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Potential impact of COVID-19 outbreak on education, staff development and training in Africa

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ABSTRACT

The COVID-19 pandemic begins in China in 2019 and because of the connections of China with the rest of the World in trade and businesses, the virus started to spread quickly around the World. This rapidly spread causes serious negative effects on education, small, medium, and large businesses, economic, health, food security, employment, traveling, environment, energy, market, even causes countries to take loans and their debt rises. The specific knowledge about COVID-19 also affects education, which is a source of human capital formation. The data obtained from an online survey, covered from June 2020 to October 2020. The methods used are descriptive statistics, correlation, and multiple regression analysis. As the results generated, we confirmed that peoples' perception about COVID-19 pandemic increases with mandatory testing in schools. In addition, the results also revealed that the work from the home measure is an insignificant negative impact on perception. 10% increases in work from the home measure, decreases people's perception by 0.0305%. The results also confirmed that the reopening of schools had significant negative impact on mandatory testing in schools.10% increases in the reopening of school, decrease the mandatory testing in schools by 0.071%. In this regard, the main aim of this research is to understand the role of the COVID-19 pandemic on education, staff development, and training in Africa.

Introduction

Coronavirus pandemic (COVID-19) which had created from the Wuhan Province of China in the last part of December 2019 (Kaswa & Govender, 2020; Fernandes, 2020; Laing, 2020). It instigated increasing quickly in China and to other parts of the world through the movement of people in late 2019 and early 2020 (Kraemer et al., 2020). The overall cases worldwide stand at 141,813,257 million (WHO, 2020a, 2020b, 2020c), and the cases in Africa currently stand at 4,439,823 million (AU, 2020 report). Most countries on the continent in Africa have experienced a second wave of the pandemic and some, such as Kenya, Egypt, and Tunisia, have seen the third wave. This new wave of infections is thought to be associated with the emergence of more transmissible variants. A new variant of the virus emerged in South Africa last year and contributed to record case numbers in the southern African region, according to the World Health Organization (WHO, 2020a, 2020b, 2020c) (Table 1).

To contain the spread of the COVID-19 pandemic, in the majority of countries around the world educational institutions have decided to temporarily suspend face-to-face instruction and move to a remote learning model of delivery lecture. According to UNESCO, 2020, at

the end of April 2020, educational institutions shut down in 186 countries, affecting approximately 74% of total enrolled students globally. In many countries, schools have been closed since the commencement of March 2020 and others since February 2020, while in others face-to-face classes especially in China had been already canceled since January 2020 due to the severity of the COVID-19 pandemic (Zhang et al., 2020). This of course has tremendous effects on students learning outcomes and, staff development, training, research, and learning. Furthermore, the plain social consequence of the coronavirus crisis was fingered through the burden of movement limitations (Barbosa et al., 2021). These measures inevitably affected economic activities in African countries especially the educational institution, which is the main sources of human capital for the continent, and because the peoples in African countries are not versatile to operate work from home and even the government lack certain understand and lack human capita based that have that knowledge to operate from work from home (Pitas & Ehmer, 2020) and contribute effectively and efficiently to the economic growth and development (Baldwin and di Mauro, 2020; Fernandes, 2020) (Table 2).

In this regard, this affects online learning outcomes in Africa and at the same time staff development and training. Sprang and Silman

Table 1
Descriptive Statistics.

	G	MS	PESDT	P	R	A	OWFH
Mean	0.704	0.909	0.250	0.684	0.714	32.222	0.882
Std. Dev.	0.465	0.294	0.447	0.478	0.463	5.820	0.332
Skewness	−0.89	−2.846	1.155	−0.793	−0.949	0.085	−2.373
Kurtosis	1.796	9.100	2.333	1.628	1.900	2.144	6.633
Jarque-Bera	1.403	6.230	6.230	6.230	6.230	0.639	6.230
Probability	0.496	0.044	0.044	0.044	0.044	0.727	0.044
Sum	5.000	6.000	1.000	6.000	6.000	216.000	6.000
Sum Sq. Dev.	1.429	0.857	0.857	0.857	0.857	186.857	0.857
Observations	27.00	22.00	16.00	19.00	21.00	27.00	17.00

Source: Author's own computation using the Google survey data.

Table 2
Linear Correlation Coefficient test.

Covariance Analysis: Ordinary Sample: 9/21/2020 10/06/2020 Correlation Probability	G	MS	PESDT	P	R	A	OWFH
G	1						
MS	−0.26	0.12					
	0.04	1.00					
PESDT	0.26	0.02	0.12				
	−0.04	0.17	1.00				
P	−0.26	0.12	0.02	0.12			
	−0.02	1.00	0.17	1.00			
R	−0.26	−0.02	0.02	−0.02	0.12		
	0.10	−0.17	0.17	−0.17	1.00		
A	0.04	−1.16	−0.84	−1.16	0.84	26.69	
	0.10	−0.64	−0.46	−0.64	0.46	1.00	
OWFH	0.65	−0.02	0.02	−0.02	−0.02	−0.59	0.12
	−0.17	0.17	−0.17	−0.17	−0.17	−0.33	1

Source: Author's own computation using the Google survey data.

(2013) show that children who were isolated or quarantined during pandemic diseases are more likely to suffer from acute stress disorder, psychological stressor adjustment disorder, mental health issues, and grief. Such adverse psychological factors may in turn have a detrimental effect on learning outcomes for the students (Steele and Kuban, 2012). Most organizations have challenges on staff development and training and at the same time have most of their training interrupted due to the COVID-19 pandemic. Most of the enterprises stop training their staff due to travel limitations, lockdown measures, social distances, online learning, and travel bans. The impact of COVID-19 effects on the educational sector was seen by "Impact of Coronavirus Pandemic on Education (2020)", which concludes that, on average, in the US students' test scores decline over summer break by one month's worth of school-year learning. Meaning lockdown affects student performance or isolation affects student performance in the long run. Shinwell and Defeyter (2017) find that in Scotland and the North East of England primary school children suffer a loss in spelling following a 7-week summer break.

A recent body of literature explores the impact of coronavirus on society (Chakraborty & Maity, 2020). For instance, Chinazzi et al. (2020) indication that COVID-19 has pretentious day-to-day life and is decelerating down the worldwide economy. Thus educational institutions are not left behind by the impact of the COVID-19 pandemic. According to (Toquero, 2020) the COVID-19 pandemic is a huge challenge for the educational system and he further stated that the viewpoint offers guidance to teachers, institutional heads, and officials on addressing the crisis. This of course has challenges on staff and students alike-in their development, learning, training, and research. For their part, Hyseni Duraku et al. (2020), found out that the closure of educational institutions due to preventive measures against the spread of COVID-19 has affected the education, well-being, and

functioning of all the parties that are benefiting education in the world. For G. Di Pietro et al., 2020, after the extensive review of different literature on how COVID-19 affect students learning outcomes in direct and indirect ways and they confirmed that in few EU countries, on average students will suffer a learning loss.

COVID-19 affect all categories of students in different level of their education and therefore, the government has also announced plans to double student grants and broaden the eligibility for financial assistance (Trudeau, 2020), as well as additional support in the form of scholarship for students affected by the COVID-19 pandemic (Ministry of Education, 2020). For example, the effects of measures to slow the spread of COVID-19 were always likely to have a severe effect on Africa's education system. A report for the influential US think-tank, the Brookings Institution, concluded that whilst African leaders had their hands full with "rising COVID-19 infections, fragile health systems, increasing food insecurity, and, in some areas, growing social unrest, education was crucial to Africa's COVID-19 response (Soares & Recuero, 2021). In this regards, it is important to study the impact of COVID-19 on the African educational system be it staff development, and be it training internally or externally. Therefore, the paper contributes to the above literature by exploring the staff development, education, and training effect on coronavirus outbreak in Africa by looking at the context that was not mentioned in the pieces of literature such as the online research methodology, staff development, and training, introduction of mandatory testing in schools, work from home measures, reopening of schools and people's perceptions about a COVID-19 pandemic. The main objective is how the COVID-19 pandemic affects education in Africa particularly staff development and training. The paper follows this formatting. Section 2 methodology, Section 3, the results, Section 4, discussion, section 5, concludes, and policy implications with areas of future researchers (Table 3).

Table 3

Estimated Coefficient of introduction of mandatory testing in schools (MS).

Variable	Coefficient	Standard error	t-statistic	p-value
STPI	−0.4	0.2	−2.00	0.092*
OEC	0.4	0.2	−2.00	0.092*
P	0.38	0.34	1.12	0.344
R	−0.71	0.09	−7.14	0.089*
Intercept term	1	0.34	2.98	0.03*

R-squa = 0.66.
Prob > F = 0.07.
Ad.R-sq = 0.50.
F(3, 6) = 4.0.
Source: Author's own computation using the Google survey data.

Methodology

Study design

The data used in this paper was generated from an online survey questionnaire from June 2020 to October 2020, in which the participants were asked about certain questions in which COVID-19 affects staff development, education, and training. The questionnaire was designed to help Africa to understand COVID-19 impacts on their daily life. The initial information was reviewed to understand the final information we put as questions to increases quality and what information needed to gather or not gather. Due to the nature of the convenient, non-probability sampling method was used to collect the data. As a web survey data collection, it is easy to complete and less time is applied to it (Table 4).

The questionnaire was designed and filled into a Google form. After spanned some months, the questionnaire was extracted and downloaded using excel format. Then, it was cleaned and coded by assigned categorical-dummy variable to the variables in questions, in which probability P assigned a numeric value of 1 and probability 1-P assigned a numeric value of 0, otherwise. This helps us to understand how much peoples in Africa have COVID-19 pandemic perceptions in their daily life especially the staff development, education, and training. In addition, the statistical computing software, Stata 16 was used to analyze the web-based survey data.

Simple linear regression model

Linear regression is a technique to quantify the relationship between the dependent variable and only one independent variable.

$y = \beta_0 \pm \beta_1 x$

In this equation y, is the dependent variable, is the variable on the vertical axis of the graph or the explained variable, while x, represents the variable on the horizontal axis or the independent variable. The value (which can be negative, positive, or zero) is called the intercept,

while the value (which can be positive or negative) is called 'slope' or 'coefficient of regression' or rate of change. The question is how to calculate the values of and. You will not be bothered with the details but in all statistical textbooks you will see that and can be calculated with the following equations:

$\beta_1 = \frac{\sum\{(x-\bar{x})(y-\bar{y})\}}{\sum(x-\bar{x})^2}$ And $\beta_0 = \bar{y} - \beta_1\bar{x}$

Multiple linear regression models

This paper is based on multiple regression analysis in which two or more variables are modeling and analyzed. The multiple regression analysis is to describe the relationship between one dependent variable called the response variable and several independent variables called exogenous variables (Constantin, 2006). Lefter (2004), identified that and at the same time the spreads in which some independent variables have on the dependent variable under study. Sometimes it takes into account the forecasting or predicting the values of independent variables on the outcomes either positive or negative it will have on the dependent variable. The multiple regression models can be much more accurate than the uni-factorial regression model (Goschin & Vatui, 2002). If y is a dependent variable and x1, xk are independent variables, and then the multiple regression models provides a prediction or forecasting of y given xi of the form.

$y_i = b_0 + b_1 x_{1i} + b_2 x_{2i} + \ldots\ldots + b_p x_{pi} + e_i$

Empirical model

The multiple regression models between mandatory testing in schools (MS), interruption of staff development and training (STPI), the challenges of the enterprise in Africa in delivery staff training program and activities (OEC), Perception on how livelihoods will be impacted in the future (P), reopening of schools (R) and so on, depending on which one is the dependent variable and which are the independent variables under investigation.

Table 4

Estimated Coefficient of Peoples' Perceptions about livelihoods will be impacted in the future (P).

Variable	Coefficient	Standard error	t-statistic	p-value
MS	0.63	0.05	11.69	0.054*
R	0.45	0.045	9.99	0.06*
OUOOFF	0.47	0.06	8.35	0.08*
BCSTD	0.78	0.06	12.57	0.051*
OWFH	−0.31	0.11	−2.74	0.223
Intercept/constant	0.82	0.16	5.26	0.12

R-squad = 0.99.
Prob > F = 0.0604.
Ad.R-sq = 0.99.
F(3, 6) = 165.39.
Source: Author's own computation using the Google survey data.

Where:

STPI = the COVID-19 pandemic interrupted the staff training programs and activities

OEC = the challenges of the enterprise in Africa in delivering staff training program and activities

P = the Perceptions on how severely livelihoods will be impacted in the future due to COVID-19 pandemics

R = reopening of schools.

Presentation of results

The purposes of the sections are to understand the results of the online survey from the non-probability method to descriptive statistic points of view. We used statistical tools to analyze the data.

Statistical analysis

We used the descriptive statistic method and regression methods to the analysis and interpret our online survey data. This helps us to understand the average of the change on the peoples' behaviors about the COVID-19 pandemic and to understand the relationship between different variables and also to have more comprehend the change in one variable(s) in the society in Africa that are affected by COVID-19 to another and to understand their statistical significance under study.

The above table shows the descriptive statistics of the variables used in the study. Firstly, the age (A) of the respondents has the highest number of observations. That mean peoples can answer more of those questions. The age of the respondents has the highest mean and highest standard deviation. Secondly, the introduction of work from home measures in response to the COVID-19 pandemic (OWFH has a mean of 0.88 and standard deviation of 0.33 and leftward skew −2.37. The impact of a COVID-19 pandemic on staff development and training, in which the enterprise suspended operations in response to the COVID-19 pandemic has a mean of 0.7 on average and standard deviation approximately closed to 0.5 and skewed to the left of −0.9. This leftward skewed is because it is not normally distributed-most or some enterprise did not suspend their staff training and development due to the COVID-19 pandemic.

The correlation is used to determine the nature of the relationship between two variables in the study. The relationship between the age of the respondent (A) and the gender of the respondent (G) is positive (with correlation coefficients of 0.0127). The relationship between the respondent who said they should reopening of schools(R) and the gender of the respondent to that questions was negative (correlation coefficient of −0.1077). 100 percent increases in reopening of schools, there are decreases in the respondent by gender at 107 percent. Age or the respondents and introduction of mandatory testing in school (MS) and reopening of schools has negative relationships with a correlation coefficient of −0.0253 and −0.0786 respectively.

The relationship between the Perceptions (P) on how severely livelihoods will be impacted in the future due to COVID-19 pandemics and the introduction of mandatory testing in schools has positive relationships (with a correlation coefficient of 50% or 0.5). The relationship between the introduction of work from home measures in response to the COVID-19 pandemic and the method of continuity of learning available for children affected by closures of the educational institution provided by a non-governmental organization such as NGOs' and the one provided by the government respectively are negative with correlation coefficients of −0.239 and 0.2887 respectively. The relationships between delivery of staff training programs and activities been interrupted due to the COVID-19 pandemic and the reopening of schools has positive correlations (with a correlation coefficient of 17.5 percent).

Multiple linear regression model results and interpretation

The COVID-19 pandemic affects education, learning, training, research, and staff development in the local and international communities, scholars, and technocrat alike. In that, we study the impact of the COVID-19 pandemic on staff development, training, and education in Africa to have clear views of COVID-19 and its interruptions and its challenges and any adjustments in the society especially academic. As it stands in Africa, the COVID-19 pandemic interrupted the staff training programs and activities (STPI). Therefore, the result is statistically significant at 10 percent of alpha, but it has negative coefficients. 1 percent increases on COVID-19 crises, there will be a reduction of the introduction of mandatory testing in schools by 0.04 percent. This is attributed to the fact that the schools will be even closed down due to the rises of COVID-19 crises.

The challenges of the enterprise in Africa in delivering staff training programs and activities (OEC) increases the introduction of mandatory testing in schools in Africa. This positive relationship (with the coefficient of 0.4) was because Africa has issues of limited digital literacy of users, Limited digital skills of trainers, Cost, Lack of adapted training programs and resources, Infrastructure issues (e.g. internet connections, computers availability, etc.), and difficulty in delivering hands-on training. The results confirmed that Perceptions on how severely livelihoods will be impacted in the future (P) has an important and positive impact on the introduction of mandatory testing in schools. If we ignored the intercept terms, 10 percent increases in people's perceptions of livelihoods will be severely impacted in the future by the COVID-19 pandemic, increases the introduction of mandatory testing in schools in Africa by 0.03765 percent. This may be attributed to the fact that the proportion of the respondents who said livelihoods will be severely impacted in the future stand at approximately 66.7 percent, while the opposite stand at 33.3 percent respectively.

In addition, as the results revealed that introduction of mandatory testing in schools (MS), reopening of schools (R), uses online/offline distance learning tools by your organization/enterprises and the reduction of investment in staff development and training beyond COVID-19 pandemic (BCSTD) are all statistically significant positive impact/coefficient on the perception of the livelihoods will be impacted in the future, while respondent age (A), partnering with the external organization to conduct staff training and development, for the organization to deliver more training in the long-run following the COVID-19 pandemic are all statistically significant negative impacts on people perception about livelihoods will be impacted in the future.

The impact of the introduction of work from home measures due to COVID-19 pandemic on people's perception about livelihoods will be impacted in the future is not statistically significant and associated with a negative sign. 10% increases in the introduction of work from home measure due to COVID-19, decreases people's perception about livelihoods will be impacted in the future by 0.0305%. This off-course is attributed to the fact that the proportion of the respondent said they should introduce work from home as a measure to reduce the spread of the COVID-19 is 90.9% and the proportion for people perception about livelihoods will be impacted in the future stand at 66.7% respectively. As livelihoods impacts in the future rise due to COVID-19, work from home during the COVID-19 pandemic increases.

The results also confirmed that the reopening of schools is statistically significant negative impacts on the introduction of mandatory testing in schools. 10% increases in the reopening of schools, decrease the introduction of mandatory testing in schools by 0.071%. This attributed to the fact that the proportion of the respondent who said they should reopen schools stand at 72.2% while the introduction of mandatory testing in schools stand at proportions of 88.9%. Meaning as we decrease/reduces the reopening of schools philosophy in Africa, then the introduction of mandatory testing in schools will rise. This off-course is attributed to the fact that in Africa health care system

has lots of issues to control over COVID-19 pandemic as do the ''Ebola'' pandemic due to limited digital technology in African's hospital to control the outbreak of COVID-19 pandemics.

Results and discussion

The descriptive statistic method found out that, the introduction of work from home measures in response to the COVID-19 pandemic (OWFH has a mean of 0.88 and standard deviation of 0.33 and leftward skew −2.37. Furthermore, the impact of a COVID-19 pandemic on staff development and training, in which the enterprise suspended operations in response to the COVID-19 pandemic, has a mean of 0.7 on average and standard deviation approximately closed to 0.5 and skewed to the left of −0.9. This leftward skewed is since it is not normally distributed-most or some enterprise did not suspend their staff training and development due to the COVID-19 pandemic.

The correlation is the relation between one variable and another variable in the study. In this regard, the relationships between delivery of staff training programs and activities been interrupted due to the COVID-19 pandemic and the reopening of schools has positive correlations (with a correlation coefficient of 17.5 percent).

Our study of COVID-19 and its impact on staff development, training, and education was impressed with results that are important to Africa educational set-up especially after COVID-19 or any diseases that may come in the future. The multiple regression results confirmed that the COVID-19 pandemic interrupted staff training programs in Africa and that in turn affect the mandatory testing in school in Africa and this was confirmed in the study done by (WHO, 2020a, 2020b, 2020c; Human Rights Watch, 2020). In addition, our multiple regression model results confirmed that in Africa, the COVID-19 pandemic interrupted the staff training programs and activities (STPI). Therefore, the result is statistically significant at 10 percent of alpha, but it has negative coefficients. 1 percent increases on COVID-19 crises, there will be a reduction of the introduction of mandatory testing in schools by 0.04 percent. This of course was also confirmed in the study done by Burgess and Sievertsen (2020) confirmed that, the global lockdown of education institutions is going to cause a major (and likely unequal) interruption in students' learning; disruptions in internal assessments; and the cancellation of public assessments for qualifications or their replacement by an inferior alternative.

Another important finding in our study dealt with the effects of mandatory testing in schools throughout Africa. In our study, we found out that the introduction of mandatory testing in schools and the challenges of the enterprise in Africa in delivering staff training programs and activities have a positive impact on each other. This is confirmed in the study done by Daniel (2020) on COVID-19 and education revealed that the COVID-19 pandemic is a huge challenge to education systems.

Most enterprises cannot be training their staff due to the distractions caused by coronavirus pandemic and this eventually leads to online education, online training programs and after all which are inefficient and lack quality due to poor energy sectors and communication sectors with poor internet facilities, our study revealed. The inefficient of energy in Africa was confirmed in the study done by Akrofi and Antwi (2020). Further, energy consumption, production, and economic growth nexus in Africa cases were confirmed in the study done by Adams et al. (2016), Maji et al. (2019).

Our results confirmed that perceptions and mandatory testing in schools increase side-by-side. This means that as peoples' perceptions about a COVID-19 will rise in the future, the mandatory testing in schools increases due to factors such as people's belief that vaccination will cure. As it stands the vaccination is not total proof to cure or remove COVID-19. The re-opening of schools, online and offline classes due to pandemic rises with mandatory testing in schools. School closures have a very real impact on all students, but especially on the most vulnerable ones who are more likely to face additional

barriers such as low income, indigenous, ethnic minority, single parents, and diverse gender (OECD, 2020). It is also confirmed that according to OECD, 2019 state that due to the COVID-19 pandemic on education, students are likely to lose the most in terms of educational outcomes. The support provides by the schools if countries take insufficient measures to promote economic, educational equity, and inclusion (Ceesay, 2021), According to UNESCO (2020) stated that one year into the COVID-19 pandemic, close to half of Africa's students in particular and the World's students, in general, are affected by schools closures either partially or totally and due to lockdown and the like over 100 million additional children will fall below the minimum proficiency level in reading as a result of health crises, the study concluded.

Conclusion and policy implications and areas for future research

This paper assesses the COVID-19 and its effect on education and staff training and development of Africa by looking at some of the important and negative effects of online lecture and staff training and development. As the results generated, most people said coronavirus will affect African countries even in the future since African countries do not have the proper human capital to deal with this pandemic. Our results summarize that COVID-19 affects the educational system in Africa by lockdown, which brings about work from home and online classes, and distance learning programs. Online training affects quality due to educational inequality and resources difference. The reopening of schools in Africa affect staff, student and their research, training, and development since the funding given to during COVID-19 pandemic affect by lockdown and travel restriction. Even online classes are ineffective and this will affect the human capital formation in Africa. The work from home measure to cope with the COVID-19 pandemic also affect by lockdown and causes a serious reduction in quality by increasing manipulation in the management of the educational system in Africa during the crisis periods. We said the management of the education system because most of the online classes are ineffective and staffs delivering for proper calculation courses are ineffective and less comprehend due to online classes and no face-to-face interaction, the study noted.

The policy implication of the results from this online survey is that it has serious impacts on education closure and staff development and training. As educations are closed due to the COVID-19 pandemic, it will affect already problems of human capital that are hampering the development of Africa. Due to the COVID-19 pandemic, the achievement of sustainable development goals on quality education will be seriously halted. The government and the ministry in Africa should work hand in hand to solve the problems of children affected by school closure after the pandemic by either additional hours or provide more study hours for schools to catch up with what happened during the pandemic, the study noted.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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