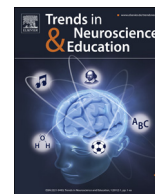




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Opinion paper

Hey teachers! Do not leave them kids alone! Envisioning schools during and after the coronavirus (COVID-19) pandemic

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In 1979 Roger Waters in the song «Another one brick in the wall» told about a child building a wall to isolate himself from a school system perceived as harmful. Instead, in 2020 school closures caused by coronavirus (COVID-19) pandemic suddenly built a wall of social isolation for children and adolescents, representing a serious risk for their mental health and academic skills [1]. For example, in Italy, adding school closure to summer vacation, students will be away from educational contexts at least for six months (from March to mid-September). Although at least half of this period of school closure should not be equated with vacation, with lessons translated into their distance and remote homologues, it will probably exponentially increase the well-known summer learning gap, i.e. a substantial loss of skills due to reduced daily exercise during summer vacations [2].

This phenomenon will be probably exacerbated by socioeconomic differences [3-6] in terms of suitable places to do homework, electronic devices, internet access, and owned books [7], as well by sociocultural differences in the parents' ability to sustain children along this period off-school, exemplified by the immigrant parent-child acculturation gap [8]. A similar if not worse phenomenon is foreseeable also for children with special education needs, as those with intellectual disability, and for children with specific learning disabilities, whose learning processes may be more affected by the prolonged interruption of daily routines due to school closure [9,10].

Therefore, for children of families with low socioeconomic status or with sociocultural barriers, as well as for children with pre-existing general or specific learning difficulties, the prolonged school closure due to the COVID-19 pandemic will amplify the achievement gap with their peers with unpredictable dimensions, being its temporal length not comparable to any analogue experiences due to recent pandemics [11,12]. Moreover, in general for all children and in particular for those with pre-existing learning difficulties, the achievement gap will be more relevant for younger children at elementary school, whose instrumental skills as reading, writing and calculation are not yet completely automatized.

How do schools counteract this wall of isolation, bridging over prolonged effects of their closure? Educational systems should plan how to reduce the increased achievement gap once pandemic will be over or under control, and school will be allowed to re-start. In this perspective,

if it is true that in every crisis could lie an opportunity, schools could take advantage of pandemic-induced constraints, as distancing, to rethink not only spaces and times but also activities and curricula to adapt themselves to the new post-pandemic scenario and to increased achievement gaps between students and within classrooms. This strategic envisioning should start from elementary school, that is at the same time less adaptable to its online version but probably more able to reduce achievement gaps, that are more plastic and modifiable in this period than in subsequent middle and high-school grades, in which may become more structural.

In this unexpected stress test for school systems, it is desirable a mutual exchange between educational policy makers and scientists working in the field of educational neuroscience [13-16]. In this perspective, post-pandemic scenario should represent for educational neuroscience an unheard-of opportunity to study, assess, measure, and intervene in educational contexts to test and challenge its principles and assumptions as regards its core business, i.e. learning processes. Moreover, considering its multi-level and multi-layer models of learning outcomes [15,16], in which learning is influenced from proximal (e.g. skills, motivation and attention, health) through intermediate (e.g. teaching materials, teaching skills, classroom environment, school policy, socioeconomic status) to distal factors (education policy and budget, national curricula), post-pandemic scenario is the occasion to test the ability of educational neuroscience to be translational (i.e. to translate research findings on neural mechanisms of learning to educational practice and policy), moving from single specific projects [see those implemented in UK from 2014: 15] to large-scale interventions.

For example, an unsolved and usually not explicated issue in the debate on educational systems, an issue emphasized by current COVID-19 pandemic, regards how education advancement is promoted: moving up the performance level of the whole population or reducing the gaps between children ('leave no child behind' policy)? This is a crucial issue, considering that factors that influence population means may differ from those that alter the shape of population distributions decreasing variability [15]: empirical data, for example from the *Programme for International Student Assessment* (PISA) suggest that countries gain more in terms of educational outcome by decreasing educational

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inequality (i.e. achievement gaps) rather than advancing population means [17,18], and policy makers should be informed and take care of this information.

Being aware of the complexity of this possible reorganization and of multiple factors involved, different between countries, educational systems and school grades, this paper aims to offer some reflections on realistic possible changes in school to adapt to the post-pandemic scenario.

For example, in western countries, guided by empirical evidence on predictors of learning abilities (e.g. phonological awareness for reading [19]), there is an increasing focus to school preparedness at kindergarten, based on literacy and math skills at the expense of art, music, science and child-selected activities) [20], despite the paucity of data on its long-term beneficial effects over early years of primary school [21]. This trend is not fully in agreement with increasing empirical support to curricula-based programs or add-ons to classroom curricula shown to enhance in children the development of executive functions [22,23], a cognitive domain that is associated with socioeconomic status in childhood [24,25] and is predictive of reading, math and mentalizing abilities along elementary school [26]. Interestingly, these curricula-based programs (e.g. Montessori and Tools of the Mind) or add-ons (e.g. Promoting Alternative Thinking Strategies: PATH; Chicago School Readiness Project: CSR) [22] emphasize more spontaneous, creative, and cooperating activities, rather than specific activities targeted to formal literacy, and have been shown to be more beneficial especially for impaired and more disadvantaged children, i.e. reducing baseline differences due also to socioeconomic inequalities. Main commonalities among these interventions include developmentally-appropriate expectancies on the child ability to sit still for long and the deliberate cultivation of positive mood, self-confidence, and social significant relationships in children, all of which support the development of executive functions, with cascade beneficial effects on academic achievement [22]. Other activities as mindfulness, aerobic physical exercise, martial arts and playing chess also may support the development of executive functions at school [22,23,27,28].

Resuming, while envisioning post-pandemic scenario, schools should not radically change but should attempt to implement more flexible programs:

- (1) mixing current traditional curricula (focusing on core academic skills as reading, writing, math) with other more spontaneous, creative, and cooperating modalities for other subjects as science, history, arts and music;
- (2) introducing less common (for being proposed at school) activities shown to be useful to have cognitive and socioemotional beneficial effects for the whole classroom, but especially for more disadvantaged children: these include, among others, activities as mindfulness, aerobic physical exercise, martial arts and playing chess;
- (3) taking advantage of measures of infection management as distancing to increase outdoor activities, open-space activities, or small group activities, promoting physical health and psychological well-being;
- (4) respecting individual differences in socioemotional reactions induced by a prolonged interruption of academic activities and routines and of social interaction with peers within the classroom;
- (5) avoiding to simply transfer previous modalities and curricula also in the new post-pandemic normality, for example translating live lessons to online lessons, because of a great risk of amplifying pre-existing gaps.
- (6) using to measure academic skills within the classroom and between peers along the school year and the academic course to have feedback on educational practices and adapt them on the basis of empirical data rather than on teachers' subjective ratings.

In conclusion, COVID-19 constraints on schooling are a severe risk

for amplifying current achievement gaps but at the same an exceptional occasion to envision schools according to empirical evidence on more effective add-on strategies for traditional educational systems. Policy makers should sustain and finance school systems to adapt and update themselves during and after the COVID-19 pandemic.

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No empirical data were collected in the context of this opinion paper. I therefore have no ethical statement to make.

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