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STA5056Z: Mathematical Modelling of Infectious Diseases

Assignment Two: School Closures

In this assignment, we will be looking at school closures, an intervention that is currently being used to manage the spread of COVID-19 in countries around the world, and assess its suitability to being applied in South Africa and other Low and Middle-Income Countries. To do this, we will be making use of a SWOT (strengths, weaknesses, opportunities, and threats) analysis, a tool to assess the effectiveness of school closures as an intervention to manage the spread of COVID-19 and develop strategic planning. SWOT analysis allows one to unpack internal and external factors concerning the intervention strategy, as well as the current and future potential of this strategy.

Strengths:

- Limits the spread of the virus, in schools, homes and journey to school.
- Provides ample time to understand the spread of the virus, as well as to make plans to prevent future spread of the virus in schools.
- Well-resourced schools are able to adjust to online learning in order to complete the academic year.
- In the absence of face-to-face classes, students are able to make use of TV and radio broadcasts which work through the curriculum of primary and high school students; as well make use of new online resources and free educational sites containing explanations of content and past papers.
- Low and middle-income countries have "ubuntu", school closures have encouraged people to work together to ensure that students writing exams have all the support through university students offering free tutoring, some teachers offering to go to remote areas to teach and people posting textbooks online for easy access for all.
- Curbing the spread of other infectious diseases which are commonly spread in a school setting, e.g. common cold, chickenpox, ringworms, etc.

Weaknesses:

- In middle-income and poorer countries, where space in a household is limited because children live with their extended families and/or in informal settlements, there is a lack of space to do work.
- Risk of increased child abuse since children now spend their entire day at home.
- Not enough funds to support students from poorer communities.
- Many teachers lack digital skills for online learning, and many parents are not educated to assist students.
- Many schools have no technology facilities, therefore; many students are unable to transition to online learning.
- Drop-out rates are already high in most low-income countries, due to lack of student engagement, lack of support from the school and the parents. This is further deepened by the closure of schools.
- Most low-income countries have high data costs, this is a threat to education for students in poorer communities having to continue with learning outside of the school.
- Due to high inequality, some learning institutions will be able to complete the curriculum. However, in learning institutions where this is not possible, many students may have to repeat a year. Therefore, resulting in a backlog of students especially at entries into primary, universities and colleges.
- Students dependent on external funding who may have to repeat a year, risk losing said funding.
- The quality of certification at the end of the year is weakened, due to factors such incomplete curriculum, inability to perform practicals, etc.

Opportunities:

- Finding alternative testing and learning forms. Encouraging creativity, e.g. creating phone applications that support learning, the use of videos, assessments encouraging research and application as opposed to memorising content.
- Extending radio and TV broadcasts to include all grades.
- For improved parent-child relationships, since parents are expected to and parents to engage with the children's learning.

- Explore the possible teaching hours, e.g. have some students attend at different times of the day or some students come in on different days to limit over-crowding in classes.
- Making technology a mandatory component in the education process. This would involve teacher training
 programs in universities and colleges prepare teachers for teaching beyond the classroom, as well as
 enhancing technology in poorer communities.
- Opportunity for the education sector to revise policies which govern education, i.e. for the government to fix the inequality present between different schools and to ensure the safety of students in schools (i.e. sanitation and infrastructure) and access to learning resources for all children more equitable.
- Opportunity for teachers to upskill.
- Opportunity for the state to look into making the data cost less expensive.
- Increased employment opportunities for individuals, e.g. online tutoring.
- Since students will not be attending school, the parents of these students, especially those from lower-income families are able to save money spent on transport and lunch money for other needs in the household.
- Increased remote immunization and support for students.¹

Threats:

- There is a disruption to learning; many schools will be unable to complete the year's syllabus. Learning
 losses, most students do not have desks, books, internet connectivity, laptops, or supportive parents. Lack of
 practical exposure may increase learning losses, as well as discourage some students. Hence, a further
 deepening of the margins of inequality.
- For remote learning, many educators may struggle to make use of online methods for teaching, therefore; may require a short course or some kind of assistance. There is almost no time to get teachers up to date without disadvantaging students? Availability of resources for teaching? As well as, time to convert face-toface content into online content.
- Reduction of student engagement and a decrease in teacher-student relationships which are essential to learning.
- Loss of income for the transport sector, caregivers, caretakers, cleaners and SMEs² (eg spaza shops)
- Child mortality is at a high risk of increasing due to hunger and malnutrition. Most children in low-income countries receive free school meals, thus, lack of meals leads to malnutrition in children which may ultimately result in mortality.
- School closures and increases in financial stresses are likely to increase the risk of child abuse, mental health breakdowns, and cyberbullying.
- Children's routine immunizations, such as testing for HIV and TB has a risk of decreasing due to schools
 closing. As well as support in the form of services provided by schools such as social workers, access to
 condoms, etc.
- Risk of young children being left home alone as most children live with single parents.
- Further marginalization of students with learning disabilities, due to not having access to trained professionals to assist with learning.
- In schools which receive little to no financial support from the state, the closing of schools may result in a loss of profits due to parents no longer wanting to pay for school fees if students aren't attending. This leaves employees of such schools vulnerable to job losses, especially those not involved in the teaching and administrative roles, e.g. cleaners, gardeners, etc.

¹An example https://www.brandsouthafrica.com/people-culture/minibus-therapy-takes-life-skills-counselling-road

² Small Market Enterprises