University: Lingnan University
Unit of Assessment (UoA): 21 – Economics and Finance

Title of case study: Applying Innovative Education Practices to Combat Inequality in Education

(1)   Summary of the impact

Education inequality is still a prevalent problem in Chinese society. The team at Lingnan University Department of Economics designed and executed a series of projects in collaboration with local education bureaus in China to solve this problem. These projects covered over 17 cities/counties, 300 schools and 50,000 students. Several of their innovative education practices have been shown to improve student test scores in underperforming schools. Their research has generated many insights into how government education policies can be improved to help disadvantaged children. The research was funded by three GRF grants and a donation of over HK$8 million from various organizations.

(2)   Underpinning research

Substantial research in economics and other social sciences has led to a consensus among both academia and the general public that human capital is a key determinant of economic efficiency, income distribution and poverty alleviation. However, numerous empirical studies show that in developed countries and some developing countries, various school expenditures that affect teacher quality, school resources, and even class size, generally have little to no effect on students' academic performances. The problems facing China's education system are even more acute. For example, in 2015 among China's working age population (15-64), only 29% had received high school education and above. This is well below the average of 61% for G20 countries and 80% for OECD countries. Moreover, there is a substantial rural-urban gap. In 2015, the proportion of the rural working-age population with high school education was only 11%, compared with the 44% in urban areas. Further, China faces a major problem with respect to the so-called 'left-behind children' in rural areas. Extensive migration has caused over 61 million (or 22% of the cohort) children and young people aged between 0-17 to be "left-behind" in rural areas while their parents work in the cities. Thus, there is an urgent need for the Chinese government to modify its education policies and reduce the rural/urban educational gap to help this particularly vulnerable group.

A series of studies was carried out by faculty members of Lingnan's Economics Department in collaboration with scholars from UPenn, Stanford, CUHK, HKBU, and the Chinese Academy of Sciences to design innovative education policies and practices aimed at helping China tackle the challenges presented above. The Lingnan University team comprised members: Professor Simon Fan, Professor Xiangdong Wei and Professor Alex Wong.

In the 2013 study by Wong et al. [R1], a randomized controlled trial was conducted among 150 young children in a poor, rural county. The analysis showed that the intervention, consisting of a tuition waiver and a cash transfer conditional on attendance, raised attendance by 35%. In another study done by Wong et al [R2], another randomized controlled trial was conducted with over 2,000 children in 60 elementary schools in rural Shaanxi Province, Northwest China. Here, it was found that providing children with daily iron supplements for six months improved children's haemoglobin levels and standardised their mathematics scores. The results provide the local government with good policy tools to combat poor diet and malnutrition and improve the academic performance of rural children.

In a project funded by Hong Kong's Research Grants Council, both Simona Fan and Xiangdong Wei had participated as major collaborators. They provided convincing evidence of how being left-behind has adversely affected the academic achievements of rural school children in China [R3]. They also collaborated with the local education bureau in Longhui County, Hunan Province and conducted a randomized trial for a low cost after across-age tutoring programme in which high-achieving 4th and 5th graders were recruited to provide high-dosage, one-on-one tutoring to low-achieving 2nd and 3rd graders. Their research showed that such a low-cost tutoring programme can help improve the math scores of underperforming students, in particular left-behind children [R5].

Wei and Wong, together with colleagues from Birmingham University, UK, also collaborated with the local education bureau in Shaoyang County, Hunan Province [R4]. Their research experimentally evaluated a teacher-student feedback policy, whereby the teacher discussed the student's academic and classroom performance every 2 weeks. For a subset of the students, the feedback was also communicated with the parents. The research took place in rural Hunan, a low-income area of central China where a large proportion of the school children are 'left-behind'. This included 4,000 primary school children in grades 3 and 5. The results show that such a feedback policy can significantly improve the academic performances of the school children.

(3)   References to the research

[R1] Wong, Ho Lun, Luo, Renfu, Zhang, Linxiu and Scott Rozelle. 2013. The Impact of Vouchers on Preschool Attendance and Elementary School Readiness: A Randomized Controlled Trial in Rural China. *Economics of Education Review* 35, 53–65.

[R2] Wong, Ho Lun, Shi, Yaojing, Luo, Renfu, Zhang, Linxiu and Scott Rozelle. 2014. Improving the Health and Education of Elementary Schoolchildren in Rural China: Iron Supplementation versus Nutritional Training for Parents. *Journal of Development Studies* 50(4), 502–519.

[R3] Zhang, Hongliang, Behrman, Jere, Fan Simon, Wei, Xiangdong and Junsen Zhang. 2014. Does Parental Absence Reduce Cognitive Achievements? Evidence from Rural China. *Journal of Development Economics*, Vol. 111, 181-195.

[R4] Siebert, Stan, Wei, Xiangdong, Wong, Ho Lun and Xiang Zhou. 2018. Student Feedback, Parent-Teacher Communication, and Academic Performance: Experimental Evidence from Rural China. *IZA Discussion Paper* No. 11347.

[R5] Behrman, Jere, Fan Simon, Wei, Xiangdong, Hongliang Zhang and Junsen Zhang. Family Background, After-school Tutoring, and Student Achievement: Theory and Experimental Evidence from Rural China. Presented at the 18th Annual Meeting of the Association for Public Economic Theory, July 2017, Paris France.

(4)   Details of the impact

Over the past eight years, Simon Fan, Xiangdong Wei and Ho-lun Wong from the Economics Department have successfully obtained three GRF grants from the Hong Kong Research Grants Council, with their funding totalling over HK$2.5 million. They have also served as Co-I for one GRF grant and one NSF of China grant to work with colleagues in the Chinese University of Hong Kong on relevant topics. In addition, they have attracted a donation of over HK$8 million from various organizations on related research. Their education intervention studies have, in total, benefited 17 city/county local education bureaus in China, and covered more than 300 schools and 60,000 students.

These studies have attracted the attention of various international and regional organizations. For example, the study carried out by Wong et al. [2013, R1] was included in a report produced by UNESCO: *Education for All 2000-2015: Achievements and Challenges* [S1]. Their other study

[2014, R2] was cited by the World Bank's policy research paper "The impact of education programmes on learning and school participation in low- to middle-income countries, 3ie Systematic Review Summary 7" [S2]. Reports on the relevant studies can also be found in [S9] and [S10].

With support from the local education bureau, Simon Fan and Xiangdong Wei, in collaboration with researchers from University of Pennsylvania, the Chinese University of Hong Kong (CUHK) and the Hong Kong Baptist University (HKBU), organized a series of studies in Longhui County, Hunan Province, China, from 2012. Their after-school, cross-age tutoring program included 760 students in 79 rural schools in 2013. The study found that such a program generates a 0.1 standard deviation increase in the math scores of all the participants and a 0.2 standard deviation increase in the math scores of the left-behind children. The outcomes of these studies have not only attracted the attention of the local government with regard to their future education policies (the research team has visited the Longhui County a number of times to share their findings with government officials, teachers and school principals) [S3], they were also cited in research reports by international organizations such as the Asian Development Bank [S4].

The study conducted by Ho Lun Wong and Xiangdong, in collaboration with the University of Birmingham, used the popular social media outlet WeChat to enhance the teacher-student-parents three way communication on the feedback on a school student's academic and behavioural performance. These feedback assessments were also presented to parents to further improve their impact. The research team was subsequently invited by the Education Bureau to hold a public forum to disseminate their research results and conduct a further study on the long-term effects. The forum has attracted over 100 local education bureau officials, school heads and teachers [S6].

Supported by a large GRF grant from the Hong Kong Research Grants Council and the assistance of Intel (China) Corporation Limited, Xiangdong Wei (as PI), working with colleagues from Lingnan, MIT and the Chinese University of Hong Kong, signed agreements with education bureaus in Nanchang, Zhaoqing, Zhongshan and Xinshao to help them evaluate the effects of various forms of e-learning. The research is still on-going but has already generated useful insights. For example, in Nanchang, all participating students in the experimental group were given a laptop by the local education bureau for e-learning. The research team not only helped the schools identify useful e-learning materials but also designed a reward scheme for students targeting improvement in their test scores (influencing student extrinsic motivation). Such a combination of e-learning with a pay-for-grade scheme has never been trialled before. Building on this pilot study, the team carried out a further study on e-learning. In this case, the intervention on student motivation changed from extrinsic motivation to intrinsic intervention. The intervention has improved student test scores on math and Chinese significantly and these changes are also long lasting. The results were disseminated at the 4th Annual Conference of Future Schools in China, organized by the China National Institute of Education Science. It was then introduced to four schools in Suzhou by the local education bureau in 2018 [S5][S7].

Two further studies carried out by Xiangdong Wei were awarded HK$2.4 million by the Tin Ka Ping Foundation in 2017 for use the e-learning platform he created to implement a project entitled "Lingnan Student Voluntary Online Teaching Scheme for Rural Schools in China". The project has obtained support from the Education Bureaus in Nanchang and Xinshao and currently covers over 100 schools. The project sets up online teaching facilities at Lingnan University to link it with rural schools in China and hires volunteer teachers from among students at Lingnan to teach the Arts, Music, and English to elementary school students in remote village schools in China. It serves both as a service-learning project for students at Lingnan and as a research project for the two education bureaus on how important Arts and Music education is for elementary school students in rural areas. Xiangdong Wei has further been given donations and charitable funds (over HK$7 million).

Xiangdong Wei's research programme (China Economic Research Programme) received HK$0.5 million from the Yuen Long Pok Oi Hospital Foundation to organize the First Mainland, Hong

Kong and Macau Young STEAM Maker Competition with the China National Institute of Education Science. In 2018, Xiangdong Wei's research centre (Pan-Sutong Shanghai Hong Kong Economic Research Institute) signed various collaborative agreements with the National STEAM Education and Research Centre of the China National Institute of Education Science and with Intel Global Education to form a Lingnan-Intel Intelligent and Innovation Centre. These collaborations will enable it to be the local champion in promoting STEAM education and research. The Centre has so far organized three annual STEAM Young Maker Competitions in Hong Kong and these competitions have attracted over 2000 students from across China, the US and Malaysia [S8]. It also hosted talks for visitors from the National Institute of Education Science, Hong Kong Education Bureau, and educational officials from Gui Zhou, China. On 21 September 2018, it organized a half-day symposium with Intel China for the local school principals and teachers on the topic of how to teach AI in schools in Hong Kong. These talks and the symposium attracted more than 300 teachers and school heads as attendees.

(5)   Sources to corroborate the impact

[S1] UNESCO's report that cited Ho Lun Wong's studies R1

[S2] World Bank's report that cited Ho Lun Wong's studies R2

[S3] News report by the Longhui County government on the after school cross-age tutoring project

[S4] The paper produced from the research R3 has been cited by the Asian Development Bank

[S5] News reports or online media covering the e-learning projects

[S6] News report for the feedback project in Shaoyang county

[S7] Reports on Xiangdong Wei's keynote speech for the 4th China Future School Congress, where he presented findings and implications from the Zhaoqing and Zhongshan project

[S8] News report on the STEAM Competition

[S9] Selected news reports on the Childhood Anemia in China's Poor Rural Areas (Scott Rozelle is Ho Lun Wong's collaborator)

[S10] Policy briefs on Eliminating Childhood Anemia in China's Poor Rural Areas (Scott Rozelle is Ho Lun Wong's collaborator) (see policy briefs #9 to #11)

Policy brief on the Development of the China's Rural Education System through Preschool Education (Scott Rozelle is Ho Lun Wong's collaborator) (see policy brief #2)