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EDITORIAL

COVID-19 and Education: World's Issue

SINCE the outbreak of the COVID-19 pandemic, all schools have been forced to suspend classes. Chinese schools impacted by the COVID-19 pandemic started "School is Out, But Class is On" in universities, middle and elementary schools as early as the spring semester of 2020, and launched the world's largest online education. To study and summarize the current teaching and education status of the COVID-19 pandemic timely, Best Evidence of Chinese Education actively contacted Chinese educators and professionals to write for the issue of "School is Out, But Class is On" of the journal. After the publication of the special issue on the "School is Out, But Class is On" in March, 2020, it has received great attention from education peers around the world. Educational researchers in some countries have written to the journal and authors to express their interests in hoping to learn more about the implementation of "School is Out, But Class is On" in Chinese schools.

The journal reported the world response of the special issue to the editorial board and received active support from the editorial experts. At the same time, the journal paid attention to the education of countries in the world under the background of the COVID-19 pandemic. At the initiative of Professor Alan Cheung, the Editor-in-Chief, and Professor Jijun Yao, the executive Editor-in-Chief, experts of the editorial board also conducted research on their own national education under the COVID-19 pandemic from an international perspective, and wrote special articles for the journal. Although the journal is dedicated to empirical studies in China, when countries around the world face the challenges of the COVID-19 pandemic to education, we need to learn from each other's successful experience and jointly solve the problems we face. The editorial board members of the journal are from North America, Europe, Australia and Asia. Their contributions to the journal will definitely broaden the research horizon of the journal and provide diverse experience for the education of countries around the world to respond to the COVID-19 pandemic.

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ORIGINAL ARTICLE

The US Educational Response to the COVID-19 Pandemic

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Abstract. *This paper examines the United States federal and state educational responses to the spread of the COVID-19 pandemic, as well as states' plans for reopening schools. The virus entered the United States in January 2020. As the virus spread, most school districts began to close in March. At the end of June, the United States has experienced the highest number of cases and deaths due to COVID-19 in the world, and infection rates appear to be rising once again. Given the great physical and socioeconomic diversity of the United States, the federal and state response to COVID-19 and plans to reopen schools in the autumn have emphasized flexibility and adaptation. However, the implementation of remote (online) learning has highlighted and exacerbated long-standing racial and economic inequalities in US society related to technology access, school engagement, and school-parent relationships. These inequalities may be exacerbated as schools attempt to reopen and students continue to face inconsistent access to learning, learning loss during the spring semester and summer, and COVID-19 spread among the most at-risk population groups. Further research and practical interventions, such as tutoring, should be implemented to address educational equality issues and improve access, whether to in-person or remote instruction.*

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IN the 2020 pandemic, the United States has had the largest number of COVID-19 cases and deaths of any country. Its responses to the health crisis have been fragmented and uncertain. The same fragmentation and uncertainty have prevailed in the US education system, and as of this writing (June 2020), the policies and outcomes of US schools combating COVID-19 are not yet known. The educational response in the United States has emphasized a reliance on flexibility, adaptation, and local decision-making, for both better and worse. This paper will examine the US response to the coronavirus outbreak, focusing on the different approaches taken by different states and school districts, the challenges encountered in closing schools and shifting to remote (online) or distance learning, and prospects for reopening school systems in the Fall 2020. As will be seen, the transition to remote learning was often inconsistent and revealed or exacerbated existing inequalities in US society, especially those related to socioeconomic status and race. These inequalities are likely to be further intensified should the remote learning system continue in place under the conditions that existed in the spring or without large-scale, effective action taken to address COVID-19-related learning loss.

Onset of US Pandemic

The first identified coronavirus cases in the United States were reported in mid-January 2020, though some speculate the virus entered the United States as early as December 2019, and began circulating in northern California and Washington State, before spreading to other states (Baker, 2020). At the end of January, the US Department of Health and Human Services (HHS) declared a public health emergency, introducing quarantines for US citizens traveling from China and denying entry to non-US citizens who had been to China. Washington State reported the first US death due to coronavirus on February 29, and the virus had been reported in over half of all US states by the middle of March. By the end of March, US states reported over 3,000 deaths and 164,500 confirmed cases. The US federal government passed the Coronavirus Aid, Relief and Economic Security (CARES) Act on March 27, 2020, including support for K-12 and higher education institutions in the form of formula grants to be distributed to states based on their shares of Title I-A funds, to be used for response activities and long-term closure planning and coordination and educational technology purchases, as well as a portion of the Governor's Education Relief Fund, a discretionary sum to be used for emergency support grants for childcare, K-12, and higher education (Reid, 2020). The intention of the bill was to enable flexibility in addressing the specific educational needs each state faced. In addition, the act included $18.5 billion for the Supplemental Nutrition Assistance Program (SNAP), supporting child nutrition (Jordan, 2020). One month later, the US had reported 60,966 total deaths and over 1 million confirmed cases, which nearly doubled again by the end of May, when the US reported 103,781 deaths and 1.77 million cases (Ritchie, et al., 2020). As of July 1, 2020, there have been 2.5 million cases and 125,000 deaths, and both numbers continue to accelerate. While the federal government passed some measures and recommended social distancing actions, the more substantive responses to the pandemic have occurred at the state level.

State and Local Response to COVID-19

Since no cure or vaccine existed, the main public health response to the pandemic was social distancing, which entailed the closures of most venues in which people gather. This included schools. By the time the CARES Act was signed into law in late March, US states and territories had been forced to take action on their own to determine when and how to close schools and to support teachers and students transition to remote learning. School superintendents petitioned the federal government and the Centers for Disease Control and Prevention (CDC) for guidance on how to respond to the pandemic in February (Binkley, 2020), but the first states did not begin mandating the closures of in-person schooling until mid-March, initially on a two-three week basis, though individual school districts and schools did close earlier than that as students and faculty began testing positive for the disease (Forgie, 2020). By the end of March, all 50 states had announced mandatory or recommended closures of public schools, and most required remote learning in place of in-person classes. Some states, such as Kansas, Virginia, and Oklahoma, decided that schools would not reopen for the remainder of the school year, but other states, including New York, Maryland, and New Jersey, put off that decision until April or early May. Though most states ordered schools to be closed, seven states (California, Idaho, Tennessee, Florida, South Dakota, Maine, and Kentucky) merely recommended schools be closed, allowing district variations in response to the virus, and by May, some counties in Colorado, Wyoming, and Montana (Meltzer, 2020) had begun to reopen in a limited capacity and in smaller, less-populated areas (Map, 2020; Kirsch, 2020). As it became clear that schools would have to remain closed beyond the initial two-week closure, districts began petitioning the federal government for waivers on the required number of school days and hours in a year (Jones & Pflaum, 2020) and on completion of standardized testing. At least one state, Georgia, petitioned the Department of Education for approval to suspend standardized testing for the 2020-2021 school year as well (Strauss, 2020). While the school schedule and standardized assessments are determined by states and school districts, receipt of federal funds is tied to completion of these requirements under the basic US education law, the Every Student Succeeds Act (ESSA). With the closing of school campuses for all levels, schools began the process of creating remote learning curricula, materials, and policies and procedures on short notice.

Online Learning Provision and School Services

The short period between the decision to close schools and the initiation of remote learning caused a scramble across the country to prepare for online instruction, requiring flexibility and adaptation at the state, district, and school levels. In short succession, teachers received tutorials on using Zoom or other videoconferencing platforms, revised their curricula and standards for assessment, and developed printed packets to be distributed to students' homes, among other approaches to support the transition. Washington State developed resource lists for parents including courses, online resources and learning games, exercise activities, and downloadable content for learning (OSPI, 2020).

Teachers soon found themselves taking on unprecedented responsibilities. Many states required or recommended regular teacher-student communication, such as through synchronous lessons, sometimes on a daily basis (as in Iowa, Minnesota, and Vermont), or on a weekly basis (as in Arkansas, Delaware, and Michigan) (Sparks, 2020). Schools switched to communications by email, phone calls and text messages, print, and even social media (Herold, 2020). A teacher in Greenville, South Carolina, remembered, "'It 'was just like a free-for-all. We [teachers] all went to school. We created lesson plans in, like, 12 hours. So 10 days of lesson plans in a day, essentially. And we had to be prepared to launch those lesson plans by Wednesday and to start doing full-on e-learning, which our kids had never really done before without us'" (Turner, et al., 2020). Florida schools relied on teachers to build new curriculum plans from a variety of sources, including Public Broadcasting System (PBS) programs, existing materials, and new materials developed on short notice (Kamenetz, 2020). This conversion was a monumental feat asked of teachers and administrators, which they rose to face in their combined commitment to students' wellbeing and education.

With the transition to remote learning, the focus on education provision shifted out of necessity, not just in terms of curricular material, but also in regard to other school roles and responsibilities. Many states, including Kansas, Wisconsin, and Virginia, prioritized preparations for graduating students to be able to complete their studies by waiving or allowing districts to request waivers for graduation requirements (Sawchuk, 2020; Sparks, 2020) that would no longer be feasible while conducting remote learning. Few states opted to specify the number of hours or methods used for remote learning (Sparks, 2020). In order to allow flexibility, Montana decided that remote learning did not have to be online, requiring no single mechanism for districts to continue education. Cleveland's long distance approach, recognizing that the district included a large high poverty population and many students had inconsistent or no internet and computer access, chose to prioritize review of material students had already been introduced to, instead of new curriculum material not yet covered during the year (Gewertz, 2020). Districts have also chosen to prioritize student social emotional welfare during the traumatic period. Schools play an important role not just in students' education, but also their wellbeing, and many districts have endeavored to continue providing these services, such as free meals, during the pandemic. The Salt Lake City (UT) School District, for example, provided breakfast and lunch Monday through Friday and dinners for students three days a week starting in April (Stauffer, 2020). These efforts highlight the flexibility required of schools and districts to address the specific needs of the students they serve and the importance of schools beyond the classroom.

The necessity for distance education and worries about equity led some larger urban districts to partner with local public television to develop programs for broadcast and online distribution. Los Angeles Unified School District partnered with Public Broadcasting System (PBS) stations across Southern California to produce educational programming for television, websites, and apps targeting PreK-second grade students, grades 3-8, and 9-12 (Kamenetz, 2020; Goldsmith, 2020; Li & Lalani, 2020). Teachers were able also to turn to preexisting online curricula meeting multiple states' standards,

including EngageNY, LearnZillion, and Open Up Resources (Rand, 2020). These partnerships have the potential to reach more students who may lack access to a laptop for joining online class sessions or regular internet access. Few of these programs have been studied systematically, so it is unclear how effective the programs selected are for meeting students' learning needs, however.

Some states and school districts have opted to reach their students through increased technology purchases, using existing budgetary funds or funding from the CARES Act grants. Chicago Public Schools reportedly gave out more than 100,000 devices to students (Turner et al., 2020), and Miami-Dade County Public Schools disseminated over 80,000 mobile devices and 11,000 smart phones to create Wi-Fi hotspots (Goldstein et al., 2020). The Greater Nashville (Tennessee) School District (Glover, 2020), put into place programs to purchase laptops or Wi-Fi hotspots for students who struggled with access to internet, though recent predictions cast doubt on whether the computers will be procured and distributed in time for the start of the new school year (Mangrum, 2020). With Cleveland's large high-poverty population, the district has attempted to distribute technology to enable access, but there are reportedly still many without regular access (Gewertz, 2020). Technology provision was not limited to major urban areas. Rural Minford, Ohio also attempted to deliver laptops and printed work to the roughly 25% of students without technology (Goldstein et al., 2020), and South Portland Maine Schools district began a one-to-one technology program in 2003, using both iPads for younger students and Chromebooks for older ones, and began pairing remote learning with online courses for teachers and administrators in the design and implementation of online learning (Hogan, 2020).

Some districts relied on previously obtained technology and information to reach those struggling with access. South Carolina (Munyan-Penney, 2020) and the Coachella Valley (CA) Unified District (Lee et al., 2020) both used previously purchased school buses with Wi-Fi hotspots, positioned primarily in lower-income neighborhoods, to enable greater Internet access. Idaho provided residents with a list of no-cost or low-cost Internet options, while South Carolina developed maps showing Wi-Fi hotspots throughout the state, including those the state had placed on school buses. (Munyan-Penney, 2020). Lindsay (CA) Unified School District, with a large population of migrant agricultural workers, had started a community Wi-Fi project in 2016, allowing minimal interruptions to Internet access and learning as schools transitioned to remote learning (Kamenetz, 2020). Salem City, Virginia (VA) implemented a one-to-one program prior to 2020, providing Chromebooks to grade 3-12 students, paired with 200 hotspots and a partnership with a local cable company to provide free internet access for students qualifying for free and reduced lunch (Sawchuk, 2020). These approaches, both using newly purchased technology and previously appropriated technology distributed in new ways, became among the most popular means to address differential access to remote education offerings.

In the immediate aftermath of the closure of schools, districts wondered if and how they would continue to provide aid and services for students with disabilities, required under the Individuals with Disabilities Education Act (IDEA). Some even con-

sidered not providing services out of a fear of compliance violations (Green, 2020). While the federal government granted waivers on grading and hours of class time, Secretary of Education Betsy DeVos rejected waivers on IDEA (Jordan, 2020; Green, 2020), and federal authorities have been flexible in the remote services (such as telehealth) that can be reimbursed through Medicaid, a major funding source for school-based health care (Jordan, 2020), enabling teachers and parents to find educational solutions. Special education teachers employed a variety of approaches to reach their students. Some connected with students virtually or via videotapes provided to parents demonstrating practices they can do with their children at home (Jordan, 2020). Many students with disabilities struggled to use online videoconferencing and learning tools or printed materials, requiring the assistance of human or technological aides such as screen-reading software, which are not included in programs such as Zoom (Hill, 2020). There is great variation in the population of students with disabilities, with many different needs and abilities, so for some the transition has been beneficial. The ASD Nest program in New York City focuses on incorporating students with autism into mainstream classrooms. Tracey Murray, a kindergarten teacher with ASD Nest, moved her classes, as well as a "social club" for students with autism (ASD), to practice conversations online, discovering that students found it easier to communicate and look each other in the eye when using Zoom instead of speaking in person (Hill, 2020). While states, districts, and teachers took drastic action to continue providing education to many students, the transition was not without problems, some of them more significant than others.

Challenges and Inequities in Online Learning

While many states and districts went to great lengths to continue educational services for students, the remote learning process was not without its challenges. The transition was not always smooth. Some districts and schools, particularly in urban areas, such as Sidwell Friends, a private school in Washington, D.C., which went paperless before 2020 (Turner, et al., 2020), more easily transitioned online because of existing infrastructure. But many school districts faced various issues, including lack of technology access for all students; teacher struggles to provide online lessons, student engagement, and the socioemotional impact of COVID-19 on students. Often, these issues corresponded more highly with preexisting conditions including family socioeconomic (SES) background, school funding and infrastructure, and student learning needs. Access to technology, and therefore, access to educational content during remote learning, proved to be a disproportionately greater challenge for students and families from lower socioeconomic statuses. US census data from 2015 suggested that 15% of US households lack high speed internet, which impacts students' ability to complete and turn in assignments; this is disproportionately more of an issue for Black teens than their peers (25% compared to 4% of White teens and 6% of Latinx teens) (Anderson & Perrin, 2020). Upon the initiation of social distancing and remote learning, adults working service industry jobs often lost their jobs, leading to a loss of stability for their families. One outcome of this could be the loss of internet access for their homes. Over 30 mil-

lion jobs may have been lost during the months of March-May (Morath, 2020), hitting working class families the hardest, as these jobs are often ones which cannot be conducted remotely. Unable to pay bills, internet access could easily fall by the wayside, depriving their children of remote learning opportunities.

While many districts and states took or are in the process of taking steps to bridge the technology access gap as described in the previous section, a significant gap remains, which has a greater harm for those who need the most support. Rigorous remote learning, using online platforms and at least some synchronous learning, attendance tracking, and grading of students' work, was challenging to accomplish in the timeframe required, but implementation was skewed towards school districts with larger proportions of high-SES families. The policies and practices school districts reported following revealed that as few as 20% of schools may have offered rigorous remote learning nationwide (Lieberman, 2020), but this number is almost certainly worse in areas and schools that cater primarily to students from high poverty and minority backgrounds.

Teacher interactions and student access to remote learning both appeared to be significantly worse for students from disadvantaged backgrounds. By one estimate, up to 40% of the poorest students accessed remote learning just once a week (Kamenetz, 2020), while only 32% of teachers in high poverty districts reported interacting with students on a daily basis (compared to over 50% in higher SES districts) (Education Week, May 7, 2020). In districts with few low-SES families, only 20% of school leaders were concerned with missing technology issues, while 68% of school leaders in districts with a high proportion of low-SES families were concerned with this issue (Herold, 2020). As described above, some states moved quickly to provide devices and hotspots to students lacking access, but for other states that made efforts to do this later in the semester or over the summer, technological options were more limited due to high demand (Herold, 2020; Munyan-Penney, 2020). The students in these states and districts are liable to then become even more behind should schools not reopen in the fall, as they will continue to miss out on class content and educational support. Some students were left out of state guidance and teacher efforts. While all states issued guidance on the provision of special education remotely, just two-thirds of states provided guidance or resources specifically for English learners (ELs) (Sparks, 2020). Due to the differential access to education, Jonathan Plucker of Johns Hopkins University Center for Talented Youth suggests that students may enter the Fall 2020 semester with a range of up to eight grade levels in knowledge (Bowman, 2020). This is a huge difference in experience during this challenging time, which, unless addressed, will have a disproportionately large impact on students from disadvantaged backgrounds.

Because of educational access and technological issues, teachers have struggled to make remote learning work effectively for all students while taking on a large workload themselves. Teachers reported struggling with learning to use the technology effectively. There have been reports of "Zoombombing," when outsiders join classroom Zoom sessions, shouting obscenities or otherwise disrupting the lesson (Munyan-Penney, 2020). Some teachers struggled with learning how to host and manage live

learning sessions and instead relied on recording sessions and sending out videos for students to watch on their own or on students completing assignments included in paper packets (Herold, 2020). Teachers, parents, and students agreed that teachers teaching online were far more likely to engage students than were videos or assignments to be done without teacher input, but many teachers found online teaching more difficult. In addition, teachers have also been asked to take part in additional professional development sessions to be able to maximize the effectiveness of remote learning, use of platforms such as Zoom, and how to support students during this time. While the professional development was necessary, requiring additional professional development created another strain on teachers' time and energy, when they too were dealing with trauma and stress in their own lives.

Some teachers were challenged to reach students over large distances. The Mountain Empire district (California) must provide services for students spanning more than 660 square miles, three Native American reservations, and six different communities (Sawchuk, 2020). Consequently, teachers are working longer hours than before. Rebecca Sorenson of rural Michigan reported holding individual Zoom sessions with students for 4-5 hours a day, followed by hours of driving to students' homes to drop off educational materials (Gewertz, 2020). Methods and requirements related to grading students' work quickly became an equity-focused conversation. Many districts thought that continuing to grade students punished low-income students without access to technology. This partly reflected school leaders' own ability to provide access to these students. High-poverty and rural district leaders reported that they were less able to provide remote learning options for all students than wealthy districts. Only 34% of high poverty districts reported able to provide access for all, compared with 62-73% for suburban and wealthier districts (Herold, 2020). Their concerns also were informed by student engagement in existing classroom activities. Almost one third (32%) of students in districts of highest poverty families were not regularly logging into online classwork, completing assignments, or communicating with their teachers, while only 12% of high-income district students were "truant" (Herold, 2020). Districts subsequently considered moving to pass/fail grading systems (Sawchuk, 2020), focusing on moving students towards standards instead of to establish a grade, or passing all students already on track to progress to the next grade before the suspension of in-person learning (Schwartz, 2020). These approaches were intended to ameliorate the "double hit" of losing class learning time and school community (Fay, 2020) that are particularly beneficial to low income students.

In disadvantaged areas, the load of responsibility fell more significantly on parents to support their children's education. This challenge was greatest for younger students in elementary and pre-kindergarten (pre-K) grades, as well as students with disabilities, who require more supervision and support when using technology or completing classwork. Older students in secondary school, more self-sufficient and competent in technology use, did not generally require this level of supervision. Schools sought to coordinate more closely with the parents of students who appeared at risk of struggling or falling out of the system. Peter Kannam, principal at Henderson-Hopkins Elemen-

tary/Middle School in Baltimore, Maryland, reported that their school hired four instructors to provide support for teachers to conduct online classes, send out daily text updates to parents on student engagement, as well as emails and robocalls two to three times per week, and held parent town halls every other week (Kannam, 2020). These efforts, coupled with laptop distribution to 80% of the students in need of them, appear to have paid off, as the school reported that almost 99% of their students were engaged in classes, with 84% attending classes over the first seven weeks of the pandemic school closure. But in some cases, these efforts could not replace the role of schools in engaging students and supporting their learning. "No amount of love and care at home can turn the average parent into a special-education teacher overnight. Nor can it enable them to practice occupational, speech, or physical therapy" (Hill, 2020).

Differences in student engagement can also be tied to the various roles schools play beyond the classroom. Students from low-SES families or experiencing homelessness rely on schools for food, healthcare, and social supports. Nearly 1.5 million students nationwide experience homelessness, while 13 million children experience hunger (Nuamah, et al., 2020). For these students, the supports schools provide are vital to their very survival. Even though schools have made efforts to provide meals, the food insecurity (Van Lancker & Parolin, 2020) and socioemotional trauma that students are experiencing without school support systems are very real. These issues have been shown repeatedly by strongly designed research studies to have an impact on educational achievement.

Another factor that may have exacerbated differential implementation of remote learning is state education funding levels. Much has been written about the differently sized budgets maintained by public, private, and charter schools. Following the passage of the CARES Act, Secretary DeVos pushed for funds distributed by the federal government to states to be distributed increasingly to private schools (Stratford, 2020). This breaks from previous Title I funding standards, which restricted private schools to access these funds only for "equitable programs" (Jordan, 2020).

Planning the Reopening of Schools

As the rate of infection and death has decreased in some parts of the United States, thanks to social distancing and other preventative methods, attention has turned to planning the reopening of schools in the fall. All states and districts, however, are planning for a fall reopening. But with disease rates continuing at high levels, and even continuing to rise in many states as of late early July 2020, it is unclear when it will be safe to fully open. Many states began reopening public spaces and loosening public social distancing restrictions in May and June 2020, and subsequently are seeing an uptick in cases, in some contexts experiencing record highs in state COVID-19 cases. Should these renewed rising levels of COVID-19 prevalence continue into the fall, it is unknown if schools will be able to reopen as planned. While the American Association of Pediatrics (AAP) has recommended reopening in-person schooling on account of schools' role in child development (Kamenetz, 2020-e), the decision to do so belongs with state government and local school districts. Districts and states must determine if

restarting in-person classes is worth the potential risk of infection, what steps and requirements to put in place, or if it is best to continue remote learning until infection rates diminish.

All US states are planning to reopen in the fall to some degree, working with school boards and state and local leaders to develop plans and guidance. The CDC has put forth a series of recommendations for school districts to consider enacting in the process of reopening, including social distancing inside the school building, enhanced cleaning of surfaces, and providing options for teachers who feel uneasy or are at greater risk of infection to work remotely (CDC, 2020). Given the potential for resurgence, others are preparing for a hybrid reopening approach or a return to remote learning even if schools reopen, purchasing more devices and considering one-to-one policies. Philadelphia School District is considering a hybrid plan based on limiting the number of students and staff in the school on a given day while allowing other students and staff to participate remotely based on health concerns (Hanna, 2020). Annette Anderson of the Johns Hopkins University Center for Safe and Healthy Schools sees this as the number one priority, "We need a one-to-one technology policy in every district…One student, one device with internet access included'" (Myers, 2020). Other dramatic restructuring ideas have been widely discussed, including two-session days, alternating school and home days to limit the number of students in a classroom (Sharfstein & Morphew, 2020), "microschools" with intensive home-school cooperation, moving classrooms outdoors (Kamenetz, 2020), or extending the school year (Ehren & Turkeli, 2020). Alternate-day plans have been widely adopted in other countries, and at least one large district, Fairfax, Virginia (Arnold, 2020), has announced such a plan. However, districts in Tucson (Arizona), Nashville (Tennessee), and Cincinnati (Ohio), have announced plans to fully open schools in the fall whenever it is safe, and allow each school to figure out how to implement social distancing (Conover, 2020; Mangrum, 2020; Ryle et al., 2020). These districts have also announced that parents will be allowed to keep their children at home and that any students remaining at home will be provided with remote learning for this purpose.

The most common approach to reopening being discussed as of this writing seems to be social distancing within the school building. The best methods to implement this practice include spacing students out within classrooms by separating individual desks, keeping students in small groups that do not mix with each other during the school day, keeping students out of common areas, and ending extracurricular sports and clubs (Sharfstein & Morphew, 2020). Within-classroom spacing requires alternate-day or two daily session strategies to reduce the number of students in each class. Some schools have considered repurposing cafeterias and shared space into additional classroom space (Editors, 2020), using barriers between desks, spacing out arrival and departure from schools (Sharfstein & Morphew, 2020). Since many US students ride buses to and from school, social distancing on buses has been a widespread concern. School buses could, for instance, be run with fewer students, spaced out in each bus, with more buses, and with buses using certain routes to avoid mixing (Will, 2020). Fairfax (VA) County Public Schools (FCPS) developed diagrams for classroom desk arrangement, as

well as seating in school buses. Based on a 77-seat bus, FCPS recommends 23 students per bus, as well as the bus driver's child and the driver (FCPS, 2020). These approaches are all intended to minimize transmission of the virus among students and staff.

But social distancing could be difficult to maintain, particularly for younger children and when students are not in organized environments such as classrooms. Distances are easy enough to maintain when students are stationary at their desks in a classroom, but time spent in the hallways moving between classes, in recess on the playground, and getting to and from school, are the bigger challenge areas, where social distancing protocols could easily break down without careful monitoring, a herculean task. This makes it clear that social distancing is not a silver bullet to enable schools to be reopened. There is some question about who should wear masks, at what ages students should start being required to wear them, and what procedures should be put in place for people to enter school buildings. The CDC recommends that students be encouraged, not required, to wear masks, and that all faculty and staff wear masks (Will, 2020) as so far, adults are the more at-risk population. While some countries have used temperature checks at the entrance of schools, some have seen this as an insufficient method given the possibility of transmission by individuals not displaying symptoms. Overreliance on temperature checks could give a "false sense of security" (Will, 2020), leading to the loosening of adherence to social distancing and mask wearing, to say nothing of potential complications when students must be checked following outdoor activities or fire drills. Other added steps could include testing, increased places to wash hands, and enhanced surface cleaning protocols. Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, recommended use of pooled testing (combining several students' tests together into one sample for testing) to save school resources and time (Watts, 2020).

Despite the existence of a number of different potential steps to address COVID-19 spread in schools, many teachers remain concerned about whether returning to schools is the right decision. Questions abound for what the classroom and school format will look like and how these policies will impact teachers' routines and procedures. School districts must consider how self-quarantine policies impact teacher sick leave, whether teachers can and should take on additional responsibilities regarding child safety and classroom sanitation, how to manage high-risk teachers (or teachers with family who are high-risk) (Will, 2020), to name a few issues. Parents too are concerned about what returning to school mean for their children. A survey of Los Angeles parents revealed that around 20% of parents are not yet ready for their children to go back to school in person (Blume, 2020). There is not much time left for states and districts to make these decisions, satisfy worried teachers (and parents), and implement policy changes or make physical changes to school grounds.

The changes necessary could also be cost prohibitive for some districts. At a time when state education budgets are facing cuts, school districts are estimated to need as much as $1.8 million each (Will, 2020) for construction, repairs, changes to transportation protocols, new staff and health personnel, equipment, and maintenance. One common recommendation, an increase in school nursing personnel, is also potentially

challenging for urban schools where nurses are spread across multiple locations, or rural areas, where qualified nurses may be hard to come by or attract. Even in California's affluent and mostly suburban Orange County, the ratio of nurse to students can range from 1:1,100 to 1:10,000 (Editors, 2020). A more practical and inexpensive alternative would be the hiring of "health aides," certified individuals who could assist schools with practical matters such as temperature checks, administration of prescription medicine, and distribution of masks, among other tasks. School health aides could also gather information, support the spread of information to a school's community, form relationships, and refer students to established health providers. These services would free up the time and responsibilities of school nurses (if present) to take on regular student health needs and more serious health concerns. Additional funding could come from the federal government. The House of Representatives passed a bill, the Health and Economic Recovery Omnibus Emergency Solutions (HEROES) Act in April 2020, which would have included additional education funds, but it has not been introduced to the Senate. The funds could be prioritized for public school districts facing the greatest levels of COVID-19-related learning and staffing loss (Sharfstein & Morphew, 2020).

While these steps may support schools in putting into place health protocols to minimize spread of COVID-19, they do little to address the learning gaps that have developed between students with and without regular access to remote learning. How should schools go about bridging the potentially eight levels of difference between students that have developed over one semester? One potentially effective approach to address this gap could be tutoring. One on one or small group tutoring support has been proven to have a strong effect on learning reading and mathematics. Some existing tutoring programs consistently produce effect sizes of 0.40 or more, around 5 additional months of learning (Slavin, 2020), and tutoring by paraprofessionals has been shown to be as effective as tutoring administered by teachers (Inns et al., 2018). In large enough numbers, tutors, perhaps recruited and organized through AmeriCorps, could move the needle for students to make up the COVID-19 learning loss slide. The government of the Netherlands recently set aside $278 million to provide support to all students in elementary, secondary, and vocational schools who need it (Baars, 2020), while the UK set aside roughly $1.24 billion for tutoring and other services (Adams, 2020). Were the US to implement a similar program, considering the different population size, similar approaches could cost $5-7.5 billion (Slavin, 2020). Regardless of the methods used, significant steps must be taken to address the widening gap in learning brought on by the pandemic.

Implications

In contrast to the transition to remote learning that occurred in more centralized educational systems, such as South Korea, the United States has a long way to go to address the challenges of equity in the implementation of remote learning. While some steps and school-network-platform partnerships made efforts to close the gaps, a large portion of students experienced lower access to and participation in education after the initiation of remote learning. Reopening schools to in-person instruction would enable great-

er access to education, but comes with its own questions, including whether families would be comfortable sending their children back to schools, whether teachers would risk exposure, what steps should be taken to limit transmission of the virus and how best to ensure compliance with these protocols, and how school districts would pay for any changes at a time when school budgets are being cut. Regardless of whether schools reopen, remote learning is continued, or some sort of hybrid of in-person and online learning is implemented in the fall, the largest question of all remains: how can schools close the gap that has formed due to the COVID-19 slide and unequal access to education during the spring semester? The federal government and US states must consider the steps taken by other countries as they reopen to learn what is most effective, how challenges can best be addressed as they arise, and what programs, such as widescale tutoring provision, can make up for the time lost.

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ORIGINAL ARTICLE

Transforming Pedagogies in Australian Schools amid the COVID-19 Pandemic: An Activity Theoretic Reflection

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Abstract. *"Learning from home" was a collective response to school closure in Australia amid the COVID-19 pandemic. In this paper, we offer a description of the learning-from-home event, highlighting changes that were required of teachers, students and parents. Drawing on Engeström's cultural-historic activity theory, we reflect on these changes and query the extent to which the changes amount to a transformative pedagogy recognizing home and community as a significant source of and place for learning. It is argued that cultural knowledge and family practices have not been sufficiently acknowledged and utilized in the current practices associated with the learning-from-home event. Based on the notion of funds of knowledge, we argue that a transformative pedagogy should build purposeful connection between school curriculum, cultural knowledge and family practices. This approach is illustrated using an example of play-based learning where a parent engaged her Year 4 daughter in a home café enabling informal learning that met the requirements of the school curriculum. This case invites further reflection on important questions related to what counts as learning and what worthwhile learning encompasses.*

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Introduction

"LEARNING from home" has made it possible for Australian students to continue their education despite school closure amid the COVID-19 pandemic. 'Learning from home' encompasses different forms of flexible learning arrangements, including online learning, using paper-based learning packages or a combination of both online learning and paper-based materials. In this paper, we reflect on pedagogical changes associated with 'learning from home' arrangements in response to the coronavirus outbreak in Australia during the period between March and May 2020. We draw on Engeström's third generation activity theory that situates pedagogy as part of an evolving activity system (Engeström, 1987, 2001, 2007). Pedagogy is defined, not as a set of teaching skills, but as a structured process wherein acts of teaching are mediated by a set of rules, interactions, and use of tools for achieving valued outcomes. This definition highlights the social and contextual nature of pedagogy. It aligns with Vygotsky's sociocultural understanding of learning and teaching, which Renshaw (1998, p.83) considered important, as 'it situates learning (and teaching) as an aspect of interrelated historical, cultural, institutional, and communicative processes'. Adopting this contextualized perspective, we consider pedagogical changes associated with the learning-from-home event, which, owing to its unprecedented scale, can be taken as an example epitomizing, what Renshaw (1998, p.83) described as, 'novel forms of collective action and community participation that the technologies support'. In this reflection, we highlight the question of novelty in relation to pedagogical transformation amid the learning-from-home event, examining the extent to which this novel form of collective action has triggered 'novel ways of acting, feeling and thinking' about pedagogies.

In the sections that follow, we describe first how education authorities in Australia responded to the pandemic and in what ways 'learning from home' were taken as a temporary solution to school closure. Based on cultural-historic activity theory (CHAT), we then argue that due attention has not been given to utilizing home resources (in addition to computing and internet technologies) and parental involvement as core components of a transformative pedagogy addressing educational exigencies due to the pandemic. At the time of writing, Australian jurisdictions were re-opening schools. Although the learning-from-home phenomenon is not perennial, home resources, parental involvement and student agency are important features that can remain and be incorporated into teachers' pedagogical repertoire. The COVID-19 pandemic provided a rare opportunity to reflect on current practices and reconsider significant pedagogical elements that could transform the learning and teaching processes.

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COVID-19 Outbreak in Australia and School Closure

In Australia, school closures began in late March 2020, following a wave of pandemic-triggered restrictions including social distancing requirements, business closures, travel bans, and compulsory quarantine of travelers returning from overseas. Despite school closure, Scott Morrison, the Prime Minister, insisted that learning should be continued.

'One thing that I know teachers are united on, with their parents, is we do not want one of those things to be the loss of a child's education, giving up a whole year of their learning' (SBS News, 15 April 2020).

Education authorities in different Australian jurisdictions supported this stance wherein the concern about 'a loss of learning' justified creative arrangements to enable 'learning from home'. Complicating this novel education scene was that children of essential workers, such as medical professionals, were allowed to attend school, resulting in two cohorts of students – those who learnt from home and those who attended school. In this discussion, our concern was about the majority group of students who continued education using the mode of 'learning from home'.

The term 'learning from home' refers to different kinds of flexible learning arrangements that schools and teachers used to assist students to continue education at home. These flexible arrangements include online learning, using of pre-set learning packages, televised lessons, and their combinations. Teachers put together learning materials enabling learning through paper-based and online-based modes over a short period of time while the threat of coronavirus infection intensified. This involved redesigning lesson plans and resources, careful structuring of learning activities, and developing new assessment tasks for online and self-guided or parent-guided learning. It was indeed a professional feat as Australian teachers made this possible within a short time amid the outbreak, which has inevitably fomented teachers' concerns about unexpected workloads (Heaney & Breen, 2020). Recognising the immensity of tasks associated with 'learning from home', education authorities across the country have provided urgent support and advice in relation to sample lesson plans, design of online learning activities and learning packages, and guidelines for delivering online lessons or 'learning from home' (see an example of departmental guidelines from Queensland, https://education.qld.gov.au/curriculum/learning-at-home; see examples of learning packages from New South Wales, https://education.nsw.gov.au/teaching-and-learning/learning-from-home/learning-at-home/learning-packages). In Queensland, the Department of Education partnered with different TV networks to deliver televised lessons for lower primary and pre-school students in order to assist parents with 'learning from home', especially those who did not have IT skills or were disadvantaged due to cultural, economic and linguistic constraints. Parental guidelines were provided to encourage parents to minimize distraction, provide learning spaces, and manage screen time and online safety for their children (see an example of parental guidelines from Victoria, https://www.education.vic.gov.au/parents/learning/Pages/home-learning.aspx). In many cases, parents were expected to play the role as a monitor to ensure that online lessons and learning activities were completed in accordance to a set plan (see ABC News,

2020a). Students' engagement and attendance through online learning were monitored (Kelly, 2020). In some cases, students were told that their parents would be informed if they did not finish all the learning tasks diligently. For students who did not have computing devices for online learning or who did not have internet access at home, the departments of education and charitable organizations across the country offered internet dongles and mobile devices to many disadvantaged students. Nevertheless, the issue of digital divide remained the most pressing concern amid the pandemic. In particular, the negative impact on disadvantaged students was pronounced, as 'only 68% of Australian children aged 5 to 14 living in disadvantaged communities have internet access at home, compared to 91% of students living in advantaged communities' (Graham & Sahlberg, 2020).

'Learning from home' has indeed magnified some perennial educational problems in Australia, such as digital gap, educational inequalities, and literacy underachievement. To evaluate the effects of school closure on students from vulnerable backgrounds, the Federal Government called for a series of quick research and expert reports (e.g. Lamb, 2020; Masters, 2020) to examine critical issues such as digital divide, educational inequality and achievement gaps. These reports highlighted risks for vulnerable students from various disadvantaged backgrounds of falling further behind in academic achievement compared to their advantaged counterparts during the pandemic (Duffy, 2020). A significant decision made by the Federal Government, in response, was to cancel the national test of literacy and numeracy (NAPLAN) that was originally scheduled to conduct in May 2020.

Importantly, the learning-from-home initiative has revealed core elements of education in Australia. First, teachers were recognized and celebrated for their crucial role in educating children (ABC News, 2020b). Such recognition is in marked contrast to a decade of policy focus on top-down accountability that fostered mistrust of the teaching profession. Teachers' professionalism, generosity and care for the students were widely acknowledged and celebrated in the media during school closure. Second, the cancellation of the national test of literacy and numeracy amid the pandemic indicates that national tests such as NAPLAN have limited value in progressing learning for individual students. In this unprecedented time, the most important task was to enable meaningful learning to continue, but not testing, though an important concern was how best to assess Year 12 students and facilitate selection for university education. Third, home remains the most important place for learning to occur. In this sense, the government has rightfully sought expert advice on facilitating 'learning from home' for vulnerable students from disadvantaged backgrounds. This of course highlighted the problem that some homes are less conducive to learning than others. Due attention, however, has not been given to positioning home, a significant place of education, as a solution or part of the solution to complex educational issues. The pandemic has inadvertently set a spotlight on 'home' as a significant source of and place for learning. This means that any meaningful solution needs to consider influences derived from home and ways that the home can be incorporated in the solution designed to overcome the problem of school closure.

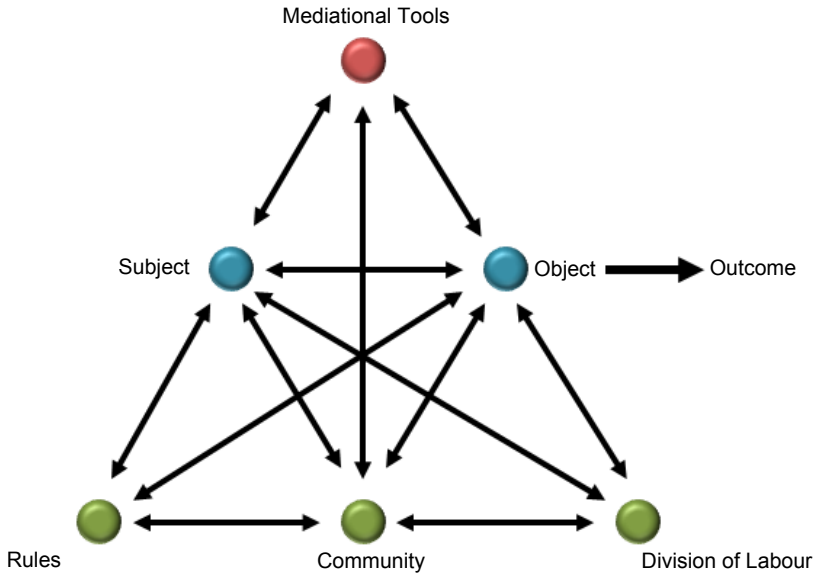

Figure 1. A Triangular Representation of An Activity System. ***(adapted from Engeström, 1987, p.78)***

Reflecting on Pedagogy for "Learning from Home" Using Activity Theory

The pandemic has made it possible to experiment with online delivery of school education at a large scale in a short period of time. As education researchers, we are interested in reflecting on the systemic change in practice and exploring how the pandemic might facilitate a rare opportunity for transforming pedagogies. The key questions are: What has been changed? Were these changes transformative? These questions are important as we may face a second wave of infection and there is a need to prepare for another unpredictable event that may lead to school closure.

We draw on Engeström's cultural-historic activity theory (CHAT) to assist our reflection and exploration. CHAT is used because it conceptualizes pedagogy not as a set of teacher skills but as contextualized actions and practices in an activity system. Importantly, CHAT alerts us to take a holistic perspective to pedagogy by examining it as an emergent process derived from the interaction between components of an activity system as a whole. CHAT draws attention to the dynamic link between what teachers are trying to achieve, what they do, how students learn and resist learning, how other

stakeholders contribute to learning/teaching, and how norms and rules are implemented and resisted. **Figure 1** shows a triangular representation of a typical activity system that Engeström used to highlight essential nodal components of an activity system. These nodal components include subject, object, tools, rules, division of labour and a community. Human actors (subjects) interact with each other using relevant cultural tools in their participation in an 'activity' in order to achieve a shared goal (an object) which is arguably the most important element separating one activity system from another. Actors' interaction and mediated use of tools are governed by norms and values (rules) agreed between the members (community) who share a common interest on the object and play different roles within an activity system (division of labour). It should be noted that the whole activity system is always in a dynamic state fraught with contradictions, as members interact with each other to achieve a goal that might be understood in different ways. An activity system is therefore "the minimal meaningful context" for understanding human actions and development (Kuutti, 1996, p.28).

Using CHAT, we are able to avoid a reductionistic treatment of pedagogy, as it draws our attention to multivoicedness (different members), historicity and continuity (enduring institutional goals and practices) in pedagogical construction and development. Pedagogical change may involve a new educational goal, use of new technologies or a new curriculum, new rules (e.g. pre-requisite for university entrance), new partners who assume a particular role, and the dynamic interaction between new and extant elements in a pedagogical activity system. Pedagogical change, therefore, is an uncertain venture wherein contradictions and tensions abound, as teachers, students and other members interact and adjust with each other during the introduction of a new pedagogical element. Negotiation is inherent to the process of pedagogical change and resolving successfully contradictions and tensions is critical for genuine pedagogical transformation (Ng, 2009).

From a CHAT perspective, major pedagogical changes during the learning-from-home event involve the following areas:

1. *Mode of delivery* changes from face-to-face interaction to online delivery or working remotely on pre-packaged materials;
2. *Lesson context* changes from classroom-based activities to home-based activities;
3. *Teacher's role* changes from classroom instructor to online instructor and designer of pre-packaged/online curriculum materials;
4. *Student's role* changes from learning in a face-to-face interactive context in the classroom to learning individually using self-contained materials or participating remotely on online platforms;
5. *Parent's role* expands to encompass supporter, monitor and regulator of child's online learning or other forms of 'learning from home' activities;
6. *Multimodal literacy strategies* are required for effective interactions between peers, and between students and teachers during online learning.

To examine the extent to which the classroom-based pedagogical system has been transformed, it is not sufficient to examine changes at a particular node (see Figure

1). Any pedagogical change needs to be considered in the context of interconnected relationships between individual nodes within an activity system. Therefore, pedagogical change during the pandemic is not just a question of students' access to the internet and the quality of internet connection at home. Additional questions include: Are students prepared for online learning? What forms of support are available from teachers, peers and parents? What forms of interaction are promoted on online platforms? What kinds of learning outcomes are privileged in online materials? From a teacher's perspective, the question goes beyond the quality of re-designed learning materials provided to students via an online platform. Additional considerations include whether teachers have the required knowledge and skills to assume the role of online instructor and what capabilities they have developed to teach effectively in an online environment. More importantly, as 'learning from home' assumes parental involvement, the extent to which teachers understand how to involve parents in online learning and home-based learning is crucial for successful delivery of 'learning from home'. From a parent's perspective, the key concern is not just whether internet and computing devices are provided to their children. It is also important to examine whether parents feel comfortable to take on new roles as a monitor and supporter of online learning or home-based learning. Parents' knowledge and skills of online learning and their understanding of school curriculum are critically important to supporting their children's online learning and other forms of 'learning from home' activities. Furthermore, worries and concerns from teachers, students and parents about these changes need to be dealt with. Taken together, successful and transformative change is not simply a matter of putting materials online or ensuring students' online attendance as scheduled.

Has the pandemic enabled the emergence of a new form of pedagogy stretched across home-school contexts and mediated by online technologies and materials? The key to answering this question is to examine the object within an activity system, which, as explained above, is an important element that separates different activity systems. This is because it is through the object that different component elements are designed and related to each other. Importantly, the object signifies what is worthwhile pursuing and what is being valued as an outcome in an activity system. It seems to us that during the 'learning from home' period, the object of teaching and learning remained unchanged (though setting up online platform and developing learning packages can be taken as a transient object at the initial stage of school closure). Teachers and schools still focused on the extant curriculum goals. For example, scholars (see https://www.dese.gov.au/covid-19/schools) who were commissioned by the Australian Government to write short research reports on the effects of home-based learning during the pandemic, framed their responses in terms of 'loss of learning' and 'widening gaps'. They deployed metrics to describe the loss in terms of the number of months or terms of a normal school year (see for example, Lamb, 2020; Masters, 2020). This reveals that for policymakers the learning-from-home event was an aberration from the standard form of schooling. This of course became problematic. Worries and tensions were unavoidable as teachers, principals and parents wondered how 'learning from home' could ensure steady progress of learning as set out in the national curriculum

(ABC News, 2020a; Heaney & Breen, 2020). Unsurprisingly, in many cases, 'learning from home' involved an identical lesson schedule and similar teaching routines used in classroom-based instruction, which of course, made it hard for students to maintain engagement when they were expected to sit through a day's lessons in front of a computer or a mobile device, though younger children might have had more freedom regarding how they engaged in a lesson under the supervision of their parents (ABC News, 2020a). Parents responded anxiously to the narrative of loss of learning measured against pre-set curriculum standards. Asking parents to monitor students' engagement in online learning or completing pre-set learning activities at home, as reported repeatedly in the media, created anxieties and increased conflicts with their children (Fisher, 2020). Migrant parents faced additional challenges due to cultural differences, language barriers and limited knowledge about the Australian educational systems (Yang et al., 2020). Our view is that the legitimate and significant role of 'home' as a source of and a place for learning has not been acknowledged sufficiently in the learning-from-home initiative. Below we discuss this case of missed opportunity based on the notion of funds of knowledge (Gonzalez et al., 2006).

A Missed Opportunity

The pandemic offered a rare opportunity for reconsidering pedagogy and change. In addition to critical issues such as teachers' technological pedagogical content knowledge (TPACK) and effective use of social media and internet resources, an important point of consideration is the extent to which resources and practices derived from home and relevant communities can be incorporated into the learning and teaching processes in order to develop a transformative pedagogy. From a CHAT perspective, home-based and/or community-based resources and practices can be taken as cultural tools for learning. Linking the school curriculum with valued knowledge and practice at home and in the wider community can create a problem space for negotiating a shared object or valued outcome in a pedagogical activity system. This is a problem space because teachers' epistemological beliefs about valued knowledge and how best to teach it will be challenged when deliberate connection is made to link school curriculum with cultural knowledge and practices derived from home and wider communities. In this form of transformative pedagogy, students are no longer receivers of knowledge controlled by the teacher; they too are legitimate knowers with access to, and experience of cultural knowledge and practices. Parents can be expected to play an important role as an expert knower assisting their children to make sense of knowledge about a school subject from a cultural perspective, sharing their experiences and understanding.

Related to this proposal is the concept of and research on funds of knowledge (FoK). FoK is "a systematic and powerful way to represent communities (including home) in terms of resources, the wherewithal they possess and how to harness these resources…" (González et al., 2006, p.x). FoK includes, but is not limited to, language practices, social relationships, knowledge about culture, histories and local environments and a set of strategies for getting things done. This concept bridges the gap between school and home and enables theorization of pedagogy based not on the teacher's

own knowledge of the curriculum but also 'the lives of ordinary people, their everyday activities and what has led them to the place they find themselves' (González et al., 2006, p.1). Importantly, this approach 'allows for variability within populations' and 'the infinite variations that social agents are able to negotiate within a structure' (González et al., 2006, p.43). In other words, FoK acknowledges diversity, respects agency and values localized knowledge. More significantly, González emphasizes that FoK is formed and transformed within sociohistorical circumstances and constructed through discourses. From this perspective, any form of 'learning from home' needs to consider (i) In what ways localized knowledge can be connected with school curriculum; and (ii) How to utilize FoK to promote a dialogue in order that school learning and family practices are related in sensible and meaningful ways. In this way, students and their families are positioned as knowledgeable partners in the course of delivering 'learning from home'. This will also help bridge the divide between school and home, and avoid a deficit view of learning, especially for students coming from culturally and linguistically diverse communities or economically disadvantaged families. In this context, Rodriguez (2103) alerted us to the issue of power imbalance in advancing FoK pedagogical designs. More recently, Llopart and Esteban-Guitart (2017, 2018) have reviewed FoK pedagogical designs that addressed power relationship and purposefully connected cultural knowledge and family practices to school curriculum.

An Illustration

At this point we want to illustrate how FoK can be part of the learning-from-home process using a news article reported in the ABC news, dated 27 April 2020 (Parker, 2020). In this article, an Australian parent, named Rachel Parker, recounted her worries about 'learning from home' and how she greeted with tears what her Year 4 daughter, Lila, called the 'mummy school'. Rachel, Lila and other family members experienced the rigidness of 'learning from home' as Lila shouted 'shut up' to all her family members at the commencement of her online lesson. Though the news article did not depict a detailed account of all the worries that Lila and the family had experienced as a result of 'learning from home', Rachel's thought of needing to 'get out of here' and to take a walk with Lila in the nearby park epitomized her frustration.

As the pair walked through the park, Rachel engaged Lila in an educational chat about different creatures they encountered. They saw flying bugs and Rachel raised a question about 'what are they? Will they bite?'. They saw other dogs and Lila asked the owner 'do they shed?'. They were puzzled to see a truck with a barrel of chemicals and a spray gun and wondered what it did. Lila thought it might be related to the outbreak. Rachel and Lila continued to talk about what they had seen as they returned home.

The day continued for Lila and the family, not following the scheduled online lessons, but through a pretend play of running a home café for the family members. Lila initiated the home café after watching a YouTube video of a girl who started a restaurant in her driveway during the pandemic. Lila, as the chef, created a menu for her mother to read. Playing the role as a waitress, Lila took order from Rachel and her elder

sister, calculated the price and served them in a physical setting observing social distancing rules. Lila assigned Rachel to play different roles including servant, cleaner and IT helpdesk. Rachel, in her role as an IT employee, helped Lila re-design the menu using the photos of food and drinks they took, showed her how to use Word and email, and how to use different Word functions to type and price new items. The pair discussed operating costs, pricing, and discounts. They watched YouTube videos on decimals, fractions and percentages in order to work out discounts for the family members. They also decided to donate the profits to a hospital for purchasing surgical masks. As a customer, Rachel wrote a review of the café for Lila to read.

Rachel, in her reflection, considered Lila's learning during the day met the Year 4 English curriculum that requires students to create texts using software and multimodal sources. It also covered the Year 4 Mathematics curriculum of learning fractions and decimals and using them in relevant contexts. She concluded that her experience of 'learning from home' could serve as a reminder that 'we might use parts of our ordinary lives as the canvas to paint a simple picture of learning through play at home'.

From a FoK perspective, this play-based case illustrates that home is an important source of and place for learning. Home furniture, kitchen equipment, home space, and computer and internet resources were re-organized and redeployed to enable play-based learning of a home café. Notably, the short walk in the park and an engaging talk about creatures they encountered set the scene for Lila to free up her creative mind and for Rachel to see alternative learning possibilities. Rachel, as the parent, played an important role enabling, facilitating and participating in meaningful learning that met Lila's needs and simultaneously addressed the requirements of the school curriculum. This was a stark contrast to the role of monitoring children's learning and ensuring time-on-task that the school expected parents to take. Creativity, flexibility and involvement are keys to success, as demonstrated in Lila's play-based learning. A rather different picture would have evolved if Rachel had insisted Lila to follow the school's rigid schedule of learning which specified the exact time that Lila was required to work on literacy, mathematics and other subjects on a daily basis.

This case outlines a transformative pedagogy utilizing home resources and parental involvement based on play-based scenarios. Teachers, of course, need to understand and gather students' FoK before they can incorporate cultural knowledge and family practices as part of a transformative pedagogy. FoK researchers have achieved this through ethnographic studies involving home visits and interviewing parents (e.g. González et al., 1995; Kiyama, 2010). Other researchers have explored students' FoK through classroom discourse and interaction (e.g. Barton & Tan, 2009; Moje et al., 2004). Another important consideration is how to connect family practices to school curriculum. Addressing this issue, Llopart and Esteban-Guitart (2017) have reviewed an array of studies to show how student-produced artefacts such as photographs, texts and digital productions can be utilized to develop a pedagogy building on students' cultural knowledge and experiences. Critical to school-home connection is the question of what can be counted as learning. In the case of Lila's play-based learning, Rachel considered play-based learning favourably, while Lila's teenager sister held a different view and

commented that it was not 'real learning'. This tension could be generative if it opened up the problem space for reconsidering the object of a pedagogical activity system, i.e. what counts as valued knowledge and outcomes. Due attention should be given to the issue of power asymmetry inherent in this tension, as students and parents are always positioned at the receiving end of education (Rodriguez, 2013). The case of Lila's play-based learning, aligned with FoK studies reviewed by Llopart and Esteban-Guitart (2018), speaks against treating students and parents from a deficit perspective. As shown in Lila's case, curriculum knowledge can be developed through meaningful activities at home (e.g. calculating discounts using fractions for family members) where students and parents are legitimate knowers. Connecting school curriculum with family practices can only be taken as an effective design principle for developing transformative pedagogies when cultural knowledge and family practices are rightfully respected and utilized to enrich school learning.

Conclusion

In this paper, we have reflected on 'learning from home' as a novel collective response to the pandemic in Australia. We focused on pedagogy as the main issue because pedagogy is at the heart of all forms of learning, whether it occurs in the classroom, at home or on online platforms. Under the sway of neoliberal policies current pedagogical practices have become closely aligned with reductive accountability metrics. A good example is the concern about a loss of learning during the pandemic. In response, 'learning from home' that was supposed to be a flexible means to meet students' diverse needs, was taken as a conduit for the curriculum using rigid daily routines and schedules. We argued that this was a missed opportunity for transforming extant pedagogies and redesigning how home and parents could contribute to the pedagogical process.

'We are in this together' is a narrative widely used in the Australian media urging mutual support and care during the pandemic. If we are truly in this together, then the 'we' needs to include everyone. Following this narrative of togetherness, a transformative pedagogy, responding to the exigencies of a shared challenge posed by the pandemic, calls for a focus on diversity and cultural resources at home and in different communities. Losing sight of support on learning derived from home resources and parental involvement may result in a form of 'learning from home' that is decontextualized, rigid and disengaging. By understanding learning that diverse students may engage in outside the classroom and by creating ways for these lived experiences of learning to be woven into the curriculum and classroom activities, we may be able to transform our pedagogy with a focus on multiple contributors and partners within a reconfigured activity system, bringing partners together, working collaboratively towards a shared goal and outcome of education. In doing so, such a transformative pedagogy hinges not just on how well teachers are prepared or knowledgeable about the curriculum, but also how students and parents can be a curriculum partner bringing their resources and knowledge to enliven a curriculum text in their own lived environment. The pandemic provides a chance for us to reflect on a transformative pedagogy. Engeström's CHAT alerts us to the importance of developing a shared vision based on

broadened understanding of knowledge and learning; where students, parents and teachers together negotiate the curriculum; and where multiple voices and localized practices are valued. In this way, we propose a vision of connected learning linking school and home at the post-pandemic world. Essentially, this form of new learning is agentic, intergenerational, participatory and multicultural in nature.

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ORIGINAL ARTICLE

"School Never Stops": Measures and Experience in Italian Schools during the COVID-19 Lockdown

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Abstract. *With the COVID-19 outbreak and the resulting lockdown, Italian schools have continued to provide education using distance learning systems. In this emergency, the primary aim of the Ministry of Education was to guarantee each student's right to education. The expression "School Never Stops" ("La Scuola non si ferma") is a clear response to the country's isolation and a demonstration of the school staff's commitment. This paper describes Italy's educational response during the lockdown by illustrating the measures undertaken by the Ministry of Education and the initiatives by private and public organizations. The challenges of distance education during the pandemic emergency and future directions for the reopening of schools in September are also examined and discussed.*

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THE end of January, the World Health Organization (WHO) declared that the COVID-19 outbreak constituted a Public Health Emergency of International Concern, reporting 7,818 confirmed cases worldwide with the highest number of cases in China (WHO, 2020a). Given the wide and rapid spread of the virus and its severity, in March the WHO declared COVID-19 a pandemic. As we know, Italy was one of the first countries after China where the number of cases increased rapidly from February. The Italian government took immediate measures to halt the spread of the virus, starting from the most affected regions. On February 23, some municipalities in Lombardy and Veneto have declared 'red zones and were subjected to quarantine to reduce the spread of the virus outside these regions. After the initial measures that related only to specific areas in the country, the Ministerial Decree (DPCM) of March 4 established measures at the national level that involved the suspension of public events, the closure of schools and universities, and the recommendation to implement smart working where possible. Measures to isolate affected areas and limit the movement of people were no longer effective in a country where the number of cases and deaths had risen exponentially within a few weeks. Furthermore, the percentage of patients in intensive care reported daily in early March rose consistently, and by March 11, Italy had announced 12,462 cases and 827 deaths (Remuzzi & Remuzzi, 2020).

In this scenario, the Ministry of Education coined the expression "School Never Stops" ("La Scuola non si ferma") in response to the entire country's isolation and the measures taken to continually providing students with online instruction. As rapidly as possible, school principals and teachers implemented distance learning using different systems to deal with the emergency and the suspension of face-to-face instruction. Restructuring lessons, creating virtual classes, and managing synchronous and asynchronous communication systems was challenging for teachers and students. In April, further measures by the Ministry of Education together with the support of several educational and technological organizations helped improve and systematize online teaching and learning.

This paper aims to describe Italy's educational response during the early months of the outbreak and to discuss issues concerning distance learning during this period of emergency. Future guidelines for the reopening of schools in September – recently published by the Ministry – are also examined and discussed.

Measures and Initiatives of the Ministry of Education

The protection of citizens' health is recognized by the Italian Constitution as a fundamental right since health represents the premise for the exercise of all the other rights that contribute to the full development of the human person (Art. 32 of the Italian Constitution). The early measures of the Ministry of Education at the beginning of February concerned the diffusion of the circulars prepared by the Ministry of Health through the Regional School Offices (USR). They contained the "Indications for the management of students and teachers returning or leaving to affected areas of China" (Circular of the Ministry of Health n. 113/2020). To limit the spread of the outbreak, the Decree-Law of February 23 suspended school trips in Italy and abroad and, later, the DPCM of March

4 declared the closure of schools and authorized distance teaching activities in schools and universities.

At the same time, a task force was set up at the Ministry of Education to manage the pandemic emergency; the group was composed by delegates of the Civil Protection, pediatricians, local delegates of Ministry of Education, representatives of parents and students associations as well as public and private organizations.

As regards the management of the epidemiological situation, it was recommended referring only to information confirmed by official sources and information published by the Ministry of Education. A ***website page*** was opened by the Ministry of Education in which useful information was constantly updated for schools, universities, and institutions of advanced artistic, musical, and choreatic education. This webpage – still active – is divided into four sections: (i) distance learning in which indications and resources to support schools are published; (ii) FAQ in which the answers to the most frequently asked questions are available; (iii) measures and rules in which the measures and decrees adopted are available; (iv) links to other useful websites.

Distance Education in Italian Schools

In the last twenty years the measures adopted by Ministry of Education regarding ICT have been of different types and have involved different sectors: (i) technological equipment for schools; (ii) staff training in ICT; (iii) support of students at risk of drop out, (Ministerial Decree n. 55/2002; Ministerial Decree n. 851/2015). Especially two school experiences in place in Italy were important to base distance learning during the lockdown. The School in Hospital that guarantees education to hospitalized pupils and youths through a variety of systems including distance learning, and the Rural School project, that involves about 200 schools located in the Italian islands or mountain municipalities. In these isolated contexts, technology has always been central to maintain relationships between teachers and students and to provide education through distance learning at home.

Despite these actions and experiences, the Italian school was not prepared for such a radical change requested by the COVID-19 that 'has thrown' schools into the dimension of online education systems, with their teachers and families.

In the early weeks of the lockdown, teachers undertook a variety of initiatives, such as the transmission of materials by e-mail or class electronic register, the record of video lessons, and the use of distance education platforms activated by their schools, the contact with students via mobile phone. This operation involved over 8 million students, thus their families, and one million workers including school principals, class teachers, support teachers, and educational assistants. The tests for this emergency teaching had never been planned or hypothesized; while teachers and students know the escape routes in case of fire in the school and know where to take shelter in the event of an earthquake, nobody was prepared to teach and learn during a pandemic crisis or had previous experience to base teaching activities. Suggestions to deal with distance learning and a wide range of online training courses for teachers were promptly made available by the Ministry of Education. Furthermore, the Italian government developed

measures to allow parents to take time off from work during school closure and, at the same time, provided funding to purchase devices for the Internet connection, tablets, and laptops (DPCM of March 11).

The Note of the Ministry of Education of March 17 provided schools with concrete suggestions to teach using online educational platforms. Conscious that nothing could fully replace face-to-face education, the aim was to design a learning environment to be lived by students and teachers and to be reshaped if needed. The document also suggested privileging as far as a possible virtual classroom to conduct and attend online classes. A specific section of the document covered activities for children with disabilities, linguistic and/or socio-economic difficulties, at the hospital or in prison schooling.

A mini-guide was provided to teachers on April 6 as methodological and practical support to help students to face the emergency. One of the main objectives was to give pupils a sense of security – without sweetening the reality – providing them with simple and clear information to protect their rights – recognized by the UN Convention of 1989 – and to stimulate their ability to give original and innovative answers to situations of crisis. The guide developed by the Ministry of Education contains suggestions of activities to do with students concerning the principles of equality, solidarity, well-being, information, listening, and personality development. The followings are relevant statements from the guide: (i) reassuring children and youths without an Internet connection or digital devices that State is started to provide them; (ii) teachers should contact by phone students who cannot follow distance education and invite classmates to share their notes with them; (ii) engaging everyone in educational activities that act as a stimulus and encouragement; (iii) video calling children and youths with disabilities involving the whole class or part of it and the whole teaching team in order to give encouraging messages and make families and children feel part of the school; (iv) starting educational activities from telling a story, listening to music, or creating small artifacts; (v) reflecting with children and youths on the new educational experience according to their age and their level of awareness; (vi) proposing to write letters and postcards to grandparents, elderly and lonely people, children in group homes; (vii) proposing the hour of listening, that is one hour of connection per week to listening to the doubts and fears of children and youths; (viii) promoting physical education, through video tutorials, following the motto of 'Relaxing everyone, nobody excluded'; (ix) proposing musical pieces to listen, sing, play and then, make a narration about students' emotions.

Since COVID-19 does not only concern health but is a social, economic, and cultural crisis, the document made clear the need to guarantee students the right to play, to devote themselves to creative, supportive, awareness-raising, and mutual aid activities.

Distance Education for Inclusion

As known by the scientific community, Italy is one of the first countries that adopted the model of full inclusion abolishing special classes and schools in 1977. During the COVID-19 lockdown, particular attention was paid to students with special educational needs and their inclusion in online distance learning. As indicated in the Note of the

Ministry of March 17 "the suspension of teaching should not interrupt as far as possible the inclusion process". The Ministry of Education suggested supporting teachers to maintain interactions with the pupils with disabilities and between to promote the relationship between the pupil and the other class teachers. Furthermore, the document suggested being in contact with the family and to prepare personalized materials for the student and to periodically evaluate the implementation of the Individualized Education Plan.

For students with other special needs, such as pupils with linguistic and/or socio-economic difficulties, principals had to assign them – on loan for free use – any devices of school property or request them to the Ministry of Education. The right of education had also to be guaranteed to hospitalized pupils and youths (School in Hospital).

The main objective of the web inclusion of all children was to mitigate the potential social isolation connected to the lockdown. For this purpose, the website of the Ministry of Education had been expanded with a section called 'inclusion via the web' (https://www.istruzione.it/coronavirus/didattica-a-distanza_inclusione-via-web.html). It is designed to support the work of principals, teachers, and school staff in providing distance education opportunities to students with special needs. In this section of the website Ministry measures, educational experiences, and webinars in collaboration with the Institute for Educational Technologies of National Research Council (ITD-CNR) were published. Furthermore, online platforms for distance education were made available free of charge and thanks to the contributions of private organizations that responded to the call launched by the Ministry of Education.

Resources for Distance Learning

In the implementation of the so-called 'Cura Italia' (Care Italy) Decree-Law (Decree-Law n. 18/2020), the economic resources were allocated and distributed very quickly among schools to enhance distance education. Of the total amount of 85 million euros, 10 million were allocated to the use of e-learning platforms and to immediately increase or equip schools with digital tools; 70 million were used to purchase digital devices to be assigned on loan for free use to the students with low socioeconomic status; the remaining 5 million were invested in school staff's training. The assignment of digital devices (for 70% of the amount) was based on the Pisa Index of Economic, Social and Cultural Status (ESCS-OECD) that allowed to identify areas of disadvantaged families and in which digital devices are less widespread. Furthermore, the Ministerial Decree n. 187 of March 26 established the procedures to assign to schools the 1,000 computer technicians, who are giving support to teachers in distance learning.

An additional amount of 80 million euros were then provided to primary and middle schools through the PON (Programma Operativo Nazionale) call – funds from the European Structural Funds – for the purchase of computers, tablets, and devices for the Internet connection. The aim was to guarantee everyone access to distance education. Funds were also provided to the Provincial Centers for Adult Education (CPIA), prison schooling, and schools in hospitals.

To support schools and families the Ministry of Digital Technology and Digitization, with the technical support of the Agency for Digital Italy promoted the 'Digital Solidarity' project. It is solidarity collaboration between the public and private sectors to facilitate smart working, education, well-being, and, therefore, distance communication. Companies, associations, and other organizations have provided free digital services to limit economic damage to families, citizens, and businesses. The goal was also to improve the lives of citizens forced to stay at home and reduce social contacts and travel as much as possible, even within cities, to protect themselves and others from contagion. Many private and public organizations showed great solidarity towards schools and families supporting the growth of a school community.

Additional Initiatives to Implement Distance Education

The COVID-19 emergency forced millions of teachers and students to adopt distance learning using digital technologies. However, they were aware that these technologies would not reach the entire school population. Not only has the digital divide concerning those who do not have the devices in Italy, but even more those who are unable to use them. To deal with these issues the Ministry of Education promoted collaborations with radio and State television as well as publishing houses and training agencies to offer additional training and educational opportunities besides online distance education.

Learning Through Radio and Television

The health emergency and the requests for interpersonal distancing had given value to the role of the Italian State Television (Rai) for many reasons: ease of use; a powerful way to overcome the digital divide; the accessibility throughout the country without the need of broadband Wi-Fi internet connection; and the cultural, historical, and artistic richness of the Rai archives. In Italy over 97% of family units have the television and watching television may reinforce family relationships (CENSIS, 2018).

According to the agreement between the Ministry of Education and the Rai a wide range of television channels and programs were dedicated to education. In contrast with distance education, which is mainly developed online, Rai has made available to the schools, families, and students of all ages educational contents and lessons usable with every device.

A vast repository of products and educational programs was offered on Rai Cultura (which includes Rai Scuola, Rai Storia, Rai3), Rai Ragazzi, and RaiPlay. Among the various initiatives promoted, 'La Scuola in Tv' provided students with lessons on many subjects (e.g., English, mathematics, history, literature, art, Greek, Latin) taught by expert teachers identified by the Ministry of Education. This service also includes programs dedicated to adult education (e.g. adults participating in prison schooling) as well as programs channels to support students in preparing the secondary school State Exam. Even the radio – Maturadio – offered over 250 educational podcasts to students who are going to take the State Exam.

Unexpected Professional Development

Principals, teachers, and administrative offices had no breaks in delivering educational services and in being committed to improving their professional skills especially related to technology. In response to the need to be up to the new task, free training offers were rapidly promoted by institutions, private companies, and publishing houses.

The National Institute for Documentation, Innovation, and Educational Research (INDIRE) has provided hundreds of free webinars on good practices to support innovation processes as well as video tutorials for the use of distance education platforms differentiated by the level of skills in collaboration with 'eTwinning' – a community for schools in Europe. Many other organizations (e.g., USRs, publishing houses, ITD-CNR, scientific and educational societies) had made available training materials and training opportunities for teachers.

The offer of training courses was based on the specific need of the schools; when schools were well technology equipped the training offer was directed to contents and educational methods; when schools had teachers with a low level of digital skills the training offer was focused on the technical aspects of the use of the distance learning platforms. The COVID-19 emergency also required significant sensitive and relational resources; therefore webinars on the management of anxiety were widely attended by teachers.

The most used e-learning platforms were the ones created specifically for schools and listed by the Ministry of Education as compliant with the regulations (EU Regulation 2016/679): G-Suite for education (Google), Office 365 Education A1 (Microsoft), WeSchool (Telecom Italia Mobile). To use them, many teachers were engaged in many hours of detailed study with the support of the school digital animator. This professional and moral commitment is demonstrated by over 35 thousand accesses to the website the Ministry of Education on the first day of distance education.

As a result of both the COVID-19 pandemic and everyone's commitment to the digital skills of citizens – in particular of teachers – have been improved and strengthened.

Distance Education: Challenges during the COVID-19 Lockdown

Since the closure of schools and universities on March 5, the effort of principals and teachers was to provide instruction with online systems, as required by the DPCM of March 4. In the space of a few days, teachers, students, and their families were 'thrown' into a new reality and an approach to schooling characterized by virtual relationships instead of face-to-face ones. As a consequence of the emergency, a huge social change put into question the traditional teaching and learning process and demanded that teachers and parents design and manage online education at home. Since the COVID-19 crisis, online learning is considered "a critical lifeline for education" (Organization for Economic Cooperation and Development, 2020a, p. 1).

This rapid change was carried out within a few weeks, not without difficulties and issues mainly related to school organization, social inequalities, and the teachers' knowledge and skills in using online platforms. The challenges faced by Italy were similar to those all over the world (Organization for Economic Cooperation and Development, 2020b).

Organizing Online Teaching and Learning

One of the first challenges was to completely change the organizational rules and models for providing education. During the initial weeks, assignments, and homework via email or WhatsApp were the most common ways of connecting with students. This was done to maintain an active relationship between teachers and students; in other words, a way to show that schools were not stopping. Some schools started directly with online lessons through platforms already familiar to principals and teachers, such as Microsoft Teams, Zoom, and G Suite. In the beginning, each school used whatever they already knew how to use. As a consequence, the methods for continuing school activities varied considerably between schools. As quickly as possible, the Ministry of Education identified platforms to choose from and provided guidelines for online education – as explained in the previous paragraph.

Another organizational challenge emerged especially with students in primary schools, due to their low level of autonomy and self-control. The role of parents during the lockdown has been extremely important especially in primary schools; due to the lack of teacher guidance in the school context, many parents supported their children in studying and supervised them during the synchronous lessons. Many people worked from home during the lockdown, meaning that parents often had to work from home using their personal computers and at the same time take care of their children and support them studying.

On the one hand, this situation fostered a closer relationship between teachers and parents and a further integration between school education and family education, as happened also in China (Zhou & Li, 2020). On the other hand, supporting children in school activities demanded that parents manage the time devoted to work and their children and, for many families, access to the one device in their house. Furthermore, with the transition to phase two that happened a few days ago, other issues emerged since many people went back to work. As mentioned by Locatelli and Mincu (2020) phase two "may create even greater difficulties for families where parents need to go back to work and cannot afford to pay someone to take care of their children, who must stay at home because of the school closures".

Social Inequality and the Digital Divide

These organizational issues are linked to another wider issue, namely social inequality throughout the country. The crisis generated by the COVID-19 outbreak had a significant impact during these months on disadvantaged families and intensified existing inequalities (Locatelli & Mincu, 2020). Knowing the parents' prominent role in providing

support in education during this period of lockdown, children living in families with a high level of education had better opportunities to cope with online learning compared to vulnerable and poor families. The Organization for Economic Cooperation and Development (OECD, 2016) found that in Italy, 27.7% of adults are at or below level 1 in literacy and 31.7% in numeracy. As a consequence, many parents might not have sufficient skills to give their children the necessary educational support.

A recent report by Save the Children on poverty in Italy showed a huge increase in the level of poverty of children (aged 0-17) from 2008 to 2018 (Caderna, 2019). In 2008, 3.7% of children were in poverty, while in 2018 the percentage more than tripled (12.5%), with a clear disparity between the North and South of Italy – 45% of the children in poverty in 2018 lived in the South. Furthermore, the index of cultural deprivation of children ages 6-17 – calculated considering the access to cultural activities, such as theater, cinema, museum, and concerts – showed that 7 children out of 10 are considered 'deprived'. The ISTAT data (2020) suggests that these children might be the ones who suffered the most during the lockdown and that inequalities may grow due to the COVID-19 crisis.

Inequality was inevitably intensified during the lockdown due to the introduction of distance learning systems to provide students with lessons at home. The ISTAT data (2020) showed that in 2019, 33.8% of Italian families had no computer or tablet. The percentage dropped to 14.3% when only families with at least one child were considered. 22.2% of families in Italy have a computer or a tablet for each family member. Students aged 6-17 often have low digital skills; only 30.2% of children have high digital skills, resulting in a low level of autonomy to study using a computer. Furthermore, 23.9% of Italian families do not have access to the Internet at home and 41.9% of children live in overcrowded housing, two problems that together reduce the children's possibility of studying in a quiet place using online systems.

It is estimated that 6.7 million students were reached by distance learning during the lockdown, while 1.6 million students were excluded (Cittadinanza Attiva, 2020). To limit the rise of inequalities between advantaged and disadvantaged people and to make distance learning possible throughout Italy, at the end of March the Ministry of Education allocated funds to purchase digital devices in order "not to leave anyone behind", quoting Lucia Azzolina, Minister of Education.

The effects of this situation were particularly damaging for the most vulnerable students, including students with disabilities. Many teachers and principals believe that the greatest difficulty has been developing a system capable of giving the necessary attention to pupils with disabilities, to adapt and personalize contents and educational strategies through distance learning (Fundaro, 2020). Despite the inevitable difficulties in providing students with personalized instruction through online systems, many initiatives were promoted by the Ministry of Education, private associations, and publishers to support teachers and families during the lockdown – as described in the previous paragraph.

Teachers' Knowledge and Skills in Distance Learning

One of the first issues raised by the COVID-19 crisis was the capability of teachers to provide distance learning. According to the TALIS 2018 report (OECD, 2020c), Italy is below the OECD average for the level of ICT usage during class lessons – 47% of teachers answered that they allow students to frequently use ICT during lessons. Regarding teacher professional development, 52% of teachers reported that they have attended some kind of training on ICT, 36% felt sufficiently skilled to use ICT in teaching after completing their training. Furthermore, the PISA 2018 data (OECD, 2020a) showed that 50% of the principals believed that teachers in their school have the necessary technical and pedagogical skills to integrate digital devices in their teaching. Further data published by the European Commission in 2019 and WeSchool showed a worse scenario regarding professional development on ICT; only 20% of teachers have attended digital literacy training courses, 20% can teach remotely, 40% would like to learn to do it, and the remaining 40% are against it (Pasta, 2020).

These data revealed that Italian schools and teachers were not fully prepared for the shift from face-to-face instruction to distance learning that occurred due to the COVID-19 outbreak. Nevertheless, a huge change was achieved in the first months of the lockdown thanks to the commitment of principals and teachers and free professional development initiatives. Teachers' efforts were recognized by public authorities, families, and more in general by society as a whole, and their efforts, like those of healthcare personnel, are uncontested throughout the country.

As regards teacher professional development, in the first weeks of the school closures the need to know and use the various online systems was particularly highlighted. Later on, more attention was given to creating digital content and adapting face-to-face instruction to the online way of delivering education (Caponata et al., 2020). As mentioned in the previous paragraph, a prominent role was played by the INDIRE, which provided teachers with first-hand support on online learning systems, and later webinars on topics related to teaching and learning strategies, evaluation, and more in general to distance learning. These initiatives were essential in addressing the emergency, however further "suitable measures will have to be adopted [at the Ministry level] to provide all teachers with the necessary skills to deal with the digital transformation which has been accelerated by this emergency" (Locatelli & Mincu, 2020).

Plan for the Reopening of Schools

As we approach the end of the school year in mid-June, the major concern for people involved in schools – the Ministry, principals and teachers, parents and students, experts, and researchers – regards the conditions under which schools will start in September. Although the decision partially depends on how the outbreak develops during summer, the Ministry of Education is working to provide guidelines for the new school year. The question from many experts and teachers is: on what basis will the Ministry of Education make decisions on how to reopen schools?

To answer this question, it would be important to know what worked and what did not, based on the data that the Ministry should have been collected during these months. A rigorous evolution would have not been feasible in a period of emergency,

during which the aim was to provide education and to continue the relationship between teachers and students. However, data on the opinions of teachers, students, and parents on distance education would have helped to effectively design the reopening of schools in September.

In Italy, few data were collected during this first attempt at distance learning and no investigations regarding the implementation of distance learning were launched at the central level of the Ministry of Education. Data were collected by the USR of each Region, but only some of them published the results on their websites. An investigation 'Youth and Quarantine' promoted by the Di.Te. National Association (Technology addictions, Gap, Cyberbullying) and Skuola.net collected data on the opinions of students, parents, and teachers on distance learning through a survey. Although the initiative is certainly valuable, it did not provide a picture of the entire country. Participation was voluntary, with 1,245 responses, which represent a few data considering that there are about 8 million students in Italy. As a consequence of the lack of a centrally promoted investigation, we do not have a clear and exhaustive picture of what worked and what should be improved in reopening schools.

A positive initiative by the Ministry of Education to restart schools in September was to collect best practices in a dedicated section of its website and its social network pages. Experiences, stories, and examples of distance learning in Italian schools were collected and shared as a way to animate the narrative of best practices, to bring together educational institutions, and to show that the school wanted to move forward, even in such a difficult and unpredictable time.

A few days ago, on May 28, the Ministry of Education published the guidelines for school reopening in September which take into account the recommendations of the WHO (2020b). With this document, the Ministry proposed to start the new school year mainly using face-to-face education. According to the guidelines, it will be necessary to observe interpersonal distancing and hygiene requirements by wearing a mask, differentiating the times of entry and exit of students, and reorganizing the classroom space, such as the arrangement of the desks and furniture. Interpersonal distancing is more difficult to observe in preschool and kindergarten. For this reason, organizational and personnel precautions will be required, e.g. disinfecting regularly the surfaces, washing hands, and reducing the number of pupils present in each class at the same time.

Each school may decide to alternate face-to-face education and distance learning based on the spaces available and the age of the students. Primary schools should privilege face-to-face lessons, while middle and secondary schools may propose the use of distance learning systems for part of the educational time to reduce the number of pupils in the school environment. The recommendation is to use school outdoor facilities for physical activities, breaks, and lessons when possible (Council of Ministers and Technical Scientific Committee of May 28).

Conclusions

During the COVID-19 pandemic, teachers, principals and families showed a great commitment to continuing to provide students with the education, thus responding to the 'Schools Never Stops' principle put forward by the Ministry of Education. In some cases, despite a few digital resources and skills, they tried to guarantee each student's right to education, also through the use of additional resources (e.g., television channels).

In a few months, the Ministry of Education, with the support of other organizations, provided professional development to teachers and technological devices to students, accelerating the integration of technology in the teaching and learning process. However – as discussed in the article – there is an urgent need to overcome the difficulties and challenges faced during these past months in time for the reopening of schools. Among the most critical issues discussed in this paper, it is worth mentioning social inequalities exacerbated by the lockdown and the preparedness of school staff in the redesign of educational strategies and contents for distance learning. This new way of teaching introduced during the lockdown has increased the difference in students' opportunity to learn in Italy worldwide. Students with disabilities, with a low socioeconomic status as well as students with no technological equipment or an Internet connection, were the ones who suffered the most during this period for the low access and participation in distance learning. This issue should be taken into account in effectively designing the reopening of schools in September; these students need the adequate support they did not receive during more than three months of lockdown by their teachers or parents. Italy may look at the initiatives for school reopening announced by other countries that are facing the COVID-19 crisis, such as the Netherlands and the UK that have planned to provide the most needier students with tutoring by an adult (Slavin, 2020a; 2020b). Tutoring – recognized by many international reviews of research as the most effective practice with struggling students (Inns et al., 2020; Pellegrini et al., 2020) – could accelerate the learning of students who did not participate in online learning or did not improve their learning during the lockdown due to different reasons.

Furthermore, there is the need to invest in teacher professional development to improve their competencies in using online educational tools, and more in general technology to make sure to provide students with adequate resources, contents, and strategies in online, face-to-face, or blended learning in September.

For the reopening of schools in September, the Ministry of Education has established a Committee of Experts to support the Ministry in making decisions and to provide advice about innovations to be implemented in schools. According to the Ministry's course of action for school reopening (latest plan dated May 28), face-to-face education will be privileged since the school is, as recognized by the document, the context in which each child has the opportunity to properly grow and develop. The Ministry guidelines of May 28 are not final and will be updated in the following weeks to provide a clear guideline for school reopening in September.

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ORIGINAL ARTICLE

Educational Responses to the COVID-19 Outbreak in South Korea

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Abstract. *This paper investigates South Korean educational responses to school closures amid the COVID-19 pandemic, viewed with a risk and resilience framework. The COVID-19 crisis emerged and worsened right before the beginning of the new school year (March 2) in South Korea, and immediately led to students' limited access to educational facilities. Well-established IT infrastructure and national curriculum facilitated the adoption of distance learning in South Korean schools. However, educational inequality due to family influences, and financial instabilities in early care and education settings disrupted students' optimal learning during the changes. The situation brought both benefits and challenges to South Korean education system. The adoption of distance learning potentially downgraded overall educational quality, but it also provided opportunities to improve educational content and professional development for teachers, and to promote individualized learning for students. Despite some challenges, distance learning was an effective alternative for South Korean schools during the COVID-19 crisis. More practical and research efforts are needed in order to reduce educational inequality and maximize the effectiveness of distance learning.*

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THE COVID-19 crisis emerged during the winter break in South Korea. It was just before the beginning of the new school year, which is typically March 2. The official first COVID-19 case in South Korea was identified on January 20. The situation rapidly worsened after February 18, which was the beginning of the community-level mass infection, involving approximately 10,000 additional cases over the following month.

In the initial stage, most schools did not experience any serious learning disruption. Only a few schools that had scheduled graduation ceremonies in late February had to modify their plans. All early care and education (ECE) centers were operating full-time. As the beginning of the new school year approached, however, South Korean educational authorities had to make a series of difficult decisions to deal with the increasing health crisis. The winter break became longer for primary and secondary schoolers. Young children were suddenly taken out of ECE centers where they used to spend most of the day. The COVID-19 pandemic brought an unprecedented educational challenge to schools and ECE centers in South Korea.

This paper investigates South Korean educational responses to school closure amid the COVID-19 pandemic, viewed within a resilience framework. In the face of adversity, organizations should demonstrate resilience for survival, not only to rebound from the negative influences of the adversity, but also to use the situation as an opportunity for advancement and transformation (Lengnick-Hall et al., 2011). This study reviews the detailed process of educational responses to school closure in South Korea, assessing risk and protective factors associated with the educational challenge. Then we analyze positive and negative consequences of the educational responses, and provide practical and research implications for South Korean schools and ECE centers based on the findings.

School Closure and Reopening in South Korea

The increased health risks associated with the COVID-19 pandemic immediately led to students' limited access to educational facilities. Due to the strong contagiousness, high fatality rate, and the lack of a vaccine for the new coronavirus, school buildings were closed to prevent school-based mass infections. The Ministry of Education (MOE; 2020a) delayed the beginning of the school year for 5 weeks. Students were offered online self-directive learning materials during the period. Teachers provided individualized social and emotional support to students and parents via electronic methods such as online learning platforms, phone calls, or SMS messages. Meanwhile, MOE prepared for full-scale online schooling, collaborating with wireless service providers to expand web server capacity and traffic capacity of government-operated online learning platforms (Park, 2020). Starting on April 9 and gradually increasing until April 20, full-scale online schooling officially began for primary and secondary schools, starting late for the first time in South Korean education history (MOE, 2020a). During the period of school closure and online schooling, elementary schools offered emergency care services to children of working parents.

MOE had suggested that schools would physically open when daily new cases were maintained under 50 for more than 7 consecutive days (Oh, 2020). However, MOE waited until early May, when there were fewer than 50 new cases per day for almost a month, to officially announce a plan for physical reopening of schools. This initial plan was postponed for an additional week because small-sized community-level infections emerged locally right after a long holiday weekend in early May, involving more than 250 new cases. The official reopening of school buildings, although it was a partial opening, was phased in grade by grade from May 20 to June 8 (MOE, 2020b).

MOE (2020d) only recommended 12th graders to come to school daily, and suggested reduced services to all other grades. Only small schools with enough space could accommodate all students to come to school every day. Each school surveyed parents to make decisions about how many days and hours students would physically come to school. In most schools, students were divided into multiple groups and each group alternately came to school for one to three days per week, or bi-weekly. Distance learning was continued for the rest of the days.

Elementary schools seemed to be efficiently managing social distancing. Schools implemented multiple preventive measures to keep children away from each other, from the school gate to the classroom.

> *"We don't let them go to the restroom together. We only give them a 5-minute break, and even for the 5 minutes, we provide them individual activities to prevent them from playing with each other. We have partitions between each seat, and have foot stickers to keep the distance when children are lining up. We have thermal imaging cameras, hand sanitizers, and wet tissues in school, and encourage students to bring personal water bottles." (A personal conversation with an elementary school teacher, June 15, 2020)*

Similar efforts were going on in secondary schools, but older students who spent longer time in school reported difficulties in keeping the social distancing (e.g. Lee, 2020).

> *"…during the break, students walk arm in arm, chat without wearing masks, and fool around with each other, and teachers gave up on discipline." (A newspaper column of a teacher; Choi, 2020)"*

Unlike primary and secondary schools, most ECE centers in South Korea were operating full-time when they encountered the COVID-19 outbreak, because most centers only have a 1-week winter break at the end of December. South Korean ECE centers can be categorized into daycare centers and kindergartens. Daycare centers serve children of ages 0 to 5, and are under the administration of the Ministry of Health and Welfare (MHW). Kindergartens serve children of ages 3 to 5, equivalent to preschools in the United States, and are under MOE's administration. Beginning in March 2020,

both daycare centers and kindergartens are following a unified national ECE curriculum emphasizing play-based learning. However, because daycare centers and kindergarten are governed by different governmental institutions, their responses toward the COVID-19 crisis varied slightly as well.

Following MOE's guidelines, kindergartens were closed on March 2, and reopened on May 27. Daycare centers were officially closed on February 23 by MHW's order (MHW, 2020a). The closure officially continued until the end of May, when MHW gave autonomy for local governments to decide whether they would extend the closure or reopen daycare centers. Both kindergartens and daycare centers, however, provided emergency care services during the period of closure, and were not permitted to refuse children who requested the services. No distance learning contents were offered to preschool aged children at the national level. Some kindergartens shared educational videos and learning packages with children, but many young children had to either stay at home without any official educational support, or attend ECE centers using emergency care services with increased risks of infection. The attendance rate for ECE centers' emergency care services were 10% right after the closure, but it gradually increased and reached close to 70% in mid-May (Choi, 2020; MHW, 2020b).

Social distancing is almost impossible in ECE settings. There are not enough physical spaces to keep 1-meter distances in most ECE centers in South Korea, and more fundamentally, young children are not developmentally mature enough to follow instructions for social distancing (Weber, 2020). During the emergency care services, ECE centers in South Korea could only utilize limited options to prevent infections, such as making children wear masks all day, and not accepting children with respiratory symptoms.

> *"My daughters have to wear masks for the entire period that they stay in the center, from the moment that they step in until I pick them up. I feel sorry about this." (A personal conversation with a parent of young children, April 20, 2020)*

> *"My son's ECE center is very sensitive about coughing or sneezing. When kids are coughing, the center refuses them even though they don't have a fever. Once, I went to the center to drop off my son in the morning, and the teacher refused to take him right in front of the door because he was coughing. I had to take him back home." (A personal conversation with a parent of a young child, June 30, 2020)*

Educational Responses Associated with Risk and Protective Factors

Assets for Distance Learning

Distance learning was in the center of educational responses to the COVID-19 crisis in South Korean primary and secondary schools. Relying on distance learning, schools in South Korea were expected to prevent school-based mass infection without compromising students' academic learning. Two key assets enabled the relatively smooth implementation of full-scale online schooling in South Korea. First, the country benefited from its well-established IT infrastructure. Most regions in South Korea are accessible to a highspeed Wi-Fi network, and devices for digital learning are widely utilized (e.g., Silver, 2019). The digital learning platform used for online schooling was based on cloud servers. Therefore, capacity could be rapidly scaled up just in nine days by increasing the number of cloud servers, so that they could handle the sudden surge of users (Lee, 2020). Access to smart devices was also not a problem for most schools. During the COVID-19 crisis, only 0.2 million among 5.5 million students in primary and secondary schools reported that they needed to get devices for distance learning, and schools and local governments could easily rent their own devices to those students because they were equipped with more devices than they needed (Lee, 2020).

> *"For students, most already have electronic equipment such as a smartphone, laptop, desktop, or tablet. In my school, all 1,000 students have an electronic device for online learning and teaching." (A blog post of a high school English teacher; Hwang, 2020)*

Second, having a national common core curriculum allowed the entire student population to easily transfer to online schooling. Under a centralized education system, South Korean schools have used a national curriculum for almost 70 years, since the end of the Korean War (Seth, 2002). As all schools are following the same curriculum, distance learning contents had already been developed and provided by the Korea Educational Broadcasting System (EBS) for many years, based on the national curriculum. Schools and students have been encouraged to actively engage with these distance learning contents, and to facilitate the engagement, Korean college admission tests have intentionally incorporated those contents. Based on the high-quality digital learning contents and know-how that have been accumulated for decades, South Korean schools could deliver timely distance learning lessons despite the unprecedented COVID-19 health challenges (Shin, 2020).

Televising services and contents of EBS even enabled varying educational approaches depending on the ages of children to provide developmentally appropriate instruction. First and second graders were believed to be too immature to effectively engage in virtual communications, and were recommended not to be exposed to digital devices for long periods. Most schools allowed these young children to take distance learning classes through EBS, without interacting with computers or smart devices (MOE, 2020c), although some schools provided virtual learning opportunities to these children as well (Lee, 2020). First and second graders also received physical learning packages to enable them to learn without accessing digital learning platform (Lee, 2020).

> *"Teachers shared the broadcasting schedule of EBS with parents so that they could turn on the television and show relevant lessons to children. Parents of first and second graders could either access the EBS contents online or show them on television." (A personal conversation with an elementary school teacher, June 15, 2020)*

Challenges from Family Influences and Financial Instability

Although the assets and resources in education system and the society enabled quick implementation of large-scale online learning, schools and ECE centers went through diverse risks for successful adjustment to the changes due to the COVID-19 crisis, such as variabilities in family influences and financial instability in ECE centers.

Variabilities in Family Influences

South Korean educational responses to the COVID-19 crisis inevitably brought fundamental problems associated with family backgrounds. In South Korea, the culture of 'work from home' is not settled yet, thus, only about 60% of workers could at least partially work from home even in the peak of the pandemic (Shin, 2020). Therefore, when schools were closed, working parents who were financially unable to hire a nanny, or find a family member who could take care of children, had to use emergency care services offered by schools or ECE centers, potentially increasing the risk of COVID-19 infection for their children (Kim, 2020).

Moving toward partial school reopening, working parents had to worry about not being able to use emergency care services during distance learning days (Lee & Shin, 2020).

> *"Children go to school once a week and continue online schooling for the rest of the days, so if there are no emergency care services, working parents have to quit their jobs. Emergency care services need to continue even after school reopening." (An interview with a parent in a newspaper article; Lee & Shin, 2020)*

On the other hand, some stay-at-home parents complained about opening schools too early, and a few of them even chose to keep their children at home after school reopening to avoid possibilities of infection (Kim, May 27 2020; Yoo, 2020).

> *"Can you understand that, among two children living in the same place, one goes to school every day while another goes to school once in a couple of days? How can we keep children healthy amid school reopening determined by majority rule? Why do you enforce school reopening in this ridiculous way while COVID-19 is ongoing and there's no remedy for it? Please don't forget what the most important thing is. School reopening should be postponed until either a vaccine or a remedy be-*

comes available for public." (A petition for the Blue House by a parent, May 26, 2020, https://www1.president.go.kr/petitions/589251)

The COVID-19 crisis uncovered a stark contrast of experiences between students from different family backgrounds. Some were kept safe from every possible source of infection while some were forced to go to schools for emergency care services, dealing with increased health risks, during the period that they were not allowed to go to school.

Online schooling itself also created environments that magnified the function of families in students' care and education, which enlarged the educational gap between high- and low-income students (Hwang, 2020). For instance, for distance learning, students had to follow a series of processes requiring strong IT literacies, such as setting up computers, installing relevant software programs, accessing course websites, downloading resources, and submitting assignments. Students with stay-at-home parents who were familiar with technology could easily follow these steps and adjust to the transition to distance learning. However, low-income students with limited access to digital technology, or students raised by grandparents who were more likely to be IT-illiterate, experienced challenges in each of these processes (Ju & Lee, 2020).

"As schools are reopening, I requested for a computer at the community center and received one to install at home. But the community center said that they can't set it up, and I also couldn't do that. So, it's just sitting there (without being set up). … I can't help her (=granddaughter) (because I don't know anything). She's sitting in front of the computer all day long, but I have no idea whether she's studying or just surfing the web." (An interview with a grandparent raising a sixth grader in a newspaper article; Ju & Lee, 2020)

Once students and families overcame all the initial barriers, they still had to be self-directive to efficiently manage time and schedules. Taking classes per se only took several hours per day, but students then had to deal with long assignments (Kang, 2020). Without the physical presence of teachers, primary caregivers who can stay at home, or families who have financial capability to hire tutors to manage students' efficient online learning, provide higher quality education to students (Hwang, 2020). According to a recent survey, the average daily learning hours during online schooling was reduced to half of those in the regular school years (Kang, 2020). However, many students, particularly those from middle class homes, individually received private education to make up the educational gap (Kang et al., 2020).

Like many countries, South Korea has long suffered from income-based educational gaps (Byun & Kim, 2010). In particular, widespread private education has functioned to worsen the educational inequality due to differential family influences. According to the Korea National Statistical Office (2020), about 75% of students participated in private education in 2019, and the gap in receiving and expending on private

education between low- and high-income families has been growing for the past several years. While at least some types of private education are found to have positive associations with improved academic achievement (e.g. Byun, 2014), differential access to private education depending on family socioeconomic status already has been a critical contributor to educational inequality in South Korea (Choi & Park, 2016). Dealing with increased family responsibilities for care and education due to the COVID-19 crisis, and with families' greater reliance on private education using differential financial and social resources, the current situation is exacerbating this chronic challenge.

Financial Instability in ECE Centers

South Korea provides universal preschool education to all children. Primary caregivers can decide whether they will keep their children home and receive childcare subsidies, or send children to ECE centers and let the government pay the base tuition. ECE centers can charge additional costs from parents but the maximum amount is limited by the government. Public ECE centers tend to be financially stable under this financial structure because they receive government support to cover key expenses including teacher salary and facility repairs. Private ECE centers, however, have to take care of the key expenses by themselves, while the maximum costs that they can charge from parents are limited. Therefore, without financial flexibility, losing children immediately results in financial burdens in private ECE centers (Lee & Chung, 2016).

For the first one or two months after the COVID-19 outbreak, most parents chose to keep children at home. Some parents cancelled the enrollment of their children at ECE centers so that they could receive the childcare subsidies from the government (Choi, 2020; Kim, 2020). This caused a severe financial crisis in private ECE centers, particularly in home-based childcare centers (small-sized daycare centers operating in an apartment unit or in a single home, usually having a maximum capacity of 21 children) which have the least financial flexibility among private ECE centers.

> *"Home-based childcare centers are facing the most difficulties. As many children cancelled enrolment, classes were dissolved, and teachers lost jobs." (From a discussion among educational professionals; p.243, Kang et al., 2020)*

Even though parents kept children enrolled in ECE programs, many complained that the government was paying ECE centers instead of families, while families were taking care of children. Some refused to pay the monthly costs that they had to pay in addition to the base tuition paid by the government (Choi, 2020). Meanwhile, ECE centers had to pay teacher salaries and rent because they were operating as usual to serve children using emergency care services. As a result, ECE centers, particularly private kindergartens whose additional monthly costs are the greatest in general, encountered severe financial challenges due to the COVID-19 crisis (Kim, 2020).

> *"There really can be a riot among parents in April. They complain, 'How can I pay anything when I never sent my child to your facility? My child never set foot in your classes.'" (An interview with an ECE program director on television news; Han, 2020)*

Consequences of the Educational Responses

Dealing with school closure due to the COVID-19 crisis, South Korean schools and ECE centers utilized assets and resources in the education system and the society to quickly adjust to the sudden changes in educational environment. However, some of the educational responses in South Korea produced undesirable consequences in schools. One of the most prominent challenges was differential and downgraded educational quality.

Adopting distance learning, primary and secondary schools could choose whether to offer live classes, recorded classes, or assignment-based classes for distance learning. Some teachers offered at least partial live classes while some only provided recorded classes. Even with the recorded classes, teachers who have relevant IT skills and knowledge recorded their own lectures, while many only shared the EBS learning contents (Shin, 2020). Teachers expressed concerns about the quality of contents and instruction because of the short period of preparation and limitations in the means of instruction.

> *"Teachers couldn't be prepared enough because we were told to provide online learning classes in only one week." (From a discussion among educational professionals; p.68, Kang et al., 2020)*

> *"Most teachers don't have experiences in online classes. … (Authorities) say that we can easily offer live classes using a smartphone, but if we do it without enough infrastructure or experience, and fail to meet students' expectations, it can generate distrust in education in general." (An interview with a high school teacher in a newspaper article; Shin, J., 2020)*

> *"There was a tendency for downward leveling to keep everyone on the same pace in online classes." (From a discussion among educational professionals; p.23, Kang et al., 2020)*

Students also expressed negative impressions about online classes. According to Oh (April 23, 2020), in a survey of high school students, almost 70% of 12th graders and more than 55% of 10th and 11th graders reported that they felt negatively about online learning classes. About 40% of them said that the quality of education was much lower in online classes, and they were more difficult to focus on. More than 25% said that they experienced technological difficulties, and more than 15% said that there were limitations in assignments and evaluations (Oh, April 23, 2020).

"If I only watch 60% of EBS contents, I'm marked as attended. … Actually, I sometimes take a nap or do other things while EBS videos are being played. Some of my friends studied for the college entrance tests during classes." (An interview with a 12th grader in a newspaper article; Shin, Y., 2020)

Parents were concerned about the varying quality of learning depending on teachers. Some parents were disappointed about the low quality of classes recorded by teachers, and some complained about teachers who only shared EBS contents, saying that those teachers were not doing their jobs (Jeon, 2020; News1, 2020). Because many students attended classes at home, parents who have multiple children could easily observe the classes and compare classes offered by different teachers and schools.

"My younger child's school has live classes, and shares videos recorded by teachers. But my older child's school only plays EBS videos. As a parent, I naturally compare the two schools and teachers." (An interview with a parent in a newspaper article; News1, 2020)

Despite the challenges, schools and ECE centers in South Korea also identified positive aspects of the changes associated with the COVID-19 crisis, which can provide practical and research implications for potential advancement and transformation of the field of education in the future.

First, some teachers felt that the new educational setting due to the COVID-19 crisis provided increased opportunities for teachers to utilize more diverse resources in classes, and to spend more time for the improvement of learning contents and instructional quality, because of the flexibilities in time and schedule (Lee, 2020).

"There were improvements in preparation for classes and the quality of classes due to online schooling." (An email communication with a teacher, May 30, 2020)

In particular, teachers in ECE settings felt that they benefited from the changes due to the COVID-19 crisis. Both kindergartens and daycare centers were transferring to a newly implemented play-based curriculum since March 2020, and the reduced classroom capacity provided opportunities for teachers to test and practice the new curriculum in more comfortable settings.

"(Daycare) teachers actually liked the situation that less children came to the center. They'd been worried about the transition to a play-based curriculum, and this situation allowed them to practice the new curriculum in the smaller classroom that they could handle more easily." (A personal conversation with an early childhood researcher, May 18, 2020)

Second, distance learning also enabled more effective individualized learning for students. Students had increased flexibility because they could choose the best time to take the recorded classes and to work on assignments. Teachers also had more flexibility time-wise so they could provide more individualized feedback to promote children's learning.

> *"Online classes are good for students' individualized learning. It is good that students can adjust the pace of the lecture, or take the same class repeatedly." (An email communication with a teacher, May 30, 2020)*

> *"I feel that I never have given one-on-one feedback as deeply as what I'm doing these days. … I can see each of 27 children's notebooks in detail, and can provide individualized responses. For the first time, the individualized learning became possible. When we were in the classroom altogether, this was impossible." (From a discussion among educational professionals; p.21, Kang et al., 2020)*

Implications

School closure and full-scale online schooling provided unexpected natural experiments in the field of education in South Korea. It is too early to evaluate the effects of the educational responses to the COVID-19 crisis in South Korea. However, initial statistics show that at least online schooling was successful in providing learning opportunities to a broader range of students than was typical in normal schooling settings, even though it also increased family-based learning gap. Online attendance rates reached up to 98.8%, which is higher than 93%, the usual attendance rates in the beginning of regular school years (Nam, 2020; Oh, April 22, 2020). Jeon (2020) suggests that easy access to classes and increased flexibility in timing and format could have encouraged more students to attend classes. Or, it could also be the case that teachers utilized more channels to encourage students' participation in classes (Jeon, 2020; Oh, April 22, 2020).

> *"Students are marked as 'attended' if they cover more than 60% of the content. But many students do not take online classes on time, so their academic progress rates in the distance learning system often appear to be much lower than where they should be. Teachers pester parents by texting, messaging, and calling, to make children take the classes so that they can be marked as attended. I think there are more difficulties among children to participate in distance learning classes, and more disruptions in learning." (A personal conversation with an elementary school teacher, June 15, 2020)*

The reliance on distance learning probably will continue for a while. Even after the reopening, many schools are being closed daily due to new COVID-19 cases rising in the neighborhood or within the school. Whenever schools feel that the health of students and teachers are threatened due to the novel coronavirus, they can easily transfer back to full-time online schooling until the situation is relieved. The pandemic is expected to come back (Wan & Johnson, 2020), and it is not clear when the partial school reopening will be scaled up to full-scale physical schooling. The distance learning infrastructure that South Korean schools has established this time will continuously enable schools to prioritize students' health without compromising academic learning.

Moreover, as the quality of online learning classes rapidly improved over time, and after students and teachers experienced unexpected challenges in face-to-face schooling, public opinion is leaning toward online schooling. According to S. Kim (2020), a recent survey showed that approximately 55% of students who experienced face-to-face schooling after online schooling expressed a preference for online schooling.

> *"Although I ask questions, students don't answer that much. … Since we're all wearing masks, students sitting far from the teacher can't hear the teacher's voice well, and the teachers are affected because they have to speak loudly. … I'm not sure whether face-to-face classes are offering higher quality learning experiences to students than online classes." (An interview with an elementary school teacher in a newspaper article; Kim, 2020)*

> *"After children came back to school, we are actually controlling children more. … To be honest, school reopening is causing high stress for schools. However, we're not sure whether having children in the school building with all these efforts will be more effective than online schooling. Children who are coming to school only come once a week. Even when they are in the school, they are not allowed to work together. Parents who don't want to send kids to school are still keeping children at home." (A personal conversation with an elementary school teacher, June 15, 2020)*

With the mixed messages about online schooling and physical school reopening in the midst of the COVID-19 crisis, and without scientific evidence on the effectiveness of both schooling methods, it is hard to make decisions on the best strategy to provide the most optimal education for children. However, based on some of the positive consequences of online schooling in the midst of the health crisis, distance learning can become an alternative strategy to increase access to high-quality education. Rather than merely pointing out negative outcomes of online schooling, it may be the time to welcome the new era of education, and to concentrate research efforts to counteract educational inequality.

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ARTICLE

The Mediating Role of Anti-Bullying Administrative Measures in the Relationship between Bullying and Students' Core Competencies

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Abstract. *This research evaluates the role of school administrative measures (including creating a greater school belonging and paying attention to student attendance) as independent variables and their resulting core competencies through the mediator of students' experience with school bullying. This study adopted a multi-level mediation model to empirically analyze data from middle school students and school administration in four Chinese provinces based on the 2015 Programme for International Student Assessment (PISA). Data were collected from a total of 9,060 students and 260 administrative staff. The results were: (i) Relational bullying was significantly and negatively correlated with the three core competencies, although no significant impact was found for either verbal or physical bullying; (ii) Schools which were successful in creating a more positive environment, including greater school belonging and greater attention to students' attendance, demonstrated lower levels of relational bullying; (iii) In terms of school-level variables, a greater sense of shared belonging had a direct effect on improving student performance on math and science competencies, while greater attention to students' attendance was associated with higher student scores on all three core competencies; (iv) Furthermore, school-level variables, including the sense of shared belonging and greater attention to students' attendance demonstrated a positive indirect effect on students' core competencies through the mediating effect of reduced relational bullying.*

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Introduction

GLOBALLY, educational administrators and policymakers hold the standardized scores reported by the Programme for International Student Assessment (PISA) in high regard, placing a strong emphasis on PISA's measurement of core competencies, holding these scores as indicators of school success (Wu, 2013). The emphasis of student performance on PISA, thus, reflects the role that school administrators must play in the cultivation of students' core competencies. However, PISA not only evaluates the core competencies of 15-year-old middle school students across the globe (in terms of mathematics, reading, and science), but also collects a wide range of relevant background information, including student- and school-level factors which may influence student performance. As such, PISA data serves as a valuable source for educational researchers in empirically investigating the potential relationships between performance on core competencies and other relevant background factors, the results of which can reveal, to a certain degree, which factors related to school administration demonstrate the greatest influence on students' academic performance in terms of the three core competencies.

Given the availability of student- and school-level background data, some Chinese researchers have already begun to conduct studies using a variety of items from PISA datasets. In the case of students' science competencies, Zhao, Guo, and Jiao (2017) utilized multi-level analysis to evaluate PISA data, demonstrating the significant and positive effects of school-level variables, including the provision of creative extracurricular activities, scientific resources, and greater cooperation among science teachers. In terms of reading, science, and mathematics competencies, Chen (2017) found significant effects for non-cognitive factors, including achievement motivation, parental emotional support, reduced test anxiety, and a sense of belonging to the school. Although a sense of belonging to the school, as measured in Chen's (2017) study, was based on individual students' perceptions, the construct of "belongingness" can also serve as a higher-level (school-level) variable in multi-level modeling, as in the shared perceptions among students of the same school. In this manner, the use of school-level belongingness can better reflect the degree to which school administration is effective in developing an appropriate environment for teaching and learning.

While the aforementioned studies have evaluated the relationship between school measure variables, such as the provision of activities and resources, with students' performance on core competencies, the relationships among school bullying, school administration efforts and students' core competencies have not yet been empirically evaluated. Therefore, this study utilized the PISA data released in 2015 to empirically explore the relationships among school administration factors, student bullying, and the three core competencies (mathematics, reading, and science). Variables belonging to different levels, both school-level and student-level, were included in the multilevel mediation modeling analysis of the present analysis. The aim of this analysis was to evaluate how school-level variables, including school administration, can influence student-level variables, such as performance on core competencies, by considering the

mediating role of school bullying. As such, this study contributes a new perspective on the prevention of school bullying that, in turn, has the potential for improving adolescent students' performance in terms of core competencies.

Independent Variables: Creating a Sense of Shared Belonging and Attention to Student Attendance

Based on the limitations facing existing studies, which were based on single-level models, this study adopted a multi-level analysis, including mediation, using aggregated data from the 2015 PISA datasets. This data was used to generate school-level independent variables including a) creating a sense of shared belonging and b) attention to student attendance. Since these two school-level factors reflect the administrative actions or measures implemented by school staff, they are highly practical in nature and can be generalized to other contexts. Based on preliminary analytical results adopting single-level analysis, these two variables were supported as relevant to both students' performance on core competencies and school bullying, serving as the basis for the decision to further test these relationships using a multi-level mediation model.

In terms of the sense of shared belonging to one's school, Chen (2017) demonstrated that higher levels for the sense of shared belonging were associated with higher core competencies for adolescent students. Furthermore, students' perceived sense of belonging to the school was negatively associated with reported bullying (Chen & Zhi, 2017; Didaskalou et al., 2017). In terms of student attendance, research has demonstrated that student truancy has negative impacts on academic achievement and is associated with reported bullying on campus (Gastic, 2008). Based on the aforementioned studies, administrative measures that both develop a sense of shared belonging and greater attention to student attendance are relevant to the incidence of school bullying as well as student performance on core competencies.

Mediator: School Bullying

The results of a meta-analysis have shown that school bullying has a significant negative effect on academic achievement (Nakamoto & Schwartz, 2012). Empirical evidence supporting the negative influence of bullying served as a basis for this study in selecting school bullying as a mediating variable. Moreover, the school bullying is both a new item for PISA, added for the first time in 2015 (OECD, 2017a), and an increasingly prevalent issue in Chinese education in recent years (Yang et al., 2017; Li, 2017; Wang et al., 2015). According to the OECD (2017a), after controlling for the influence of the overall socio-economic status of a school's families, students who report being more frequently bullied at school scored 47% lower on the science competency exam as compared with students who reported infrequent bullying.

Given the fact that peer victimization has a profound impact on student learning performance, the PISA report (OECD, 2017a) urges schools to take concrete measures to curb school bullying, adding that school bullying directly and negatively impacts students' performance on core competency measures. Furthermore, the report

(OECD, 2017a) suggests that, in order to improve campus safety and enhance students' potential learning success, schools must actively enact student management policies. Based on this logic, the mediating role of school management efforts is seen as a means to indirectly improve students' performance on core competencies by directly reducing school bullying.

Following the release of the 2015 PISA data and report, some studies in China have conducted secondary data analysis on school bullying-related topics (e.g., Chen & Zhi, 2017; Huang, 2017). However, thus far, no studies have adopted a multi-level mediation model including the school-level administration variables of (i) developing a sense of shared belonging and (ii) attention to student attendance.

Research Questions

The purpose of this study was to investigate the degree to which school-level independent variables indirectly influence students' performance on core competencies through the mediation of the student-level variable of school bullying. This study utilized raw data from students and administrators in mainland China from the 2015 PISA datasets in the development of a multi-level mediation model. Based on recommended procedures for examining mediation effects in multi-level models (Wen & Chiou, 2009), the research questions of this study are stated as follows:

RQ1: Does school bullying significantly influence students' performance in terms of reading, mathematics, and science competencies?

RQ2: Does an administrative approach that seeks to develop a sense of shared belonging and pays greater attention to student attendance significantly reduce students' experiences of school bullying?

RQ3: Does the reported sense of shared belonging and student attendance significantly explain differences among students in terms of performance on reading, mathematics, and science competencies?

RQ4: Does a sense of shared belonging and student attendance have a significant indirect effect on students' performance on reading, mathematics, and science competencies through the mediating factor of school bullying?

Multi-Level Modeling Procedures

Assuming that school administrative policies and procedures will directly reduce school bullying which, in turn, will indirectly influence students' performance on core competencies, a fundamental feature of the research model was the relationship between school administration factors and school bullying. In order to clarify the relationship between these two factors, related variables were first controlled. The following sections discuss the control variables included in the multi-level model and research hypotheses corresponding to the paths of the multi-level model.

Control Variables

Based on a review of school bullying research, certain student-level and school-level demographic variables have been found to influence the occurrence of school bullying. However, since many of these variables were not the focus of the model developed in this study, they are treated as control variables. In terms of student-level variables, gender, grade, and family socioeconomic status were included as control variables. Based on the findings of Huang (2017), who evaluated 2015 PISA data from mainland China, boys, and lower grade students were more likely to be victims of bullying. Furthermore, Jansen et al. (2012) reported that adolescents in the Netherlands from families of lower social status reported a higher proportion of physical and psychological bullying symptoms and, as such, more strongly experienced the negative effects of school bullying.

In terms of school-level variables, the school's overall family socioeconomic status, school size, and location of the school district were included as control variables in the multi-level model. The school's overall family socioeconomic status was necessarily included based on the results of a multi-level study of high school students from various countries, which revealed that large gaps in the levels of economic purchasing power among families in a school district were associated with more frequent occurrences of school bullying (Due et al., 2009). Based on the recommendations of Due et al.'s study, a school's overall family socioeconomic status, as a school-level variable, must be controlled. The size and location of schools were also evaluated by the model, in reference to Betts' (2014) investigation into the relationship between the size and location of schools and differences in the occurrence of school bullying, with students from larger schools demonstrating greater vulnerability to physical bullying, and location (urban vs. rural) showing no significant influence. Thus, although there no significant impact on school location was noted in Betts' (2014) study, due to the large educational gaps between China's urban and rural areas, it was considered prudent to incorporate school location in the model as a school-level control variable.

Research Hypotheses

The research hypotheses proposed by this study are in reference to the limited findings of prior single-level studies. The expansion of the proposed model to a methodology adopting multi-level analysis was deemed prudent, given the potential contribution of both the student-level and school-level variables discussed in previous sections of this paper.

Sense of Shared Belonging

The first school-level variable included in the multi-level model was "sense of shared belonging." A sense of shared belonging can be conceptualized as a student-level constructor, in the case of this study, computed as a school-level variable through the aggregation of data from a school's entire student population. Thus, as a school-level variable, the interpretation of "sense of shared belonging" differs from the student-level construct in that, in addition to representing the shared and collective perceptions regarding the school environment by a school's student population, it can also reflect the school's overall administrative efforts towards the development of an appropriate envi-

ronment for teaching and learning, including care for and acceptance of students (Freeman et al., 2007). While past empirical studies have evaluated sense of belonging as a student-level variable (Chen, 2017; Chen & Zhi, 2017), in order to evaluate the efficacy of school administration in anti-bullying efforts (Stewart, 2008), a sense of shared belonging was set as a school-level construct in this study. Furthermore, it should be noted that Liu and Liu's (2011) follow-up study found no significant correlation between students' sense of belonging (as a student-level variable) and academic achievement, after differentiating initial stage and linear growth values. As such, this study adopts students' sense of shared belonging as an emotional factor, with the influence of emotional factors on academic achievement operating as an indirect, rather than direct, effect.

Based on the findings of previous studies investigating students' sense of belonging, it seems more likely that a sense of shared belonging, as a school-level variable, can best reflect the degree to which school administrators actively and effectively develop an environment wherein students develop positive feelings towards the school, leading to better academic performance. However, although the school-level sense of shared belonging influences the core competencies of individual students across levels, the possible mediating effects have yet to be investigated. As Liu and Liu (2011) conclude, students' sense of belonging serves as an emotional factor that indirectly influences academic achievement through other mediating variables (Dong & Yu, 2010). Thus, this study hypothesizes that a school-level sense of shared belonging will influence students' performance in terms of PISA core competencies (RQ3).

As such, this study proposed school bullying as a potential mediator for the influence of a sense of shared belonging on students' core competencies. Specifically, victims of bullying often feel a lack of acceptance within a school's environment and, as a result, fail to seek assistance, retreat from school life, and demonstrate lower levels of confidence, resulting in an increased likelihood of being bullied further, resulting in a long-term vicious cycle (Chen & Zhi, 2017; Didaskalou et al., 2017). Moreover, a significant correlation exists between the experience of being bullied and low academic achievement, based on the meta-analysis of Nakamoto and Schwartz (2010). Thus, this study hypothesizes that bullying directly impacts students' performance on core competencies (RQ1).

From the previously noted single-level empirical studies, students' sense of shared belonging and school bullying appear to be causally linked, making it difficult to determine which variables are independent and which are mediators. However, by aggregating individual data in computing a school-level variable for a sense of shared belonging and adopting bullying as a student-level variable, the independent variable and mediating variable can be more clearly assessed. From the perspective of multi-level mediation analysis, higher-level (school-level) variables are generally adopted as independent variables and are hypothesized to influence the lower-level (student-level) variables (Wen & Ye, 2014). Therefore, the "sense of shared belonging" as a school-level was adopted as the independent variable and school bullying as the mediating variable. After determining the possible paths among the three variables (students' sense of shared belonging, school bullying, and student core competencies), we hypothesized

that school administrators, by actively developing students' sense of shared belonging would a) directly prevent school bullying (RQ2) while b) indirectly improving students' core competencies (RQ4).

Attention to Student Attendance

Based on PISA data, the factor regarding the school administration's efforts towards "attention to student attendance" is evaluating using three items evaluating: students' lateness, skipped classes, and truancy. These are student-level variables in the original 2015 PISA datasets but were aggregated as a school-level variable reflecting the administration's attentiveness to school attendance. Students' timeliness and attendance are undoubtedly necessary to ensure the quality of learning. If students are not willing to attend classes or are truant, they are not likely to perform well academically (Fang, 2007). As such, paying closer attention to students' attendance in one measure by which school administrators can promote students' attendance classes and timeliness, factors assumed to have a direct effect on students' performance on core competencies. Thus, this study hypothesizes that school-level sense of attention to student attendance will demonstrate an influence on students' performance in terms of PISA core competencies (RQ3).

Furthermore, the PISA report (OECD, 2017a) suggests that when students realize that the school will attentively enforce school rules, bullying events will be reduced. Therefore, it is possible that more attentive student management by the administration, as a school-level variable, can deter the occurrence of school violence, reduce opportunities for students to experience bullying, and have a positive indirect effect on students' core competencies. Thus, in the multi-level model, school bullying likewise serves as a mediator between school administrators' efforts to enforce student attendance and students' resulting performance on core competencies.

Close relationships have been found among school bullying, student attendance, and academic achievement (Gastic, 2008). In order to avoid bullying, students may protect themselves by avoiding the school environment. However, by skipping classes, such students fail to keep up with lessons, resulting in poor academic performance. The research of Zhao and Zhu (2012), targeting both juvenile offenders and non-offending middle school students, found that skipping classes was closely associated with peer victimization, demonstrating that skipping classes weakened the relationship between students and the school, leaving them vulnerable to negative behaviors. As such, skipping classes has a mutually causal relationship with school bullying, wherein bullied students attempt to skip classes to avoid peer victimization but, by skipping classes, lose their connection with the school, preventing victimized students from obtaining assistance and continuing to suffer bullying. Thus, this study hypothesizes that bullying directly influences students' performance on core competencies (RQ1).

As previously noted, if the single-level analysis is adopted, it is difficult to determine the independent variable from a bi-directional correlation. However, by aggregating attendance as a higher-level (school-level) variable, the independent and mediating variable can be clearly distinguished. Since the school-level factor of attention to

students' attendance, as defined in this study, reflects the attentiveness of the school's administration in the implementation and enforcement of school rules, this variable serves as a higher-level, school-level variable and an independent variable in evaluating the effectiveness of school bullying prevention. Therefore, this study hypothesizes that if the school administration pays attention to students' attendance through a more attentive administrative approach, they will demonstrate that the school attaches importance to students' learning, resulting in a strengthened relationship between students and the school and more effective prevention of school bullying. In this way, an attentive school administration, which pays attention to students' attendance, mediated by a decrease in school bullying, has the potential to improve students' core competencies. After determining the possible paths among the three variables (attention to school attendance, school bullying, and student core competencies), we hypothesized that school administrators, by paying more attention to student's attendance would a) directly prevent school bullying (RQ2) while b) indirectly improving students' core competencies (RQ4).

Research Methods

Data Source

Variables from the 2015 PISA dataset were selected for analysis, including background information on students and school administration. These samples represented the Chinese provinces of Beijing, Shanghai, Jiangsu, and Guangdong. Data from a total of 9,841students and 268 schools (with each school represented by one school administrator) were analyzed. After excluding missing data, the number of valid subjects included 9,060 students (52.4% male and 47.6% female) and 260 administrative staff. From among these schools, schools with a total student population of less than 1,600 accounted for 59.2% of schools, while schools with more than 1,600 students accounted for 41.8% of total schools. Schools located in towns and small cities accounted for 50.8% of the total, with schools located in large cities accounting for 37.3% of the total, and schools in rural areas accounting for 11.9% of total schools.

Variables in the Multi-Level Model and Corresponding 2015 PISA Data

This section lists the variables included in the research model and provides examples of items from the corresponding 2015 PISA dataset (see **Table 1**). Included in **Table 1** is a column entitled "Variables" which includes the variables of the multi-level mediation model, including dependent and independent variables, a mediator, and control variables belonging to either the student- or school level. The column entitled "Corresponding 2015 PISA data" includes items from the 2015 PISA dataset used in computing model variables (including both measurement indicators and the original items on which these measurement indicators were based). Derived variables included in the model include two generated from the PISA data, including the original PISA item of

Table 1. The Variables of the Model and the Corresponding Data of PISA 2015.

	Variables	Corresponding data	
		Measurement Indicators	Original PISA Items
Dependent Variables (student-level)	Mathematics, reading, and science competencies	Ten plausible values (PV) for each competency	Mathematics: PV1MATH - PV10MATH Reading: PV1READ - PV10READ Science: PV1SCIE - PV10SCIE
Independent Variables (school-level)*	Sense of shared belonging	The aggregate of the variable "Belong" for students from the same school	Belong: ST034Q01TA-ST034Q06TA
	Attention to students' attendance	The aggregate of the number of days students are late for school each week	Late for school: ST062Q03TA
		The aggregate of the number of days students skip class each week	Skipping classes: ST062Q02TA
		The aggregate of the number of days students are truant each week	Truancy: ST062Q01TA
Mediator (student-level)	Being bullied	Verbal bullying: Mean PISA verbal bullying scores.	Verbal bullying: ST038Q04NA and 05NA
		Relational bullying: Mean PISA relational bullying scores.	Relational bullying: ST038Q03NA and 08NA
		Physical bullying: Mean PISA physical bullying scores.	Physical bullying: ST038Q06NA and 07NA
Control Variables (student-level)	Gender	Male or female based on PISA codes	Gender: ST004D01T
	Grade	Grade based on PISA codes	Grade: ST001D01T
	Family socioeconomic status	"ESCS"	Weighted "HOMEPOS", "HISEI" and "PADER" values
Control Variables (school-level)	School size	"SCHSIZE"	Addition of the number of SC002Q01TA (boys) and SC002Q02TA (girls)
	Type of school	Private *v.s.* public from PISA codes	SC013Q01 (1 = private school, 3 = public school)
	School location	Location-based on PISA codes	SC001Q01 (1-5 representing the village, small town, town, city, and big city, respectively)
	School family socioeconomic status	The aggregate of the "ESCS" value for all students from the same school	

** Averaging scores for students in the same school and aggregate them as a school-level variable*

Note 1: The variable names in the table are exactly the same as those in the PISA 2015 data file.

Note 2: According to the PISA 2015 manual, in order to correctly analyze the PV values, a one-time analysis of the ten PVs in terms of the mean value is not recommended. Rather, each PV must first be analyzed and then combined with the results of the other 10 PV values in order to establish significance. This study utilized HLM software to perform the above-mentioned processes.

Note 3: In addition to variables such as the size, type, and location of the school, other school-level independent variables and control variables were aggregated from student-level variables.

Note 4: For the calculation of family socioeconomic status, the following items were included: "HOMEPOS" (home possessions), "HISEI" (highest parental occupation), and "PADER" (parental education).

"Belong" (representing the sense of shared belonging) and "ESCS" (representing the overall school families' socioeconomic status). The technical manual for PISA (OECD, 2017b) stated that the derived variables are scale scores generated by computing original items through item response theory, with these resulting derived scores being suitable for using for direct comparisons among OECD member countries.

Data Analysis

Data analysis consists of two parts: descriptive statistics and multi-level mediation modeling. In terms of descriptive statistics, since the PISA data involves ten plausible values (PVs) for estimating students' core competencies, these values cannot be directly processed using SPSS statistical software. Therefore, a syntax was first generated using IDB Analyzer 4.0 (IEA, 2018), and then executed using SPSS 22.0 to compute descriptive statistics. For the multi-level mediation model, we used HLM 6.0 to analyze the data, following the suggestions provided by the PISA technical manual (OECD, 2017b) to weigh variables at the student-level and school-level, utilizing the values of "W_FSTUWT" (Final student weight) and "W_SCHGRN" (Final school weight). In terms of the steps involved in conducting multi-level mediation modeling, this study followed the recommended procedures of Wen and Chiou (2009) to address the four research questions.

- Step 1 (RQ1). This study first evaluated the coefficient for the influence of the mediator on the dependent variables. The dependent variables included students' mathematics, reading, and science competencies. The mediator included three types of school bullying (verbal, relational, and physical). Based on the results of the first step, we retained the bullying types with statistically significant coefficients before continuing to conduct a follow-up analysis.
- Step 2 (RQ2). Next, we computed the coefficient for the influence of the school-level independent variables on the mediator variable of school bullying. The school-level variables in this study were a) sense of shared belonging and b) attention to students' attendance. In terms of attentive school administration efforts, which pay attention to students' attendance, three items were included: "late for class," "skipping classes," and "truancy." In Step 2, we tested the impact of these two school management measures on the mediator (school bullying) and retained those context variables with statistically significant influence.
- Step 3 (RQ3). The third step was to test the coefficient for the influence of the school-level variables on the dependent variables (core competencies). From Step 2, only school-level variables with significant coefficients were used in testing their effects on the dependent variables. It should be noted that only school-level variables with coefficients reaching statistical significance in Step 3 were then retained for further analysis in Step 4.
- Step 4 (RQ4). The final step was to confirm whether or not a mediating effect existed within the model. The criterion for a mediation effect is that when the school-level variables and the mediator are included in the same model, the coefficient for the influence of the school-level variables on the dependent variables must be lower

than the coefficient when the mediator is not included. In this case, if the coefficient for the influence of the school-level variables on the dependent variables (core competencies) was not significant, and the influence of the mediator on the dependent variables was significant, a complete mediating effect would be indicated. However, if the coefficient for the influence of the school-level variables on the dependent variables (core competencies) still reached a statistically significant level, a partial mediating effect would be indicated.

Results

Descriptive Statistics

The descriptive statistics are provided in **Table 2**. In terms of school-level variables, the average school size was 1,476 students (*SD* = 1,445). The mean for overall school families' socio-economic status was -1.16 (*SD* = 0.76), while the mean shared sense of shared belonging was -0.30 (*SD* = 0.21). Mean values were also calculated for being late for school (*Mean* = 1.52, *SD* = 0.24), skipping classes (*Mean* = 1.11, *SD* = 0.11), and truancy (*Mean* = 1.03, *SD* = 0.05), which indicated that, on average, less than two absences or late arrivals were observed over the most recent two weeks. The average value for student-level family socioeconomic status was -1.04 (*SD* = 1.11). Since this value was negative, it suggests that the family socioeconomic status of students was lower than the average for students in other OECD countries. Among the three core competencies, the mathematics competence was the highest (*Mean* = 538.38, *SD* = 104.19), followed by science competence (*Mean* = 524.38, *SD* = 101.84), and reading competence (*Mean* = 501.18, *SD* = 106.87). The mean value for verbal bullying was 1.30 (*SD* = 0.56) and relational bullying was 1.30 (*SD* = 0.59). The mean for physical bullying was 1.35 (*SD* = 0.56). Given the above values and the variation among different types of bullying, student-level bullying ranged widely among schools, from situations where students reported no bullied to schools where students reported experiencing bullying several times a year.

Mediation Effects

The analytical results of multi-level mediation modeling are provided in **Table 3**. In order to confirm that the intraclass correlation coefficient (ICC) and the variation components met the requirements of multi-level analysis, we first tested a null model including the dependent variables of the three core competencies (mathematics, reading, and science). The results demonstrated that the ICC for mathematics, reading and science competencies were 48%, 51%, and 49%, respectively, and that the various components of these three variables were significantly different from zero, which indicated that the core competencies for students in the same school were similar, with significant differences between schools. Since the assumptions required for multi-level mediation modeling were met, this analysis was adopted to evaluate the nested data derived from the 2015 PISA through non-independent sampling. In addition, based on the recom-

Table 2. Descriptive Statistics.

	Mean	SD
School-level		
School size	1,476	1,445
School-level family socio-economic status (ESCS)	-1.16	0.76
Sense of shared belonging	-0.30	0.21
Late for school	1.52	0.24
Skipping classes	1.11	0.11
Truancy	1.03	0.05
Student-level		
Family socioeconomic status (ESCS)	-1.04	1.11
Mathematics competency	538.38	104.19
Reading competency	501.18	106.87
Science competency	524.38	101.84
Verbal bullying	1.30	0.56
Relational bullying	1.30	0.59
Physical bullying	1.35	0.56

mendations of Wen and Chiou (2009) school-level variables adopted a fixed slope and grand mean-centered when the multi-level mediation model was tested.

The Relationship between School Bullying and the Core Competencies

The multi-level model equations are shown as follows. The results demonstrate that when student- and school-level control variables were included, only relational bullying was shown to negatively influence all three core competencies (with a coefficient for mathematical competency of γ_{50} = - 8.53, p = 0.01; a coefficient form reading competency of γ_{50} = -6.21, p = 0.04; and a coefficient for science competency of γ_{50} = -6.93, p = 0.01). Verbal bullying and physical bullying showed no significant effects on the three core competencies.

Student-level (Equation 1-1)

$$\text{Core Competency}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}_{ij}) + \beta_{2j}(\text{Grade}_{ij}) + \beta_{3j}(\text{Socioeconomic status}_{ij}) + \beta_{4j}(\text{Verbal bullying}_{ij}) + \beta_{5j}(\text{Relational bullying}_{ij}) + \beta_{6j}(\text{Physical bullying}_{ij}) + \gamma_{ij}$$

School level (Equation 1-2)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{School type}_{j}) + \gamma_{02}(\text{School size}_{j}) + \gamma_{03}(\text{School location}_{j}) + \gamma_{04}(\text{School-level socioeconomic status}_{j}) + U_{0j};\ \beta_{1j} = \gamma_{10};\ \beta_{2j} = \gamma_{20};\ \beta_{3j} = \gamma_{30};\ \beta_{4j} = \gamma_{40};\ \beta_{5j} = \gamma_{50};\ \beta_{6j} = \gamma_{60}$$

The Relationship between School Administrative Measures and School Bullying

Table 3. Multi-Level Mediation Model.

	Null Model	Step 1			Step 2	Step 3			Step 4					
Dependent Variable	CC	CC			RB	CC			CC (Without Mediator)			CC (With Mediator)		
		M	R	S		M	R	S	M	R	S	M	R	S
Fixed Effects														
γ00		267.25**	229.48**	195.53**	1.83**	223.56**	203.88**	165.85**	241.26**a 246.92**b	213.30** b	172.71** a 177.46**b	246.09** a 251.29**b	216.19 **b	176.19** a 180.63** b
γ01 School type		-18.41	-15.35	-10.13	0.02	-12.78	-11.16	-5.12	-11.22 a -17.98 b	-14.86 b	-3.49 a -9.53 b	-10.94 a -17.44 b	-14.52 b	-3.31 a -9.16 b
γ02 Size		-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00 a 0.00 b	0.00 b	0.00 a 0.00 b	0.00 a 0.00 b	0.00 b	0.00 a 0.00 b
γ03 Location		-5.03	-0.05	-2.09	0.02	-3.35	1.35	-0.47	-3.95 a -4.11 b	0.81 b	-1.07 a -1.11 b	-3.76 a -3.90 b	0.94 b	-0.94 a -0.96 b
γ04 School-level ESCS		62.03**	63.05**	62.47**	0.01	42.02**	46.89**	43.78**	46.51** a 51.76** b	53.86** b	48.31** a 52.07**b	46.49**a 51.37**b	53.61** b	48.30** a 51.79 **b
γ05 School-level shared belonging					-0.33**	62.82**	45.04	53.51*	90.85** a		82.06** a	87.59** a		79.76 ** a
γ06 Late for class					0.02									
γ07 Skipping classes					0.27*	-182.27**	-164.70**	-185.00**	-210.34** b	-184.86** b	-208.91 ** b	-206.01** b	-182.05** b	-205.85** b
γ08 Truancy					0.40									
γ10 Gender		9.28*	-13.83**	13.02**	0.12**	8.24*	-14.43**		8.31* a 8.26* b	-14.41** b	12.48* a 12.43* b	9.23*a 9.19* b	-13.81** b	13.13** a 13.09** b
γ20 Grade		32.38**	34.26**	36.16**	-0.08**	34.46**	35.73**		33.95** a 33.95** b	35.37** b	37.42** a 37.38** b	33.18** a 33.19** b	34.87** b	36.87**a 36.83**b
γ30 ESCS		6.83*	8.48**	5.94**	-0.01	6.89**	8.50**		6.90**a 6.91** b	8.51** b	5.97** a 5.98** b	6.80** a 6.81** b	8.44** b	5.90**a 5.91**b
γ40 Verbal bullying		-1.67	-0.72	-1.19										
γ50 Relational bullying		-8.53*	-6.21*	-6.93*								-8.26** a -8.30** b	-5.38* b	-5.81* a -5.86* b
γ60 Physical bullying		2.29	2.25	3.30										
Random Effects														
σ2 (Intragroup variation)	M: 5562.65 R 5481.30 S: 5091.36	5282.33	5135.06	4757.59	0.36	5305.17	5144.49	4769.17	SB: 5304.63 SC: 5305.24	SC: 5144.62	SB: 4768.62 SC: 4769.43	SB: 5283.25 SC: 5283.85	SC: 5136.39	SB: 4759.05 SC: 4759.86
τ00 (Intergroup variation)	M: 5145.82* R: 5667.24* S: 4901.72*	1849.56**	1648.24**	1466.85**	0.004*	1370.26**	1297.71**	1005.84**	SB: 1671.39** SC: 1469.10**	SC: 1344.84**	SB: 1315.21** SC: 1074.77**	SB: 1636.61** SC: 1435.53**	SC: 1324.72**	SB: 1292.61** SC: 1053.93**

Note: CC: Core Competency; RB: Relational Bullying; M: Math; R: Reading; S: Science; SB: Shared belonging; SC: Skipping classes.
**p < 0.05, **p < 0.01; [a] coefficient for the influence from sense of shared belonging to the school (school-level); [b] coefficient for the influence of skipping classes (school-level)*

Based on the results of Step 1, only relational bullying had a significant effect on students' core competencies. Thus, only relational bullying was utilized to test the association between school administration measures and bullying. Based on Equations 2-1 and 2-2, the results demonstrate a significant and negative coefficient for sense of shared belonging (γ_{05} = -0.33, $p < 0.01$) and a significant and positive coefficient for skipping classes (γ_{07} = 0.27, $p = 0.03$). However, the coefficients for late for school and truancy were not significant. These results imply that the higher the sense of shared belonging (as an aggregate measure) and the more attentive the student administration was towards students' attendance (as evidenced by lower rates of skipping classes), the lower the level of reported school bullying.

Student-level (Equation 2-1)

$$\text{Relational bullying}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}_{ij}) + \beta_{2j}(\text{Grade}_{ij}) + \beta_{3j}(\text{Socio-economic status}_{ij}) + \gamma_{ij}$$

School-level (Equation 2-2)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{School type}_j) + \gamma_{02}(\text{School size}_j) + \gamma_{03}(\text{School location}_j) + \gamma_{04}(\text{School-level socio-economic status}_j) + \gamma_{05}(\text{Sense of shared belonging}_j) + \gamma_{06}(\text{Late for school}_j) + \gamma_{07}(\text{Skipping classes}_j) + \gamma_{08}(\text{Truancy}_j) + U_{0j};\ \beta_{1j} = \gamma_{10};\ \beta_{2j} = \gamma_{20};\ \beta_{3j} = \gamma_{30}$$

The Relationship between School Administrative Measures and Students' Core Competencies

Since the sense of shared belonging and attention to student attendance had a significant effect on relational bullying in Step 2, we tested the influence of these two school-level independent variables on students' core competencies during Step 3. Adopting Equations 3-1 and 3-2, the analytical results are as follows. First, in terms of mathematical competency, the coefficients for sense of shared belonging (γ_{05} = 62.82, $p < 0.01$) and skipping classes (γ_{07} = -182.27, $p < 0.01$) reached statistical significance. Second, for reading competency, the explanatory effect for skipping classes (γ_{07} = -164.04, $p < 0.01$) was significant, while the sense of shared belonging was related at a statistically insignificant level. Third, regarding science competency, both sense of shared belonging (γ_{05} = 53.51, $p = 0.02$) and skipping classes (γ_{07} = -185.00, $p < 0.01$) demonstrated statistically significant effects. The results of Step 3 imply that higher degrees of sense of shared belonging are associated with higher scores in terms of students' mathematics and science competencies. Furthermore, more attentive school administrative measures (by managing students' attendance and lowering the number of skipped classes) were associated with higher scores for all three core competencies.

Student-level (Equation 3-1)

$$\text{Core Competency}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}_{ij}) + \beta_{2j}(\text{Grade}_{ij}) + \beta_{3j}(\text{Socio-economic status}_{ij}) + \gamma_{ij}$$

School-level (Equation 3-2)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{School type}_j) + \gamma_{02}(\text{School size}_j) + \gamma_{03}(\text{School location}_j) + \gamma_{04}(\text{School-level socio-economic status}_j) + \gamma_{05}(\text{Sense of shared belonging}_j) + \gamma_{07}(\text{Skipping classes}_j) + U_{0j};\ \beta_{1j} = \gamma_{10};\ \beta_{2j} = \gamma_{20};\ \beta_{3j} = \gamma_{30}$$

The Indirect Effect of School Administrative Measures on Students' Core Competencies through the Mediator of School Bullying

After conducting Steps 1 through 3, the independent variables meeting the criteria for analysis by Step 4 of the multi-level mediation model were: a) sense of shared belonging and b) skipping classes, with a mediator of relational bullying. In terms of depend-

ent variables, because the sense of shared belonging and students' reading competency was not significantly related, we only tested the mediation effect from the sense of shared belonging on mathematics and science competencies while examining the mediation effect of skipping classes on all three core competencies.

First, regarding a sense of shared belonging, we used Equations 4-1 and 4-2, including the dependent variables of mathematics and science competencies, to obtain the coefficients for their influence without including the mediator of school bullying. Then, following Equations 4-3 and 4-4, the coefficients for the sense of shared belonging for mathematics and science competencies were computed while including school bullying as a mediator. The results demonstrated that the coefficient for the influence on mathematical competency changed from 90.85 to 87.59, and the coefficient for the influence on science competency changed from 82.06 to 79.76. Based on these findings, the influence of relational school bullying on mathematical (γ_{50} = - 8.26, $p < 0.01$) and science (γ_{50} = - 5.81, $p = 0.02$) competencies were significant. Given that when the variable of relational school bullying was included as a mediator, the coefficient for the influence of sense of shared belonging on the dependent variables was lower as compared to the model which did not include relational school bullying, we conclude that a mediation effect did exist. However, this mediation was only partial, since the coefficient for the sense of shared belonging (a school-level variable) was still significant.

Second, in terms of the effects of the school-level variable of skipping classes, we adopted the same procedure described above. Equations 4-5, 4-6, 4-7, and 4-8 were used to test the effects on mathematics, reading, and science competencies. The results demonstrated that when the variable of relational bullying was included, the coefficients for the influence of relational bullying on the three core competencies were all significant (mathematical competency: - 8.30, $p < 0.01$; reading competency: - 5.38, $p = 0.02$; science competency: - 5.86, $p = 0.02$), while the coefficients for the school-level variable of skipping classes changed from - 210.34 to - 206.01 for mathematics competency and from -184.86 to -182.05 for reading competency. Likewise, the coefficient for science competency changed from -208.91 to -205.85. Thus, after relational bullying was included, the coefficient for the influence of the school-level variable of skipping classes on the three core competencies was lower than the model that did not include the mediator of relational bullying. Since the coefficient of the context variable of skipping classes reached a significant level, relational bullying was concluded to provide partial mediation.

Student-level (Equation 4-1)

$$\text{Core Competency}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}_{ij}) + \beta_{2j}(\text{Grade}_{ij}) + \beta_{3j}(\text{Socio-economic status}_{ij}) + \gamma_{ij}$$

School-level (Equation 4-2)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{School type}_{j}) + \gamma_{02}(\text{School size}_{j}) + \gamma_{03}(\text{School location}_{j}) + \gamma_{04}(\text{School-level socio-economic status}_{j}) + \gamma_{05}(\text{Sense of shared belonging}_{j}) + U_{0j};\ \beta_{1} = \gamma_{10};\ \beta_{2j} = \gamma_{20};\ \beta_{3j} = \gamma_{30}$$

Student-level (Equation 4-3)

$$\text{Core Competency}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}_{ij}) + \beta_{2j}(\text{Grade}_{ij}) + \beta_{3j}(\text{Socio-economic status}_{ij}) + \beta_{5j}(\text{Relational bullying}_{ij}) + \gamma_{ij}$$

School-level (Equation 4-4)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{School type}_{j}) + \gamma_{02}(\text{School size}_{j}) + \gamma_{03}(\text{School location}_{j}) + \gamma_{04}(\text{School-level socio-economic status}_{j}) + \gamma_{05}(\text{Sense of shared belonging}_{j}) + U_{0j};\ \beta_{1j} = \gamma_{10};\ \beta_{2j} = \gamma_{20};\ \beta_{3j} = \gamma_{30};\ \beta_{5j} = \gamma_{50}$$

Student-level (Equation 4-5)

$$\text{Core Competency}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}_{ij}) + \beta_{2j}(\text{Grade}_{ij}) + \beta_{3j}(\text{Socio-economic status}_{ij}) + \gamma_{ij}$$

School-level (Equation 4-6)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{School type}_{j}) + \gamma_{02}(\text{School size}_{j}) + \gamma_{03}(\text{School location}_{j}) + \gamma_{04}(\text{School-level socio-economic status}_{j}) + \gamma_{05}(\text{Sense of shared belonging}_{j}) + \gamma_{07}(\text{Skipping classes}_{j}) + U_{0j};\ \beta_{1j} = \gamma_{10};\ \beta_{2j} = \gamma_{20};\ \beta_{3j} = \gamma_{30}$$

Student-level (Equation 4-7)

$$\text{Core Competency}_{ij} = \beta_{0j} + \beta_{1j}(\text{Gender}_{ij}) + \beta_{2j}(\text{Grade}_{ij}) + \beta_{3j}(\text{Socio-economic status}_{ij}) + \beta_{5j}(\text{Relational bullying}_{ij}) + \gamma_{ij}$$

School-level (Equation 4-8)

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{School type}_{j}) + \gamma_{02}(\text{School size}_{j}) + \gamma_{03}(\text{School location}_{j}) + \gamma_{04}(\text{School-level socio-economic status}_{j}) + \gamma_{05}(\text{Sense of shared belonging}_{j}) + \gamma_{07}(\text{Skipping classes}_{j}) + U_{0j};\ \beta_{1j} = \gamma_{10};\ \beta_{2j} = \gamma_{20};\ \beta_{3j} = \gamma_{30};\ \beta_{5j} = \gamma_{50}$$

Discussion

Based on the findings of previous single-level studies, our research expanded upon this framework in developing a multi-level mediation model using the 2015 PISA data from mainland China. The results demonstrate that two independent variables played indirect and positive roles in terms of influencing students' core competencies by reducing school bullying. These two independent variables are a sense of shared belonging (which had a positive effect on students' competencies) and skipping classes (which when lowered, is associated with better outcomes in terms of students' competencies). These school-level variables reflect schools' administrative efforts to develop a positive environment for teaching and learning (reflected in the aggregate score of students' sense of shared belonging) and the schools' attentive administrative efforts, wherein monitoring of students' attendance was consistently adopted, as reflected by students' attendance (with more attentive administrations deterring students from skipping class

mitigating the relationship between skipping classes and experiencing bullying, as well as reducing the negative relationship between skipping classes and students' core competencies). Since these two independent variables are deemed to be highly practical and directly applicable to the field of educational management, the findings of this study provide a reference for school administrators to prevent and control school bullying and simultaneously improve students' core competencies. In light of the impact of students being late for school or truant, which are in violation of school rules and may indicate the presence of school bullying, and the resulting impacts on students' core competencies, according to this study, school management should focus more closely on students' attendance, particularly in terms of skipping classes.

Application of Multi-level Mediation Model

This study adopted a multi-level mediation model, which is rare in research regarding both school bullying and students' core competencies. In contrast, most studies use regression analysis including multiple predictor variables in the model simultaneously. However, a multi-level mediation model is a more appropriate method for further elaborating on the specific paths of influence among factors that, in turn, can provide more specific feedback and recommendations for educational administrators. Studies adopting regression analysis on school bullying among adolescents in Guangdong Province (Wang et al., 2012), Ontario, Canada (Betts, 2014), and Quebec, Canada (Di Stasio, Savage, & Burgos, 2016) have been conducted, but with mixed or unclear results. Likewise, Zhao et al. (2017) and Huang (2017), in analyzing science competency and school bullying among students from four provinces of China, also adopted the 2015 PISA data. However, although these studies found several significant explanatory variables at different levels, in terms of core competencies or school bullying, they were unable to further specify paths of influence for the factors included in their models, due to their use of multiple regression.

Thus, our multi-level mediation model aims to evaluate the factors that have demonstrated significant explanatory power in the past, and further evaluating paths among variables and their relative influence, which has potential theoretical contributions for the related research topics. At present, only Wang and Meng (2017) have published research using a multi-level mediation model, finding that the school atmosphere directly influences a number of student-level variables, which then has an indirect positive role in science competency. With the application of multilevel analysis in educational research becoming more and more popular, we expect that multilevel mediation model applications will be developed more extensively in the future.

Attentive Measures for Preventing School Bullying

The results of this study demonstrate, in terms of school administration, that it is beneficial for schools to enact measures that combine attentive approaches to the enforcement of school rules (in particular, students' attendance) as well as measures that can develop a sense of shared belonging. Building students' sense of shared belonging and

paying greater attention to students' attendance can reduce the occurrence of relational bullying among students, resulting in an indirect positive impact on their performance, in terms of core competencies. These two types of administrative approaches can jointly contribute to the development of a safe and positive learning environment for students. In this learning atmosphere, bullying can be reduced and, as a result, students may experience greater feelings of acceptance, resulting in greater willingness to seek help from others, even if they are bullying by their peers and avoidance of subsequent bullying. At the same time, when school administrators and teachers are focused on monitoring students' attendance, they can identify students who may be suffering from school bullying (which may be the underlying cause of student lateness, skipping classes, or truancy), which is conducive to immediate interventions. The results of this study echo the recommendations of PISA's school bullying report (OECD, 2017a) which calls on schools to create environments where students feel closer connections with teachers and clearly recognize that the school is an orderly place wherein school rules are followed. This recommendation is highlighted by the findings of this study that suggest school administration efforts can make students feel at ease and can prevent bullying events.

Limitations

The paths constructed by our multi-level mediation model can provide empirical evidence that school bullying serves as a mediator between the school administrative measures and students' core competencies. However, it is still unclear whether or not there are other mechanisms influencing the relationships among the variables evaluated in this study. Since some factors are beyond the scope of this study and are not addressed in this manuscript, we suggest this lack of data as a limitation and potential for future analysis. For example, if a school adopts a more attentive model of student attendance management, this approach might first influence the overall sense of shared belongingness which, in turn, can decrease bullying and its influence on students' core competencies. As such, future studies can evaluate multiple paths of mediation. Next, since this study was based on a multi-level mediation model, we were required to follow corresponding steps for data analysis. During this process, although we found other interesting findings not directly related to the primary focus of this study there were not described in more detail in this manuscript. For example, the results of the first step of our multi-level mediation model demonstrated no significant correlations between verbal and physical bullying and students' core competencies; therefore, these two types of school bullying were not included in follow-up analyses, and their impact in terms of school management measures was not tested further. Finally, the data used in this study was limited to data reported in the 2015 PISA survey, which limits the explanatory power of some research results. For example, it is impossible to conclude why a sense of shared belonging at the school-level did not affect students' reading competency but had a positive effect on mathematics and science competencies. Since this issue cannot be explained by existing 2015 PISA data, further data collection and analysis are recommended.

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NEWSLETTER

Impact of Kindergarten Environment on Teachers' Learning Engagement

By Wang, J.X., Wei, Y.T. & Zong, M.

CONFRONTED with the COVID-19 outbreak, online education has become the main way of teaching at all kinds of schools since the Ministry of Education of P.R. China proposed the "School is Out, But Class is On" policy. Recently, an empirical article published in *China Educational Technology* took 59,156 primary and secondary school teachers in Hubei Province(the worst-hit area of the epidemic), as research objects, analyzing their online teaching behaviors, teaching modes and acceptability through questionnaire survey and interview.

The research findings are as follows:

- In terms of teaching behavior and teaching mode: the smartphone has become the most commonly used teaching terminal for teachers. However, from the perspective of its functions, the function supporting the teaching process is slightly single, and the screen is too small, which will affect the effect of teachers' online teaching.
- In terms of the use of teaching resources, teachers' own resources made the most, accounting for 51.79%; in addition, public education resources play an important role in this online teaching.
- Considering the online teaching contents: teachers can carry out flexible teaching according to local conditions. On the basis of the spring schedule, 78.84% of the teachers began to teach basic cultural courses and carried out epidemic prevention education, life and safety education and other themed education. They also guided students to operate home-based labor, physical exercise, and other activities, which combining education with talent cultivation.
- As to the teaching mode and activities: live online classroom and centralized tutoring and Q&A are the teaching modes generally adopted by teachers; in addition, more than half of the teachers assigned and corrected homework (80.46%), answered questions online and provided tutoring (76.32%) and sent digital learning resources (65.11%), which ensured the learning of students' cultural foundation courses. What's more, 62.66 percent of teachers communicate with students' parents to encourage them to supervise the students' learning.

- In terms of teachers' acceptability: teachers have a strong willingness to use online teaching. The perceived usefulness and willingness of rural teachers were significantly higher than those of urban teachers, and the acceptability of junior middle school teachers was the lowest.

There are some problems in online teaching: the network environment and hardware equipment still need to be improved; teachers lack the ability to design online teaching; teachers' information literacy is uneven, and they cannot accurately analyze the learning situation.

Therefore, the author considered that the hardware facilities and software resources should be improved to provide a good environment for online teaching; the teaching concept should be changed from "teaching for teaching" to "teaching by learning"; the way of teacher training and teaching research should be innovated to improve teachers' ability of online teaching design; data-driven, individualized instruction should be realized based on learning analysis technology.

Source: China Educational Technology, 2020; 400:15-21.

NEWSLETTER

The Determinants and Impacts of Extra Tutoring in and out of School in Hong Kong

By Li, J.L. & Pan, D.D.

RECENTLY, a study published in *Education and Economy* that is based on the PISA2015 data of Hong Kong used Bernoulli Model, Hierarchical Linear Model(HLM), and Propensity Score Matching (PSM) to estimate the determinants and impacts of students' extra tutoring in and out school.

The results indicate that:

- Tutoring out of school in Hong Kong may transfer from the original intention of "serving the poor students" to "serving the poor performance".
- Tutoring in school has a significantly negative effect on students' achievement in Science, Math, and Reading. Except the negative impact on students' Math achievement, it has no impact on their Reading and Science achievement.
- Tutoring in school is mostly provided by teachers of their own or professional after-school tutoring organizations, but it rather helps students' academic performance than having a negative impact; Students who attend tutoring out of school in Math and Reading provided by school teachers score significantly lower than those who do not.

The author suggests that the implementation of after-school service policy in mainland China should make reasonable choices for students, teachers, and service modes.

Source: Education & Economy, 2020; 36(2):49-59.

NEWSLETTER

Two-Child Period: Psychosocial Adaptation of the First-born Child in Primary School

By Deng, L.Y., Wang, X.T., Xiong, Y.Y., Li, Y.T. & Li, B.L.

A recent article published in *Chinese Journal of Clinical Psychology* explored the influencing mechanism of the father's company and the mother's emotion on the psychosocial adaptation of first-born children in primary schools under the background of China's universal two-child policy. Father's company includes company time and quality, while mother's emotion contains negative and positive mood; and the psychosocial adaptation involves five aspects, including emotional symptoms, morality, hyperactivity, peer communication, and prosocial behavior. A total of 824 primary school children's parents in Beijing were surveyed through the Paternal Companion Questionnaire. The results are as follows:

- Compared to the only-children, first-born children in two-child families show less prosocial behavior but more moral problems.
- There are significant pairwise correlations between the time and quality of the father's company, the positive and negative emotion of the mother's, and the dimension children's psychosocial adaptation.
- Whether it is the first-born or the only-child, the time spent with the father will affect the quality of companionship, which will further affect the mother's emotion, and finally influence children's psychosocial adaptation.

Source: Chinese Journal of Clinical Psychology, 2020; 28(2):254-260.

NEWSLETTER

How Long Should We Sleep? The Ideal Matching Pattern between Sleep Time and Academic Achievement of High School Student

By Liu, J., Zhao, L.M., Du, X.F. & Xu, G.X.

ADEQUATE sleep time, good psychosomatic development environment, and high-quality academic achievement are necessary conditions for educational success. Based on this, a study published in *Journal of East China Normal University (Edu Sci)*, relying on the data of the Quality and Health Check-up Program of China Basic Education Quality Monitoring Coordination Center, explored the ideal matching model between students' high academic achievement and sleep time on the basis of students psychosomatic development and a good educational environment, and providing multi-level early-warning to schools that sacrifice students' sleep time in exchange for good scores. The results show that:

- In general, high school students have the best academic performance when they sleep more than nine hours. And those students enjoy a higher interest in learning, less stress, better learning quality, higher activity participation, more harmonious interpersonal relationships, and more happiness.
- For schools with low socioeconomic status, students who get the best grades when they sleep between eight to nine hours have higher interest, less stress, better learning quality, more activity participation, harmonious interpersonal relationships, and more happiness. This shows that in the school environment with an overall lower socio-economic background, students need to pay a certain amount of time and effort to achieve good grades, and the best performance can only be achieved on the basis of at least eight hours of sleep, which guarantees a healthy educational environment.
- For schools with high socio-economic status groups, students who get the best grades when they sleep for more than eight hours have higher interest, lower stress, better learning quality, more activity participation, more harmonious interpersonal relationships and more happiness.

The study suggests that high achievement should not come at the expense of less sleep, regardless of the socio-economic status of the school.

Keeping students' sleep time at or above eight hours is an ideal matching mode for schools to ensure students' physical and mental health development and to create a good educational environment. It's suggested that the administrators, schools, teachers, and parents should hold positive values and understand the relationship between students' sleep time and academic performance. For schools that blindly pursue high grades at the expense of students' sleep time, a multi-level early-warning mechanism should be established and their rectification should be supervised.

Source: Journal of East China Normal University (Edu Sci), 2020; 3:71-79.

NEWSLETTER

Where Are the Fathers?

By Xu, Q., & Wang J.S.

A STUDY using the tracking data of China Education Panel Survey (CEPS) in 2014-2015 to described the current situation of fathers' involvement in childrearing in China, and further to discuss the level of fathers' input, influencing factors, and the effects on the development of teenagers. The conclusions are as follows:

- In contemporary China, it is common for a father to participate in childrearing, but the level of participation is still obviously lower than that of the mother. This result may be related not only to the Chinese traditional division of gender roles but also to the family tradition of grandparents and the living pattern of separation caused by population mobility.
- The level of fathers' input in childrearing is not only influenced by children's gender, age, one-child status, household registration, and residence, but also affected by their family's socioeconomic status, the situation of grandparents' participation in childrearing, and the pattern of the family residence. Specifically, the level of fathers' rearing improves significantly when the child is male and single-child. Migrant children and children living in cities receive more care from their fathers; but when it comes to emotional communication, fathers' input could be relatively low. The higher the parents' educational level and professional status, the more the fathers' input in childrearing; in addition, the better the financial situation of the family, the less likely for the father to participate in the transactional parenting activities, while the degree of emotional communication with the children and the degree of intimacy with the children will be significantly improved. In addition, fathers are less likely to participate in transactional childrearing activities when there are elderly people living in the family. Meanwhile, the separated living condition caused by fathers going out to work or doing business will greatly reduce the level of parental investment.
- Fathers' input in childrearing has a remarkable influence on the development of teenagers in all aspects, and this influence is of equal importance compared with that of mothers. Comparing with participation in transactional parenting activities, the emotional

communication between fathers and children is more important for the development of adolescents, and the parental input has a significant impact on both sons and daughters, among which, in terms of academic performance, behavioral performance and the number of friends, the fathers' input has a stronger impact on sons.

Source: Journal of Social Development, 2019; 6 (1):68-85+243-244.

NEWSLETTER

Effects of Augmented Reality Technology on Lexical Cognitive Intervention in Children with Autism

By Chen, L., Zhao, J., Wang, G., & Zhang, K.

AUTISM is a neurodevelopmental disorder which originated in early childhood. The core symptoms are social communication and social interaction disorders, repetitive stereotyped behaviors, interests, and activity patterns. A study published in *China Educational Technology* explored the effect of augmented reality (AR) on improving the lexical cognitive of autistic children. In this study, 28 children aging 3-10 years old who were diagnosed with autism are recruited and screened. They were randomly divided into the experimental group and the control group, and then they received certain experimental intervention after the pretests.

In the intervention process, the word learning of the experimental group students can be carried out on the software of augmented reality technology on Android Tablet, and interaction with the virtual entity can be realized by clicking to trigger the animation and sound of the virtual entity, swiveling the screen to rotate the virtual entity, moving the position and other operations. The students in the control group were presented 2D pictures directly. They can touch the pictures on the screen, trigger the sound, and match the card with the screen image.

The results of the post-test and pre-test show that the intervention of the two groups has achieved significant effects. In terms of vocabulary identification and naming, students in the experimental group performed better and they showed a higher interest in teaching tools.

Source: China Educational Technology, 2020; 400:15-21.

NEWSLETTER

Effects Study on the Impact of Teachers' Information Technology Leadership on Teaching Efficacy

By Yu, T.Z. & Zhang, X.F.

WHAT is the impact of teachers' information technology leadership on the effectiveness of information-based teaching? Based on the analysis of relevant literature, a recent study published in *Teacher Education Research* designed a scale with teaching leadership, professional leadership, management implementation, and communication and collaboration as the key factors of teacher information technology leadership. The researchers distributed questionnaires to schools in Kaifeng, Luoyang, Xinyang, Nanyang, Zhumadian, and other cities in Henan Province. A total of 1,166 questionnaires were collected, and 996 were obtained after eliminating invalid ones. On the basis of reliability and validity analysis, the data were further analyzed, and the function path model of teachers' information technology leadership on information teaching efficiency was generated. The following results are obtained:

- From the overall effect analysis, the influence degree of information-based communication and cooperation, information-based professional leadership, and information-based teaching leadership on the information-based teaching effectiveness are successively reduced, among which the information-based management execution has little influence on the information-based teaching effectiveness.
- From the perspective of direct effect analysis, the greatest influence on the effectiveness of information-based teaching is the information-based teaching leadership, followed by the information-based professional leadership and the information-based communication and collaboration.
- From the perspective of indirect effects and mediating variables, information-based teaching leadership and information-based professional leadership are the key factors. Information-based communication and collaboration can indirectly improve the promotion of information-based teaching functions through information-based professional leadership and information-based teaching leadership.

- From the perspective of the influence degree of each index of the measurement model, the four factors that have the greatest impact on the effectiveness of information-based teaching are the belief in online supervision and guidance of students' learning, the perception in planning extracurricular learning activities, the confidence in effectively integrated digital resources, and the confidence in scientific design of information-based classroom activities. The biggest influence on information-based teaching leadership is to develop the teaching content by using information technology. What has the greatest influence on information-based professional leadership is the enthusiasm of paying attention to the frontier of information technology, using information technology to update the subject knowledge, and driving colleagues to learn and apply information technology. It is important to communicate with parents to understand their aspirations, to communicate with students to grasp the learning situation, and to discuss disciplinary issues in collaboration with peers.

Based on the data analysis results and from the perspective of teachers' information technology leadership, this paper proposed relevant suggestions for improving the effectiveness of informational teaching:

- Create a positive atmosphere and play the leading role.
- Strive to the technology enhancement and pursue the scientific blend.
- Pay attention to the radiation effect and fix the cooperation mode.
- Focus on teaching leadership and dig deep into digital resources.
- Concentrate on extracurricular guidance and combine the online and offline.

Source: Teacher Education Research, 2020; 3(2):48-56.

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