Building Back Better of Covid 19 Learning Loss: A systematic Review

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Abstract **- Build back better became a concern for policymakers after the Covid 19 shock hit the world of global education. Education stakeholders need to look at the evidence that has been taken by some States in intervening. It is important for decision makers to choose what strategy is most appropriate for better education build back. But no research synthesis has attempted to compile the finding from different studies. The purpose of this study is to state the evidence of mitigating learning loss. The article identifies a number of strategies that has been taken to intervene and provide basis for refining the research on mitigating the learning loss.**

Keywords-**Learning loss, Covid 19, mitigation, international education, systematic review**

I. INTRODUCTION

Contagious Disease Outbreaks have occurred several times throughout the history of the world and have the potential to have profound and long-lasting impact. From the bubonic plague that occurred in the 14th century, the Spanish flu in 1918, followed by SARS, Ebola and Zika in the twenty-first century. This incident certainly had an impact not only on the economy, politics, but also socially (Huremovic, 2019).

And now what we are still facing today is the Covid 19 pandemic. One of the sectors that has been badly affected is the education sector. This pandemic has created an emergency with an unprecedented escalation. Initially, school closures were carried out by the worst-hit schools. But then as the crisis escalated, 49 countries have taken the decision to close schools to reduce the risk of transmission (Domenico et al., 2020) which has caused 90% of students experienced educational barriers. (Reuge et al., 2021) . UNESCO Institute for Statistics stated that in March 2020, 165 countries carried out a lockdown, including eliminating school hours which mean an impact on 1.5 billion students and 63 million secondary and primary school teachers. (Ella Page, 2021)

Although there is a global agreement that school closures are carried out to prevent the spread of the epidemic,(Jackson et al., 2013)(Ciavarella et al., 2016) many researchers, teachers, parents and policy makers are concerned about the impact on reducing adequate learning opportunities. (Armitage & Nellums, 2020). Inadequate learning opportunities lead to learning loss in school children, not only in developing countries but also in developed countries such as in Europe.(Blasko et al., 2021). The term learning loss means a decrease in learning achievement due to disruption of the learning process (Betebenner et al., 2021) and also a reduction in knowledge and skill (Pier, L., Hough, H. J., Christian, M., Bookman, N., Wilkenfeld, B., & Miller, 2021),

(Maldonado & De Witte, 2021)'s research results described the potential for learning loss to occur in three of the five subjects tested. Especially in mathematics with a standard deviation value for an average decrease of 0.17. As for the value of Dutch, there was an average decrease in the value of the standard deviation of 0.19 compared to the previous value. Even in some students who come from marginal groups, there is a risk of dropping out of school. This of course affects the welfare of children's lives and has an impact on the socio-economic conditions of their community and even their country.

Some research have shown that learning losses happened during the Covid 19 pandemic are proofed by glaring gap in achievement between children from lower socioeconomic status and higher socioeconomic status (Engzell et al., 2021; Maldonado & De Witte, 2021). Thus, Children lost the most dan gain the least(Lewis et al., 2021). This is in line with the result of (Lee Elliot Major, 2021) 's research on the impact of school closures on the children of blue collar workers.

Overall, There are two aspects that affect the occurrence of learning loss, namely related to the availability of learning resources and the support, not only the support of the surrounding adults in helping to learn, but also the available learning time. (Sabates et al., 2021).

Taking into account these impacts, it's important to consider what to do to mitigate the devastating effects.. Based on previous research, losing little study time will have a long and accumulated impact once they re-enter school. Such as research on the impact of the earthquake in Pakistan that occurred in 2005 by (Andrabi et al., 2021). He compared the affected households and those not affected by the quake. At the time the school was closed for 14 weeks and after research four years later, the children affected by the quake were left behind for 1.5 years.. This could happen because when they re-enter the school, there is no adaptation to their lag as long as the school is closed. Resulting in accumulated lag. During the pandemic, experts are already preparing for adaptation to instruction when children return to school. That the opening of the school will be intended to catch up on basic foundation skills of children ((Hode, 2018). The World Bank has also considered an education system to perform remedial on a large scale.(Hill, 2020), also to catch up on literacy and

numeracy for primary-age children (United Nations Educational et al., 2020).

However, this learning loss does not occur in all students. As reported by (Maldonado & De Witte, 2021) Learning loss only occurs in certain subjects, not in all subject matter. Also that primary students are more affected by learning loss than secondary students.(Tomasik et al., 2021), It may be this is due to the development of cognitive abilities that make primary students unable to find their own learning resources..

The study aim is to identify the mitigation of learning during pandemic Covid 19. Taking into account the results of mitigation from various parts of the country, it is hoped that the results of this research can be caused to develop effective intervention inn mitigating the threat of learning loss during future pandemics. Thus, research question posed is, what is the state of evidence on the mitigation of learning loss across country during Covid 19 pandemic?

II. METHOD

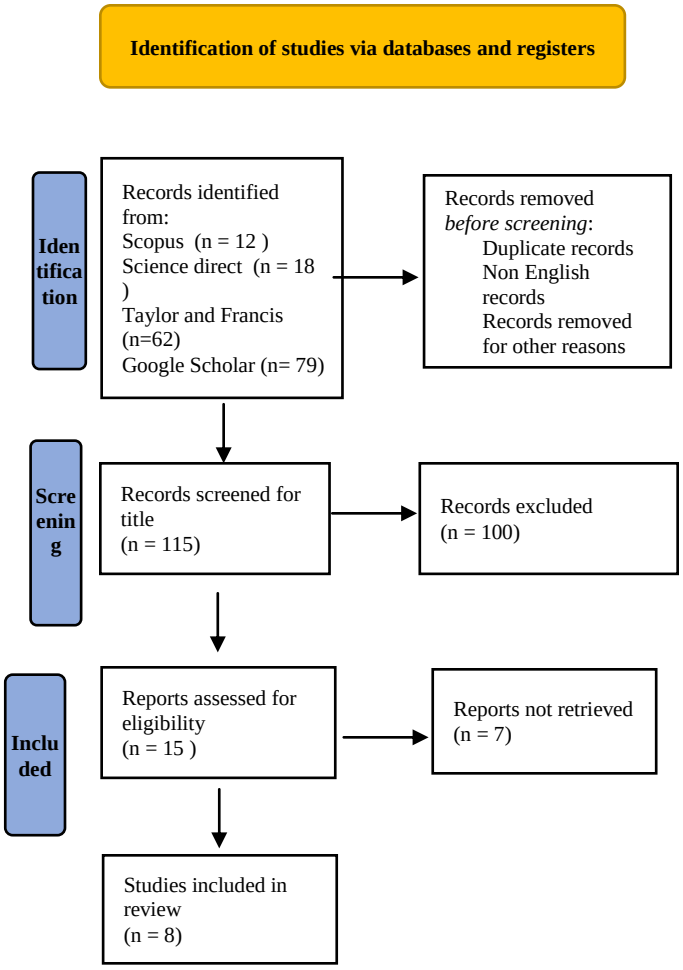

Fig. 1 The PRISMA flow diagram (MJ Page, 2021)

The reporting of this systematic review was guided by the standards of the Preferred Reporting Items for Systematic Reviews and Meta Analysis (PRISMA) (Page M, 2021). We follow the checklist in PRISMA as a formal guideline because PRISMA is reproducible, clear and sturdy procedure. We systematically obtained literatures from previous researches and published in educational journals. Then we screen the article with references from the protocol that has been set before. After passing two phases of screening then we analyzed articles that had passed eligibility. As the final step, all included literatures were synthetized.

We searched for titles and keywords from four electronic databases, namely Scopus, Science direct, google scholar, and also from Taylor and Francis from March 2020 until October 2021 for any kind of studies. In Scopus the search string used is ((learning loss) AND (mitigation) AND (Covid 19) OR (pandemic)) and we obtained 12 articles. Whereas in science direct, with the same keywords, we limited it to research articles and social science subjects, then 18 articles were obtained. While in Google Scholar we only limit to 790 articles that are relevant to the keywords we are looking for. In Taylor and Francis, with search query ((All:learning loss) AND (All:mitigation) (All:covid 19) OR (All:pandemic) AND (All subjects:social science) AND (in Journal: Psychology,Health & Medicine) we got 62 articles.

The title, year of publication ,journal name,authors' names and abstract of the identified literatures were exported to an MS Excell spread sheet. thencefort, prior screening of the relevant articles were conducted by one researcher.

Duplicated literatures, non-English, non-education/psychology were excluded. After being able to get about 115 articles, we filtered by reading abstractions and releasing 100 articles that are not relevant to the research question. Of the 15 included literature, we read the entire text and issued literature that did not provide information about its mitigation strategies and literature that was not full text. Full text analysis is based on the PICOS protocol consisting of participants, intervention, comparison, outcomes and study design. Only articles that follow the protocol that we put in the checklist list. Analysis at this stage was conducted by three researchers, disagreement discussed among the three and consulted it to reached the consensus. At this stage, we get as many as 8 articles we make a source of data. One researcher extracts included literature and two other researchers will review the results of the extraction. So it is certain that all included papers have been carefully and thoroughly examined.

III. RESULT

There are 8 literatures (table 1) that we have collected in this study, which are sought based on research questions and for examine research questions, PICOS protocol guided to select appropriate studies.

Initial search resulted in 882 records, 767 eliminated as they were duplicated, non-English, and non-education or psychology. 115 records collected we screened through title and abstract and 100 records were excluded. The full text of remaining records were screened for the eligibility criteria and excluded the record that does not meet the research question. Any kind of studies were included.

In Germany (Hardt et al., 2020) It was found that peer mentoring programs are able to improve learning outcomes and also learning motivation, although GPA values do not change significantly. The heterogenity of the effects was in contrast to prior research on the impacts of peer mentoring in higher education. . While the results of this research show that good students benefit a lot from online learning. The results also showed that students who received interventions received a 1.4 higher increase in credit rates than control students. The difference was about 5% against the control mean group and corresponded to about 28% of additional lessons. In previous research, it was found that fewer students will struggle more in online learning systems. Overall, statistical results show that peer mentoring programs help students with good grades to be able to graduate from more coursework, but these programs do not help students who have low performance in their first term at university.

(Burns et al., n.d.) in USA performed intervention strategies through computer programs that contain a curriculum to build literacy and initial numeracy. Parents are involved in the learning process, trained and coached online by mentors from Waterford Upstart. The program used, Summer Learning Path showed quite good results, judging from children gained an average of 572 points as measured by the Waterford Assessment of Core Skill (WACS) equivalence of kindergarten advanced. These results are not obtained alone because parental assistance becomes a key factor to the success of children.

(Angrist et al., 2020b) studied in Bostwana which is a developing country so the intervention chosen is low tech thus high impact. The result of this intervention was a reduction of innumeracy by 21 percent from SMS treatment only, while when combined between SMS and telephone there was 46 percent reduction in innumeracy or about 0.29 standard deviation attain.

While in USA (Kress, 2020) recorded California Charter's School implemented good quality of distance learning program. First Strategy was open classroom. By holding live classes for four days a week and conducting teacher training for teachers who carry out remote learning. Second strategy was Personalized Support and Instruction, which is an Assistant Classroom Educator (ACE) facilitated small grup discussions to discuss subject matter. Groups are created based on the student's level of achievement. Flipped classrooms is a model whereas teacher teacher records a lecture before students watch and discuss with a group of friends

In UNESCO records, (Nugroho et al., 2020) There were 164 countries that participated in the study, with participants being primary and secondary age school students. There are three strategies in mitigating learning loss, recovery, monitoring and out-reach. The most adopted strategy is recovery by reopening school with large scale remedial programs and accelerated learning model, also adjusting school calendar. However, based on report, less than one third of countries initiated accelerated education model.Followed by monitoring of re-enrolment, Less than a third of countries initiated monitoring programmes as they back to school. This strategy was undertaken by countries in the eartern and southern Africa. However, The success of this strategy must be followed by a good Education Management Information System (EMIS).). And the least frequency of strategies in mitigating the learning loss is outreach to children not attending school.

In Bangladesh (Hassan, 2021), Interventions are carried out in the form of telementoring involving students and their mothers. His mentor is a volunteer college student. Each mentor calls the student's mother once a week and gives directions in home learning, gives instructions on making weekly developments and provides textbooks tailored to the child's abilities. Mothers are also taught to make learning plans, especially on two subjects of mathematics and English. Mentors provide structured direction and support to the mother while helping her child homeschool. In line with that, Botswana also carries out the same mitigation strategy, namely with a low tech approach.

In Indonesia, Heroe's model developed by (Kurniawan & Budiyono, 2021) Showing low score failure in assessment and this learning model is able to reduce anxiety due to prolonged virtual learning showing low score failure in assessment and this learning model is able to reduce anxiety due to prolonged virtual learning, because students feel comfortable having a support system when learning. This intervention model is carried out in higher education students and involves discussion of peers virtually as well as through WA application.

In USA (Kaffenberger, 2021) recorded remediation with long-term reorientation of curriculum to childrens's learning gain not only mitigate the learning loss but also surpase the learning a full year's worth of learning. The limitation of the study is there is not consideration of dropout students. After being out of school for a period of time, some children may not back to school for some reasons (willochowski, 2020)

Table I: Countries and Mitigation Approaches

Source	country	title	Publication	Education level	Mitigation Approaches
(Hardt et al., 2020)	Germany	Can peer mentoring Improve Online Teaching Effectiveness? An RCT during the Covid-19 Pandemic	CESifo working paper	Higher Education	We designed a structured peer mentoring program that focused on providing students with general study skills, such as self-organization in a learning-from-home environment, weekly study schedules, and techniques on how to study effectively. Mentors and mentees met one-on-one online. We find that the peer mentoring program improved students' outcomes and study behavior. Our paper also contributes to the literature on the effectiveness of mentoring interventions in higher education.
(Burns et al., n.d.)	USA	Waterfor Upstart : A targeted Support to Combat Covid Learning Loss	Waterford Research Institute,LLC	Kindergarten	Summer Learning Path is a program developed by Waterford Upstart, a software company, in the form of multimedia-based activities in adaptive sequence tailored to each student's individual placement and their individual rate of growth, reading fluency, comprehension and vocabulary and language concept. The program also provides parental training and coaching so that parents stay connected to the program and can become instructors for their children. Each child accesses the program for 15-30 minutes every day, five days a week and is done for 13 weeks, children gained an average of 572 points as measured by the Waterford Assessment of Core Skill (WACS) equivalence of kindergarten advanced.
(Angrist et al., 2020a)	Botswana	Stemming Learning Loss During the Pandemic: A Rapid Randomized Trial of a Low-Tech Intervention in Botswana	SSRN Electronic Journal	Primary School	The intervention is low tech. First, the facilitator gives a one-way sms (no reply required) in the form of numeracy questions then the next step facilitator will give sms with a phone call that discusses the problem that has been given before. The phone lasts for 15-20 minutes. The facilitator will ensure that the student has received an SMS beforehand and answered the question. Furthermore, facilitators will again provide questions for students to practice as well as motivation and support. 64 facilitators were involved in the intervention of 24 households. To reach the target of calling household, each facilitator gets the task of having a phone call for 6 hours per day.
(Kress, 2020)	USA	How California's Charter Schools Mitigated Learning Loss	California Charter's School Association	Primary-secondary	Strategy #1: innovate. Created Open Classroom, which is live classes for four days a week, and distance learning by working with small school district.held on demand training schedule for teachers Strategy #2 : Personalized support system Individual support is key to Spring's learning model called Assistant Classroom Educator (ACE). ACE's job is to hold personalized meetings with students and also hold small support

					groups based on individual abilities.
(Nugroho et al., 2020)	164 countries	COVID-19: How are Countries Preparing to Mitigate the Learning Loss as Schools Reopen? Trends and emerging good practices to support the most vulnerable children	Innocenti Research Brief	Primary and secondary	Using three key reopening strategis : 1. Recovery. Reopening schools in order to speed up learning loss recovery. Steps taken in this strategy include adjusting the school calendar by rewinding school year or speeding up entry dates that have a commensibility of absence of semester holidays. 2. Monitoring of re-enrollment (attendance). There were 58 countries reported this action. 3. Outreach. Only 50 countries were considering this action to children who did not return to school.
(Hassan, 2021)	Bangladesh	Low Tech Distance Education : A Remedy of The Learning Loss due to Covid 19 Pandemic	Centre for Development Economic and Sustainability Policy Brief	Primary school	Interventions are carried out in the form of telementoring involving students and their mothers. His mentor is a volunteer college student. Each mentor calls the student's mother once a week and gives directions in home learning, gives instructions on making weekly developments and provides textbooks tailored to the child's abilities. Mothers are also taught to make learning plans, especially on two subjects of mathematics and English. Mentors provide structured direction and support to the mother during helping her child homeschooling One-time mentoring sessions, lasting for 30 and interventions are conducted for 13 weeks.
(Kurniawan & Budiyono, 2021)	Indonesia	Heroe's Model : case study to reduce students' learning los and anxiety	Cypriot Journal of Educational Sciences	Higher education	Using Heroe's Math Online Learning Model consisting of three types of online learning model, namely asynchronous, synchronous and semi synchronous. Step 1 is asynchronous/self learning. At this state teachers and students do not meet face-to-face, and subject matter is given via online then downloaded and studied independently by students Step 2 is synchronous. Confirmation and elaboration. At this stage teachers and students meet through a zoom app to review subject matter. Students are divided into groups to solve, investigate and elaborate the problems. Then discuss the results. Step 3 is semi synchronous or feedback. This phase is done through the wa application where students can discuss teaching materials freely. Teachers as mentors provide reinforcement, feedback and also maintain interaction between students and teachers so that bonding between teachers and students well established.
(Kaffenberger , 2021)	USA	Modelling The Long-run Learning Impact of The Covid-19 Learning Shock : Actions to (more than) mitigate loss	International Journal of Educational Development	Primary-secondary	Using Pedagogical Production Function Model. Combination of short term remediation with long-term reorientation of instruction.

IV. DISCUSSION

A number of actions and interventions must be taken to return children to their ideal condition according to their development. Learning loss should not be a protracted problem and then drop down the education system globally. After a few months of school enclosure, states begin to re-open their schools. And to restore the condition of children, can not only continue the lessons left behind, because the effect of learning loss is seen a few years later. The purpose of this study is to collect evidence of intervention activities in order to mitigate learning loss due to covid 19.

It must be admitted that this study is still very limited, only 8 literature that we collected and synthetized. But from the subjects of this research, covering kindergarten to higher education, also from developing countries, such as Botswana, Bangladesh and Indonesia to developed countries, such USA and Germany simply describe the heterogenity of this review. Studies from UNESCO are also synthesized to add to the list of evidence that can be studied and used as a reference source for further research.

The inequality of education and state conditions is the background to intervention strategies carried out by policy maker. Like mitigation done in Bangladesh, as a developing country most parents do not have the ability, reliance is also a skill to support distance learning. Thus, this shock adds to the severe burden of children to learn so that it takes cheap and accessible learning media but also able to build assignation between these children and their parents.(K. Muralidharan, 2021).

As a developing country, Bangladesh uses low technology approach to intervene the pandemic shock (Angrist et al., 2020a) . Optimizing low technology strategy, such as SMS text and phone call is the right way to mitigate learning loss. Coupled with the simplification of the curriculum. Both interventions, however, increase overall learning engagement. Education reform by simplifying the curriculum by providing 80% curriculum concern on basic and numeric literacy needs to be done to improve the subjects that are the basic foundation. This strategy was successfully carried out in Uganda.(Alinda, 2018)

As well as in Bangladesh, study in Botswana conducted the same strategies. Low tech thus high impact. Considering that there are still many households that are in low income economic conditions. So to limit learning loss in low-resource households, interventions involving low tech can include as many families as possible.

On the contrary, as developed country, USA uses high technologi approach to intervene the pandemic shock (Kress,2020) and also (Burns et all, nd). But (Kaffenber, 2021) recommends the modification of curriculum, combination of short term remediation with long term reorientation of instruction. As well in Germany (Hardt et al, 2020) where they utilize computer program to conduct structured peer mentoring program.

Primary and secondary levels are the majority of study subjects, but there are also interventions in kindergarten and higher education children. In USA, (Burns et. Al, n.d) investigated the use of computer software for kindergarten students, named Waterfor Upstart. This software is limited to the development of cognitive skills, such as reading fluency, comprehension and vocabulary and language concept, not yet covering the development of social emotional Parental involvement plays an important role in children's cognitive achievement, considering that children of kindergarten age have limitations in self-regulation and learning ability but as digital natives they are very familiar with educational software. (Guran et al., 2020).

Before the pandemic conditions parents gave their children education to school, but because of the pandemic shock, parents were "forced" to become substitute teachers. This opportunity can be used by parents to strengthen bonding with children, so not only develop cognitive abilities but also social emotions of children. In line with (vgostky, 1978) that children build emotional constructs through their interactions with caregivers/ mothers, And this interaction must be in ordered encounters.(Craig H. Hart, 1990)

From the study we collected, there are two literatures whose participants are higher education students. The first article came from Germany.,(Hardt et al., 2020) issuing peer mentoring program in their intervention program. As teenagers, the role of parents began to shift and be replaced by peers. Peer groups are a source of affection, sympathy, understanding and moral guidance. By the time children enter adolescence, this peer group system becomes more diverse.

In line with (Kurniawan & Budiyono, 2021), Peer collaboration is used as a strategy to improve understanding of mathematics although in this model teachers still hold the center of teaching by guiding the discussion and mentoring the students . The results of these two studies showed quite good results judging from the test score conducted.

Contrary to the results, Although since the pandemic all universities globally switch to online learning, further evidence is still needed to see the effectiveness of this learning system. Early evidence suggests online learning in higher education leads to worse outcomes (Bird et al., 2020).

V. CONCLUSION

When the school reopens, the education system must adapt the learning loss that has occurred. This is absolutely necessary in order to reduce the danger of missing out on learning in the next few years. Before the pandemic alone, education was uneven, especially after there was a school closure. The results of the world bank stated that only 10% of children who mastered reading and understanding simple stories at the age of 10 years, in low income countries, in stark contrast to achievements in high income countries of

90%.(Hode, 2018). Not to mention the sudden shift from in-person teaching to distance learning feels scary for some teachers. Teachers are also required to complete the curriculum, this leads to the provision of learning materials without giving students the opportunity to master the content. As a result, foundation skills and essential skills cannot be mastered by children and make them more left behind. (Pritchett & Beatty, 2015)

And do not let learning loss make us trapped so that the education system loses its way. Student development is not only seen from test scores or cognitive alone because it cannot be a predictor in future student success. Emotional social well-being, learning attitudes, the ability to interact with peers and also psychosocial development are also subjects that need to be considered by educators.(Zhao, 2021).

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REFFERENCES

[1] Alinda, J. A. and V. (2018). Basic Education curriculum effectiveness in East Africa: A descriptive analysis of primary mathematics in Uganda using the 'Surveys of Enacted Curriculum' Julius Atuhurra + and Violet Alinda +. 1–40.

[2] Andrabi, T., Daniels, B., & Das, J. (2021). Human Capital Accumulation and Disasters: Evidence from the Pakistan Earthquake of 2005. Journal of Human Resources, 128182, 0520-10887R1. https://doi.org/10.3368/jhr.59.2.0520-10887r1

[3] Angrist, N., Bergman, P., Brewster, C., & Matsheng, M. (2020a). Stemming Learning Loss During the Pandemic: A Rapid Randomized Trial of a Low-Tech Intervention in Botswana. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3663098

[4] Angrist, N., Bergman, P., Brewster, C., & Matsheng, M. (2020b). Stemming Learning Loss During the Pandemic: A Rapid Randomized Trial of a Low-Tech Intervention in Botswana. SSRN Electronic Journal. https://doi.org/10.2139/SSRN.3663098

[5] Armitage, R., & Nellums, L. B. (2020). Considering inequalities in the school closure response to COVID-19. The Lancet Global Health, 8(5), e644. https://doi.org/10.1016/S2214-109X(20)30116-9

[6] Betebenner, W, D., Wenning, & J., R. (2021). Understanding Pandemic Learning Loss and Learning Recovery: The Role of Student Growth & Statewide Testing. January, 1–15.

[7] Blasko, Z., Costa, P. da, & Schnepf, S. V. (2021). Learning Loss and Educational Inequalities in Europe: Mapping the Potential Consequences of the Covid-19 Crisis by Zsuzsa Blaskó, Patricia da Costa, Sylke V. Schnepf :: SSRN. IZA Institute of Labour Economics, 14298. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3833230

[8] Burns, B. C., Ph, D., & Skidmore, S. (n.d.). Waterford Upstart : A Targeted Support to Combat COVID Learning Loss.

[9] Ciavarella, C., Fumanelli, L., Merler, S., Cattuto, C., & Ajelli, M. (2016). School closure policies at municipality level for mitigating influenza spread: A model-based evaluation. BMC Infectious Diseases, 16(1), 1–11. https://doi.org/10.1186/s12879-016-1918-z

[10] Domenico, L. Di, Pullano, G., Coletti, P., Hens, N., & Colizza, V. (2020). Expected impact of school closure and telework to mitigate COVID-19 epidemic in France. Epicx-Lab.Com, 1–15. www.epicx-lab.com/covid-19.html]

[11] Engzell, P., Frey, A., & Verhagen, M. D. (2021). Learning loss due to school closures during the COVID-19 pandemic. Proceedings of the National Academy of Sciences of the United States of America, 118(17). https://doi.org/10.1073/PNAS.2022376118

[12] Guran, A. M., Cojocar, G. S., & Moldovan, A. (2020). Designing Edutainment Software for Digital Skills Nurturing of Preschoolers. A Method Proposal. Proceedings - 2020 ACM/IEEE 42nd International Conference on Software Engineering: Software Engineering in Society, ICSE-SEIS 2020, 63–70.

[13] Hardt, D., Nagler, M., & Rincke, J. (2020). Online Teaching Effective- COVID-19 Pandemic.

[14] Hassan, H. (2021). CENTRE FOR DEVELOPMENT ECONOMICS AND " Low-tech " distance education : A remedy of the learning loss due to the COVID-19 pandemic. 02.

[15] Hill, B. (2020). The COVID-19 pandemic. British Journal of Nursing, 29(8), 456. https://doi.org/10.12968/bjon.2020.29.8.456

[16] Hode, L. (2018). What Will It Take? Photomedicine and Laser Surgery, 36(12), 629–630. https://doi.org/10.1089/pho.2018.4550

[17] Huremovic, D. (2019). Psychiatry of Pandemics. Psychiatry of Pandemics. https://doi.org/10.1007/978-3-030-15346-5

[18] Jackson, C., Vynnycky, E., Hawker, J., Olowokure, B., & Mangtani, P. (2013). School closures and influenza: Systematic review of epidemiological studies. BMJ Open, 3(2), 1–10. https://doi.org/10.1136/bmjopen-2012-002149

[19] Kaffenberger, M. (2021). Modelling the long-run learning impact of the Covid-19 learning shock: Actions to (more than) mitigate loss. International Journal of Educational Development, 81(December 2020), 102326. https://doi.org/10.1016/j.ijedudev.2020.102326

[20] Kress, J. (2020). How California ' s Charter Schools Mitigated Learning Loss. California Charter Schools Association, November, 1–12.

[21] Kurniawan, H., & Budiyono. (2021). Heroe's model: Case study to reduce students' learning loss and anxiety. Cypriot Journal of Educational Sciences, 16(3), 1122–1140. https://doi.org/10.18844/CJES.V16I3.5830

[22] Lewis, S. J., Munro, A. P. S., Smith, G. D., & Pollock, A. M. (2021). Closing schools is not evidence based and harms children. The BMJ, 372, 18–19. https://doi.org/10.1136/bmj.n521

[23] Maldonado, J. E., & De Witte, K. (2021). The effect of school closures on standardised student test outcomes. British Educational Research Journal. https://doi.org/10.1002/berj.3754

[24] Nugroho, D., Pasquini, C., Reuge, N., & Amaro, D. (2020). COVID-19: How are Countries Preparing to Mitigate the Learning Loss as Schools Reopen? Trends and emerging good practices to support the most vulnerable children. Innocenti Research Briefs, 2020–20, 1–9. https://www.unicef-irc.org/publications/1119-covid-19-how-are-countries-preparing-to-mitigate-the-learning-loss-as-they-reopen.html

[25] Pier, L., Hough, H. J., Christian, M., Bookman, N., Wilkenfeld, B., & Miller, R. (2021). Covid-19 and the educational equity crisis: Evidence on learning loss from the CORE data collaborative. Policy Analysis for California Education. Https://Edpolicyinca.Org/Newsroom/Covid-19-and-Educational-Equity-Crisis.

[26] Pritchett, L., & Beatty, A. (2015). Slow down, you're going too fast: Matching curricula to student skill levels. International Journal of Educational Development, 40(2015), 276–288. https://doi.org/10.1016/j.ijedudev.2014.11.013

[27] Reuge, N., Jenkins, R., Brossard, M., Soobrayan, B., Mizunoya, S., Ackers, J., Jones, L., & Taulo, W. G. (2021). Education response to COVID 19 pandemic, a special issue proposed by UNICEF: Editorial review. International Journal of Educational Development, 87, 102485. https://doi.org/10.1016/J.IJEDUDEV.2021.102485

[28] Sabates, R., Carter, E., & Stern, J. M. B. (2021). Using educational transitions to estimate learning loss due to COVID-19 school closures: The case of Complementary Basic Education in Ghana. International Journal of Educational Development, 82, 102377. https://doi.org/10.1016/J.IJEDUDEV.2021.102377

[29] Tomasik, M. J., Helbling, L. A., & Moser, U. (2021). Educational gains of in-person vs. distance learning in primary and secondary schools: A natural experiment during the COVID-19 pandemic school closures in Switzerland. International Journal of Psychology, 56(4), 566–576. https://doi.org/10.1002/ijop.12728

[30] United Nations Educational, S. and C. O., United Nations Children's Fund, World Food Programme, World Bank, & United Nations High Commissioner for Refugees. (2020). Framework for reopening schools. 1–5.

[31] Zhao, Y. (2021). Build back better: Avoid the learning loss trap. Prospects, 0123456789. https://doi.org/10.1007/s11125-021-09544-y