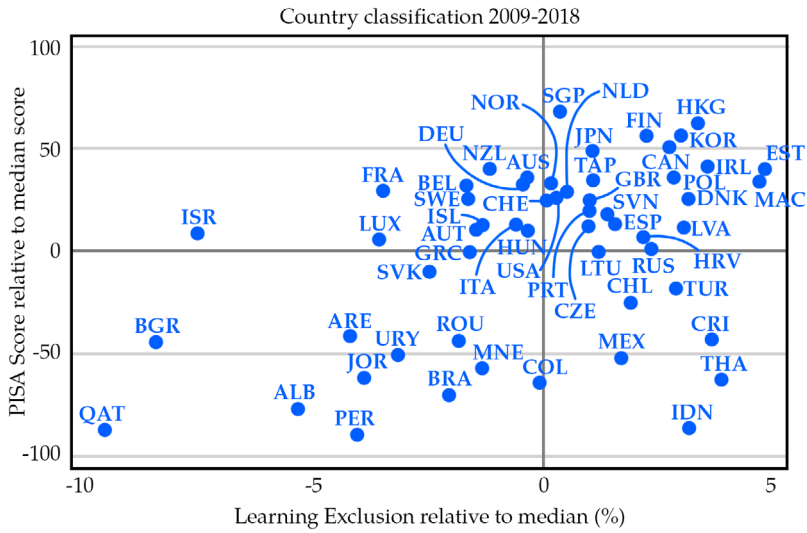

Fig. 1. Country mapping of learning exclusion relative to median score (PISA database). Note: Countries depicted are those that are present for all PISA cycles between 2009–2018. Median PISA scores are calculated by averaging the median score over all four cycles. Learning exclusion is operationalized as the percentage difference between the median score and 10th percentile for each country.

The median level of learning exclusion over the four PISA cycles studied is -27 percent. This implies that students at the 10th percentile of the PISA reading score distribution score 73 percent as high as the students at the median of the score distribution. Negative values on the X-axis represent higher levels of learning exclusion. For example, the learning exclusion level of Bulgaria is 8 percent higher than the PISA average at -35 percent, and their students at the 10th percentile of the distribution score 65 percent as high as their median-performing students.

The first observation is that the degree of learning exclusion is largely unrelated to the median PISA score itself. While fitting a regression line reveals a slightly positive relationship between relative PISA score and lower levels of learning exclusion, there are countries represented in each of the four quadrants, and countries with fairly similar median PISA scores can differ widely on their levels of learning exclusion. Countries in the top-right quadrant are those with a relatively high median PISA score and a relatively low level of learning exclusion, while countries in the bottom-left quadrant combine relatively low median PISA scores with relatively high levels of learning exclusion.

Evolution of learning exclusion over time

After exploring the more static view on learning exclusion, we can now turn to the more dynamic perspective by looking at the evolution of learning exclusion over time. In Figure 2 we show the evolution of a select number of countries' median scores and their level of learning exclusion between the 2012 and 2018 waves.

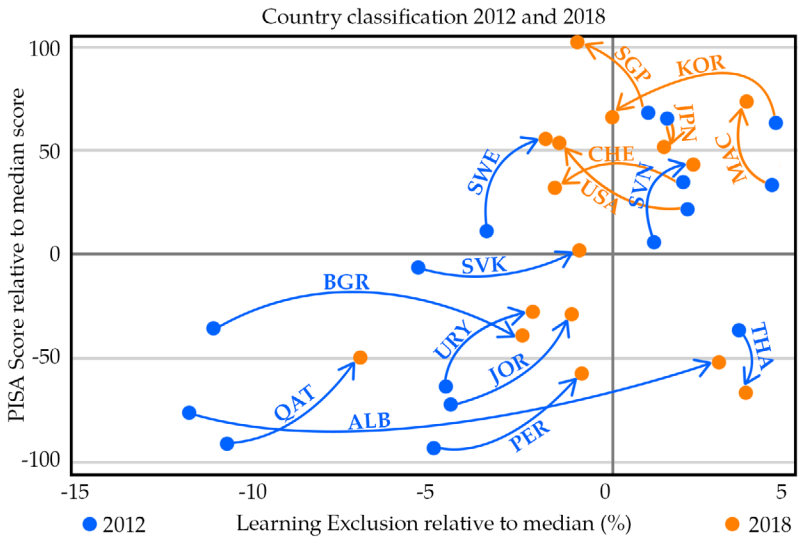

Fig. 2. Development of learning exclusion relative to median score between 2012 and 2018 – selected countries (PISA database). Note: For legibility, the only countries included were those above or below a specific threshold in terms of their development in relative median PISA scores or learning exclusion between the 2012 and 2018 PISA waves. The results for all other countries are available upon request.

As shown in Figure 2, learning exclusion is by no means an immutable characteristic of a country's educational system. Some countries that scored fairly poorly in terms of learning exclusion in 2012 have shown remarkable progress over time. For example, in 2012 Albania had one of the highest levels of learning exclusion: around 12 percentage points below the PISA average. This implies that the Albanian students at the 10th percentile of the PISA reading score distribution scored only 61 percent as high as the median Albanian student (PISA average: 73 percent). Yet, in the 2018 wave, their learning exclusion dropped below the PISA average: Albanian students at the 10th percentile of the 2018

PISA reading score distribution scored 75 percent as high as the median Albanian student. Similar developments can be seen for other countries such as Qatar, Peru, Jordan, Uruguay, Bulgaria, the Slovak Republic, Slovenia, and Sweden. The progress of these countries is indicated in blue arrows. It is interesting to see that most of those countries (Bulgaria is an exception) not only improved their learning exclusion, but also their median score.

By contrast, some countries' median scores showed overall improvement between 2012 and 2018, while their level of learning exclusion remained relatively similar (e.g., Macao) or even increased (e.g., Singapore, the US). The US and Singapore seem to have improved their overall performance at the expense of those at the bottom of the pyramid. In other countries, learning exclusion even increased while median scores remained stagnant (Korea, Switzerland). Countries with a worsening degree of learning exclusion are indicated with red arrows.

While these patterns might represent some form of regression to the mean (countries with extreme values in one period will naturally revert to less extreme values in other periods), they could also be the result of deliberate policy interventions by governments that aimed to increase educational performance at a certain part of the ability distribution. In this case, it could be that the increased policy attention and resources expended at the bottom of the ability distribution has come at the expense of students' performance at the top of the distribution (see also the discussion by Al Samerrai and Benveniste, this volume).

Evolution of learning exclusion in some specific countries

In this section, we illustrate the different paths of PISA development in terms of learning exclusion and the shape of the "pyramid" by plotting three sets of countries on different trajectories over all of their available PISA cycles in terms of their reading performance (see Figure 3).

What is interesting about different countries' trajectories is that the countries that improved the most in terms of learning exclusion seem to have compressed their pyramid somewhat. The performance of the students at the 90th percentile in Albania and Bulgaria decreased relative to the median performance. Some countries, however, appear to have been able to reduce their learning exclusion without it being at the expense of their top performers, such as Qatar and Uruguay.

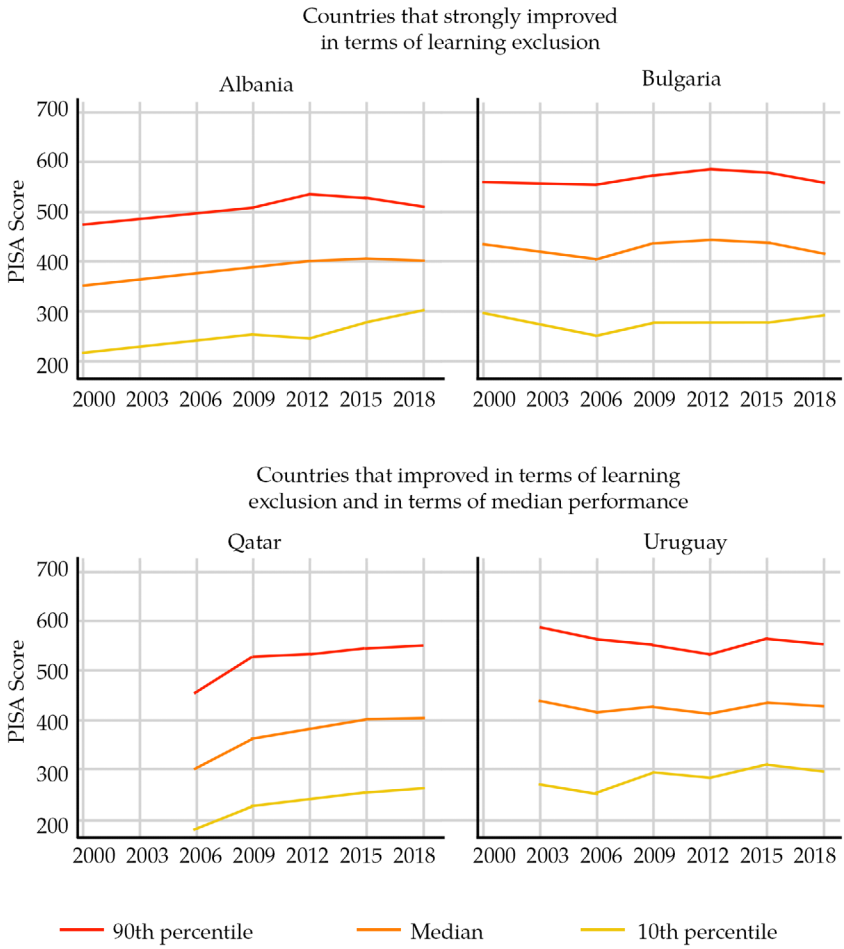

Fig. 3. (Continued on following page)

Fig. 3. Development of the pyramid between 2000 and 2018—selected countries (PISA database).

In contrast, countries such as Singapore and the US have seen increases in the performance of their median- and top-performing students, but the performance of the students at the lower end of the ability distribution has remained stagnant over time. These countries illustrate the importance of the learning exclusion indicator: evaluating these countries' educational systems based on average performance would perhaps find positive results, but taking into account their increasing levels of learning exclusion would paint a different and more disturbing picture.

Finally, in some countries, median performance is relatively stable or even decreasing, with an even stronger decrease in the scores at the 10th percentile. Korea and Switzerland, for example, while maintaining the strong performance of their students at the 90th percentile, appear to be deteriorating in terms of both their median score and measure of learning exclusion.

Conclusion

In this paper, we investigated the evolution of learning exclusion over time in a number of countries, on the basis of PISA data (2000–2018). We defined learning exclusion as the relative gap in learning outcomes, measured as the distance on the PISA scale between the median and percentile 10. This metric differs from similar approaches, such as the concept of "learning poverty" as defined by the World Bank, which is an absolute measure of low performance, or attempts to calculate the "education Gini" or other measures of educational inequality, which are metrics of variation in the entire distribution.

To measure the exclusion produced by relative low performance, inequalities between the median and the top of the distribution are largely irrelevant. Measuring the relative distance in learning outcomes between the median performance in a population and the performance of the *lowest 10 percent* gives an indication of the relative exclusion of the bottom end of the learning distribution in a society. Thus, we tracked the evolution of learning exclusion over successive PISA surveys. We identified trajectories in the measurement of learning exclusion in order to find patterns that can be related to the overall evolution of social inequality and social segregation. We also tried to identify different

categories of countries according to the evolution of their political tolerance to learning exclusion. One important caveat in our research is the limitation of data to only a small handful of countries that are in low-income countries—further research will be needed to make a direct application of our methodology to the much poorer works in LICs.

In a functional sense, however, the exclusion of a learner is not primarily defined by his or her absolute performance in a global perspective or by his or her distance to the top performers, but by the deviation from what a society considers to be the norm, which is defined here as the median level of performance. People are excluded when their proficiency level is very much below the norm which a society considers to be functional. We found that this norm is not the same across countries.

Educational policy interventions aimed at reducing learning exclusion are not necessarily identical to policies aimed at reducing overall inequality in learning. Trying to compress the overall learning distribution can be achieved by decreasing the performance at the top of the distribution, while the learning exclusion at the bottom remains unchanged. This can hardly be seen as educational progress. Policies that lift the bottom of the distribution, thereby reducing learning exclusion, make a lot more sense from an equity and fairness point of view.

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