Editorial

Successes and failures in the classroom will increasingly shape the fortunes of countries. And yet, more of the same education will only produce more of the same strengths and weaknesses. Today's students are growing up into a world hyperconnected by digitalisation; tomorrow, they'll be working in a labour market that is already being hollowed-out by automation. For those with the right knowledge and skills, these changes are liberating and exciting. But for those who are insufficiently prepared, they can mean a future of vulnerable and insecure work, and a life lived on the margins.

Schools need to prepare students for change that is more rapid than ever before, for jobs that have not yet been created, for societal challenges that we can't yet imagine, and for technologies that have not yet been invented. In today's schools, students typically learn individually, and at the end of the school year, we certify their individual achievements. But the more interdependent the world becomes, the more it needs great collaborators and orchestrators. Innovation is now rarely the product of individuals working in isolation; instead, it is an outcome of how we mobilise, share and integrate knowledge. These days, schools also need to become better at preparing students to live and work in a world in which most people will need to collaborate with people from different cultures, and appreciate a range of ideas and perspectives; a world in which people need to trust and collaborate with others despite those differences, often bridging space and time through technology; and a world in which individual lives will be affected by issues that transcend national boundaries.

We are born with what political scientist Robert Putnam calls "bonding social capital", a sense of belonging to our family or other people with shared experiences, cultural norms, common purposes or pursuits. But it requires deliberate and continuous effort to expand our radius of trust to strangers and institutions, to create the kind of bridging social capital through which we can share experiences, ideas and innovation, and build a shared understanding among groups with diverse backgrounds and interests. Societies that nurture bridging social capital and pluralism have always been more creative, as they can draw on and bring to bear the best talent from anywhere, build on multiple perspectives, and nurture creativity and innovation.

PISA has a long history of assessing students' problem-solving skills. A first assessment of cross-curricular problem-solving skills was undertaken in 2003; in 2012, PISA assessed creative problem-solving skills. The evolution of digital assessment technologies has now allowed PISA to carry out the world's first international assessment of collaborative problem-solving skills, defined as the capacity of students to solve problems by pooling their knowledge, skills and efforts with others.

As one would expect, students who have stronger science, reading or mathematics skills also tend to be better at collaborative problem solving because managing and interpreting information, and the ability to reason are always required to solve problems. The same holds across countries: top-performing countries in PISA, like Japan, Korea and Singapore in Asia, Estonia and Finland in Europe, and Canada in North America, also come out on top in the PISA assessment of collaborative problem solving.

But individual cognitive skills explain less than two-thirds of the variation in student performance on the PISA collaborative problem-solving scale, and a roughly similar share of the performance differences among countries on this measure is explained by the relative standing of countries on the 2012 PISA assessment of individual, creative problem-solving skills.

There are countries where students do much better in collaborative problem solving than what one would predict from their performance in the PISA science, reading and mathematics assessments. For example, Japanese students do very well in those subjects, but they do even better in collaborative problem solving. The same holds for students in Australia, Korea and New Zealand. Students in the United States also do much better in collaborative problem solving than one would expect from their average performance in reading and science, and their below-average performance in mathematics. By contrast, students in the four Chinese provinces that took part in PISA (Beijing, Shanghai, Jiangsu and Guangdong) do well in mathematics and science, but come out just average in collaborative problem solving. Likewise, in Lithuania, Montenegro, the Russian Federation, Tunisia, Turkey and the United Arab Emirates, students punch below their weight in collaborative problem solving. In a nutshell, while the absence of science, reading and mathematics skills does not imply the presence of social and emotional skills, social skills are not an automatic by-product of the development of academic skills either.

The results show that some countries do much better than others in developing students' collaborative problem-solving skills, but all countries need to make headway in preparing students for a much more demanding world. An average of only 8% of students can handle problem-solving tasks with fairly high collaboration complexity that require them to maintain awareness of group dynamics, take the initiative to overcome obstacles, and resolve disagreements and conflicts. Even in top-performer Singapore, just one in five students attains this level. Still, three-quarters of students show that they can contribute to a collaborative effort to solve a problem of medium difficulty and that they can consider different perspectives in their interactions.

Similarly, all countries need to make headway in reducing gender disparities. When PISA assessed individual problem-solving skills in 2012, boys scored higher in most countries. By contrast, in the 2015 assessment of collaborative problem solving, girls outperform boys in every country, both before and after considering their performance in science, reading and mathematics. The relative size of the gender gap in collaborative problem-solving performance is even larger than it is in reading.

These results are mirrored in students' attitudes towards collaboration. Girls reported more positive attitudes towards relationships, meaning that they tend to be more interested in others' opinions and want others to succeed. Boys, on the other hand, are more likely to see the instrumental benefits of teamwork and how collaboration can help them work more effectively and efficiently. As positive attitudes towards collaboration are linked with the collaboration-related component of performance in the PISA assessment, this opens up one avenue for intervention: even if the causal nature of the relationship is unclear, if schools foster boys' appreciation of others and their interpersonal friendships and relationships, then they might also see better outcomes among boys in collaborative problem solving. It is all very well for boys to understand that teamwork can bring benefits, but in order to work effectively in a team and achieve something in a collaborative fashion, boys must be able to listen to others and take their viewpoints into account. Only in this manner can teams make full use of the range of perspectives and experiences that team members offer.

Those attitudes do not just vary between the genders; they vary across countries too. Students in Portugal value relationships more so than students in other countries, and the picture is also positive in Costa Rica, Singapore and the United Arab Emirates. Students in these countries are especially likely to agree that they are good listeners, that they enjoy seeing their classmates be successful, that they take into account what others are interested in, and that they enjoy considering different perspectives. To some extent, that variation in attitudes might be shaped by cultural factors well beyond school walls; but policy makers should note that they are not written in stone.

There also seem to be factors in the classroom environment that relate to those attitudes. PISA asked students how often they engage in communication-intensive activities, such as explaining their ideas in science class; spending time in the laboratory doing practical experiments; arguing about science questions; and taking part in class debates about investigations. The results show a clear relationship between these activities and positive attitudes towards collaboration. On average, the valuing of relationships and teamwork is more prevalent among students who reported that they participate in these activities more often. For example, even after considering gender as well as students' and schools' socio-economic profile, students who reported that they explain their ideas in most or all science lessons were more likely to agree that they are "a good listener" (in 46 of 56 education systems) and students also agreed that they "enjoy considering different perspectives" (in 37 of 56 education systems). So there is much that teachers can do to facilitate a climate that is conducive to collaboration.

Many schools can also do better in fostering a learning climate where students develop a sense of belonging, and where they are free of fear. Students who reported more positive student-student interactions score higher in collaborative problem solving, even after considering the socio-economic profile of students and schools. Students who don't feel

threatened by other students also score higher in collaborative problem solving. In contrast, students who reported that their teachers say something insulting to them in front of others at least a few times per year score 23 points lower in collaborative problem solving than students who reported that this didn't happen to them during the previous year.

It is interesting that disadvantaged students see the value of teamwork often more clearly than their advantaged peers. They tend to report more often that teamwork improves their own efficiency, that they prefer working as part of a team to working alone, and that they think teams make better decisions than individuals. Schools that succeed in building on those attitudes by designing collaborative learning environments might be able to engage disadvantaged students in new ways.

The inter-relationships between social background, attitudes towards collaboration and performance in collaborative problem solving are even more interesting. The data show that exposure to diversity in the classroom tends to be associated with better collaboration skills. For example, in some countries students without an immigrant background perform better in the collaboration-specific aspects of the assessment when they attend schools with a larger proportion of immigrant students. So diversity and students' contact with those who are different from them and who may hold different points of view may aid in developing collaboration skills.

Finally, education does not end at the school gate when it comes to helping students develop their social skills. It is striking that only a quarter of the performance variation in collaborative problem-solving skills lies between schools, much less than is the case in the academic disciplines. For a start, parents need to play their part. For example, students score much higher in the collaborative problem-solving assessment when they reported that they had talked to their parents after school on the day prior to the PISA test, and also when their parents agreed that they are interested in their child's school activities or encourage them to be confident.

PISA also asked students what kinds of activities they pursue both before and after school. Some of these activities – using the Internet/chat/social networks; playing video games; meeting friends or talking to friends on the phone; and working in the household or taking care of family members – might have a social, or perhaps antisocial, component to them. The results show that students who play video games score much lower, on average, than students who do not play video games, and that gap remains significant even after considering social and economic factors as well as performance in science, reading and mathematics. At the same time, accessing the Internet, chatting or using social networks tend to be associated with better collaborative problem-solving performance, on average across OECD countries, all other things being equal.

In sum, in a world that places a growing premium on social skills, a lot more needs to be done to foster those skills far more systematically across the school curriculum. Strong academic skills will not automatically also lead to strong social skills. Part of the answer might lie in giving students more ownership over the time, place, path, pace and interactions of their learning. Another part of the answer can lie in fostering more positive relationships at school and designing learning environments that benefit students' collaborative problem-solving skills and their attitudes towards collaboration. Schools can identify those students who are socially isolated, organise social activities to foster constructive relationships and school attachment, provide teacher training on classroom management, and adopt a whole-of-school approach to prevent and address bullying. But part of the answer lies with parents and society at large. It takes collaboration across a community to develop better skills for better lives.

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