

# Why Data Application & Utilization Is Essential to Education Policies



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## Coronavirus Pandemic Shedding Light on Environment Surrounding Children

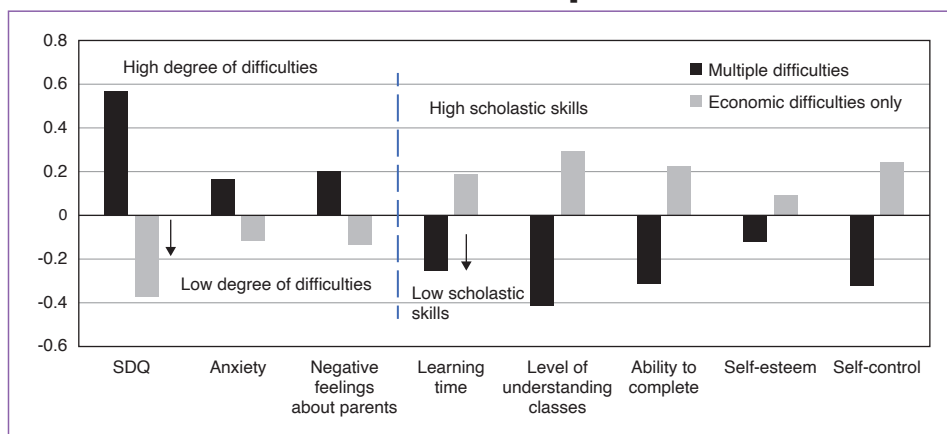
My research laboratory together with Katariba, an approved specified non-profit organization, conducted a survey on children, students and their parents from economically distressed households. One thing that became apparent from the survey was that in addition to economic distress, 40.2% of the children also suffer from other challenges. In addition to economic distress, 19% have developmental disorders, 7% have physical disabilities, and 13% are unable to go to schools. If single-parent is added here, more than 70% are suffering from multiple challenges. However, in looking at this issue from a government perspective, developmental disorders and physical disabilities are with health-related departments; children and students unable to go to schools are with the board of education; and economic distress is with welfare-related departments. This sectionalism interferes with sharing cross-jurisdiction information related to health, education and welfare, and thus support for children with multiple challenges is not fully implemented. As a result, as shown in the *Chart*, compared to

children who only suffer from economic distress, children with multiple challenges in addition to economic distress have lower understanding of classes, lower self-esteem and strong anxiety. To begin with, children from economically distressed households tend to have lower academic skills and combined with multiple challenges, it becomes even lower.

Those who work with organizations that support economically distressed households with children have also noted that children suffering from multiple challenges are sent around from one department to another, and it takes considerable time for the children to be able to finally receive the necessary support. One is required to provide the same explanation and fill out similar application documents numerous times at various departments, and this can be a huge task for someone who is economically distressed, having to take time off from work on a weekday for these procedures. Thus, it may be important to introduce measures such as a “one-stop” application process to avoid filling out similar paperwork a number of times at multiple departments, or conduct an “outreach” where authorities reach out to those in need of support rather than wait for them to apply.

CHART

## Comparison of children from families with economic difficulties & families with multiple difficulties



Note: Data is based on a questionnaire survey conducted in October 2020 with approved specified non-profit organization Katariba directed at 222 children, students and their parents from economically distressed families. Standardized values with average of 0 and standard deviation of 1 are shown, and the difference is statistically significant between the two groups for all variables. Strength and Difficulties Questionnaire (SDQ) compiled 25 questions on children's emotions and actions, and a greater number indicates higher difficulties.

Source: Nakamuro (2020) “Children's Agency, What It Should Prioritize, Part 1 Elimination of Segmentation, Also at Municipalities” (Nihon Keizai Shimbun, Keizai Kyoshitsu)

## Adverse Effect of Sectionalism

In order to achieve these, information managed by different departments needs to be quickly coordinated as required, and link that information to locating children with high risks and provide them support. What actual support can be linked? At the Research Institute for Learning and Growing in Amagasaki city in Hyogo Prefecture, a joint data analysis linking recorded administrative information has begun with university researchers. The data is anonymized information, and information such as names and home addresses of children and students that can lead to identifying specific individuals are not included.

Prof. Shintaro Yamaguchi of Tokyo University, who is one of the researchers engaged in the analysis to use this data, has revealed what sort of an environment the so-called “children with no daycare”, children who were neither enrolled in preschools or daycare before entering grade schools, are in. Results revealed that children who do not attend preschools or daycare, compared with children who do attend, are often children from families on welfare, and also showed that they are highly likely to not attend health checkups for three-month-old infants or for three-year-old infants. Preschool and daycare are not compulsory education and therefore not going is a matter of one’s personal freedom. However, the analysis showed that children who have not gone to preschools or daycare are less likely to be under the watch of non-family member adults such as nursery teachers or public health nurses, and that these children are highly likely to have slipped away from the reach of government support. This shows that by combining different information under different jurisdictions such as health checkups, poverty and school attendance, it can serve as extremely important information to think about “which child is at high risk” or “how they should be supported”. Such analysis can also lead to “prevention”. That is, if past data can show what children are at high risk, authorities may be able to get ahead to provide outreach and begin to provide support when children do not come to checkups or do not apply for preschools or daycare. If preventive intervention can be implemented and issues are resolved before they can occur, the burden not only on the authorities but on children themselves most of all can be made lighter. “Prevention” is a way of thinking that is widely known in medical treatments, and no doubt this will also become important in the fields of education and welfare.

### “Individual Optimization” Gathering Attention

I have talked so far about data managed by the government, but most recently under the “GIGA School Concept” which the Ministry of Education has been leading, data analysis on the learning histories of each individual student has been gathering attention with one computer provided per person at grade schools and middle schools. Many overseas countries have also implemented “one computer per person” under the coronavirus pandemic, and publications of research papers that verify the effects have been rapidly increasing. The connotation behind the series of research is that “simply providing one computer per person alone cannot improve scholastic abilities of children”. Conclusions in countries such as Peru, Colombia and Romania were that there was no positive impact on scholastic abilities with one computer per person, and there are even studies that indicate that with the increase in the amount of time children watch videos or listen to music, scholastic abilities have in fact declined. In other words, just providing one computer per person is not enough, and how these computers are used becomes important.

In addition, the series of studies suggest that whether the one

computer per person policy proves successful will be up to “individual optimization” being achieved which accommodates the cognitive characteristics of the children with the introduction of computers, and this is what is important. “Individual optimization” is called “Teaching at a Right Level (TaRL)” in English, and there is already an enormous amount of research accumulation around the work of Prof. Abhijit Vinayak Banerjee and Prof. Esther Duflo of the Massachusetts Institute of Technology who won the Nobel Prize in Economics in 2019, and it can be said that all studies have shown relatively large impacts.

Why is individual optimization important? Specific cases are provided to explain. The “Saitama Prefecture Survey on Scholastic Ability and Learning Situations” for which our research laboratory is responsible for its data analysis is a scholastic ability test taken by the approximately 300,000 school children and students in fourth to 9th grade at approximately 1,100 public grade schools and middle schools in 62 municipalities of Saitama Prefecture. In looking at the Japanese subject in 2021, for example, the number of school children and students who marked the highest score (100) and the lowest score (0) were both around 750 students. Roughly speaking, while around 0.3% of school children and students excel in scholastic abilities, similarly 0.3% of school children and students have serious challenges with their abilities. It is likely that many of them are in situations where they are “just sitting at their desks” during classes. For students with high scholastic abilities, classes are too easy and boring, while students with low abilities are not able to keep up with the class. Hence, “individual optimization” which accommodates the varying cognitive characteristics of the children becomes important. Going forward, offering individually optimized learning to children with various cognitive characteristics, not just to the children who score around average points, and offering education that allows each child to see the joys of learning new things and to develop their abilities will be necessary. What is gathering attention as a tool to realize this individual optimization are digital text books which many private businesses are working to develop. Thanks to the “future classroom” verification project led by the Ministry of Economy, Trade and Industry, many public grade schools and middle schools used these applications for their online classes during the coronavirus pandemic and have achieved results. As such, data application and utilization hold various possibilities. If early and productive support can be offered to various children, society as a whole, not just the children, will benefit from moving forward with data application and utilization while abiding by the Privacy Protection Law.

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Makiko Nakamuro is research director for the Tokyo Foundation for Policy Research. She received her BA from Keio University and her PhD from Columbia University. She was an associate professor in the Faculty of Policy Management at Keio University from 2013 to 2019 and became professor in 2019. She was also appointed Head of Digital Education at the Digital Agency in 2021.