



The role of adult education in the fight against the covid-19 pandemic in selected communities in Ghana

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Abstract: The wearing of face masks has been recommended as part of personal protective equipment and as a public health measure to prevent the spread of the Covid-19 virus. The use of masks by rural folks in Ghana has faced difficult challenges because of the problem with deeply rooted underlying socioeconomic and cultural health issues. To address these problems, a rigorous exploration of the engagement of men and women as leaders in three communities in Eastern Region to promote a goal-directed effort among low-income communities in Ghana was pursued. The idea was explored through a series of pilots in Ghana's Eastern Region, beginning with participatory community discussions, leading to a small pilot study about the use and wearing of masks, and concluding with a controlled trial evaluation of the effort in three communities. At the end of the study, a clearly defined protocol for running distribution and use of masks to combat the spread and impact of the Covid-19 pandemic was developed. Experimental evidence that demonstrates the study's ability to raise awareness about the use and wearing of face masks in rural Ghana using community people, and men and women leaders as forerunners was also obtained.

Keywords: Adult Education, Covid-19, Face Mask, Ghana, Pandemic, Public Health Measure, Impact.

Introduction

The fight against the Covid-19 pandemic cannot be achieved without the involvement of the people with a change of attitude, behaviour, and practices towards public health issues (Lopes, 2020). As such, it becomes important to focus on the training of people, particularly women's groups and their leaders, local communities, and rural leaders, in combating the pandemic without solely relying on the health path. Adult education plays a significant role in all aspects of development and continues to act as a key medium for promoting and facilitating the fight against the Covid-19 pandemic (Lopes, 2020; UIL, 2020). Adult education in this sense encompasses the practice whereby adults are made to engage in a process of systematic, explorative, sustainable, and self-directing education; and learning practical activities, which are both formal and informal, in acquiring new forms of skills, knowledge, values, and attitudes that are essential for their own development as well as the progress of their community and nation.

Adult education thus entails the acquisition of basic skills in literacy, numeracy, information, and communication technology, which are essential for boosting their personal and professional fulfilment and entire lifelong learning. In the light of the Covid-19 pandemic, the potential role of adult education is critical for enhancing and strengthening the strategies that are meant to combat the virus and prevent further spread of the virus, especially in the rural communities of Ghana where the number of people engaged in adult education is low. As



adult education broadens to encompass both traditional and digital realms (Lopes, 2020; McKay, 2019), more individuals, including women, are gaining awareness of public health measures. This includes proper mask-wearing to mitigate the spread and escalation of the pandemic.

According to UNESCO (2020), in countries where literacy rates are low, the education of many of the population through systems, including adult education and learning, will be significant for mitigating the Covid-19 pandemic. In such countries too, healthcare systems are not very good compared to the developed world. With this, in critically looking at the Covid-19 pandemic, it could be seen that a link is drawn between the relationship between individual behaviour and group risk (Huang, 2020; Lopes, 2020). Without individuals abiding by the preventive measures, including the wearing of masks and social distancing that are meant to limit the spread of the virus from person to person, more people and groups are at a high risk of contracting the virus (UNESCO, 2020). This explains why it is significant to give maximum attention to adult education and training of communities, particularly rural areas, and neighbourhoods through channels of adult education and learning using community leaders and key community stakeholders, such as women groups and their leaders, in the attempt to combat the continuous spread of the Covid-19 virus in the country (Puplampu, 2021; Kumbeni et al., 2021; Apanga et al., 2021).

Research has shown that in countries where literacy levels are low, particularly in its rural communities, combating the spread of pandemics becomes a serious problem (Lopes, 2019; McKay, 2018; Lyons & DeLange, 2016). With most of the people having less education, which is key to health literacy, it is likely that pandemics, viruses, and other infections are easily spread from person to person. Therefore, a nationwide agenda that aims at ensuring basic literacy for all adults and the young population is very relevant for limiting the spread of a pandemic like the Covid-19 virus in Ghana (Lettor & Akunvane, 2021; Kabiri et al., 2021; MoE, 2020). Efforts towards reshaping and improving adult education and learning in the light of a comprehensive approach that encompasses all areas including formal and informal learning and training will be important in combating the pandemic across all parts of the country. This study sought to:

1. Examine the role adult education intervention (participatory community discussion) played in reducing the burden of Covid-19.
2. Examine the role of adult education in minimising the risk of contracting Covid-19.
3. Assess the role of Covid-19 education intervention to adults on community peoples' satisfaction.
4. Determine the role of Covid-19 education intervention to adults on community members' engagement for action.
5. Examine the role of Covid-19 education intervention to adults on learning and motivation.
6. Assess the role of Covid-19 education intervention to adults in promoting healthy community living.
7. Demonstrate that there is a significant difference between an experiment group exposed to the adult education intervention and that of a control group that did not get exposure.

Background

The outbreak of the coronavirus brings our attention to the need for all individuals, communities, districts, and schools to be equipped adequately to mitigate the spread and



continuation of the pandemic. Strong minds that are equipped with public and community health knowledge is necessary for achieving the global purposes of preventing the escalation and spread of the Covid-19 pandemic across communities and the larger society (Middleton et al., 2020b; Lopes & Middleton, 2020; Wu & McGoogan, 2020). Recent studies on the coronavirus have indicated that the spread of the virus has been the transmission from close family members and relatives, as well as from colleagues at the workplace (Lope & Middleton, 2020).

Even though current research has indicated that the size of the transmission and the national ecosystem in general is significance, it could be emphasized that physical distance has been a major factor and cause in the spread of the virus in different communities and neighbourhoods of the world (Anderson, 2020; Middleton et al., 2020a). As noted, this is because when the virus first started its spread and transmission to people was more through the contact that people had through infected droplets of people with a distance between them less than two meters (Anderson, 2020; Yee et al., 2020). In this regard, the wearing of a mask became very important when the outbreak of the coronavirus was so intense.

In Ghana, raising public health awareness and conducting community outreach via various mediums, including print, electronic, and online platforms; particularly social media, played a crucial role in reducing the virus spread within the country (Kumbeni et al., 2021; Pupilampu, 2021). This is therefore significant in preventing the continuous spread of the virus from infected persons to others who are not affected. The education of people, groups and communities through adult education and learning continues to be an essential means of instituting a nationwide agenda for combating the Covid-19 pandemic in mostly deprived and rural communities (Apanga et al., 2021; Lopes & Middleton, 2020; Woo & McGoogan, 2020). Being given the needed resources, attention, and health strategies for adult learning is very important to achieve a long-lasting imprint for reducing the spread of the virus in the country.

Jones (2020) states that the Covid-19 pandemic has induced behavioural changes that are somewhat shared with broader public and community health challenges in various contexts. For instance, an implication of the pandemic was seen in the spread of false information about the virus, which resulted in people over buying health-related items and other consumable with the view of keeping it for future use (Lopes & Middleton, 2020; Mao, 2020). This led to shortages of some health-related items and consumables in the market and other shopping centres. Similarly, in Ghana, the dissemination of false information on platforms like social media led to panic buying of health supplies to preempt potential shortages due to the coronavirus (Lettor & Akunvane, 2021; Kabiri et al., 2021).

Mao (2020) has noted that these items in most instances are not directly connected to the key problem and to an extent not related to the resolution of the risks. Lopes (2020) Emphasizing an important observation, the hoarding of health items like masks during the peak of the coronavirus created shortages when these items were most needed for public health reasons among various populations. Similarly, Leung et al. (2020) has emphasized that the stockpiling of essential items including face/nose mask during the intense period of the Covid-19 pandemic resulted in shortages of the items which in turn led to further risks that effect healthcare as other people had no access to the item.

From this, it could be seen that to substantially combat the continuous spread of the coronavirus, there is the need for adequate knowledge and information management across all parts of the world (Legido-Quigley et al., 2020; McKay, 2020; OECD, 2020). Local



communities in Ghana in this sense are to be given the right education, knowledge and essential information sharing. This will ensure the needed behaviour of local community members to adequately take measures in the fight against coronavirus (Lopes, 2020; McKay, 2019). The spread of the coronavirus, even after many healthcare awareness creation and campaigns, poses risks, especially in places where people have failed to take precautions (Greenhalgh et al., 2020).

It should be noted that the outbreak and spread of the virus has had devastating consequences on the health and livelihoods of many people in the world (OECD, 2020; WHO, 2020a; Wu & McGoogan, 2020). Developing countries such as Ghana have likewise faced severe consequences, with the poor and the less privileged in the country suffering the most during the coronavirus pandemic (Kabiri et al., 2021; MoE, 2020). A strategy for distributing and utilizing face/nose masks to counter the impact of the Covid-19 pandemic was devised, alongside an adult education intervention. To evaluate the study's goals, 96 Likert scale-based questionnaires were distributed. Among the 96 respondents, 30 were randomly chosen from the intervention group and 30 from the control group. They were asked to estimate their PPE usage over 90 days following the Covid-19 education intervention in the three communities.

Theoretical basis

According to Mukhalalati and Taylor (2019), adult learning theories play a pivotal role in the design and implementation of education programmes, including healthcare professional programmes. This paper draws from two adult learning theories, namely the transformative learning theory and social learning theory that were judged to be applicable in the learning and teaching of behaviours by adult education professionals for the purpose of health promotion during the Covid-19 pandemic.

Transformative learning theory (reflective learning)

The transformative learning theory focuses on transformation of meaning, context, and long-standing propositions. Adult learners are motivated to find and challenge the validity of assumptions embedded in them. This was referred to by Mezirow as “frames of reference”. Adults learn when new knowledge becomes integrated into existing knowledge, and adult learners maintain their original “frame of reference” but continue to challenge and alter some of their perspectives. Transformative learning involves three stages: the first stage involves experiencing a confusing issue or problem and reflecting on previous perspectives about the event; the second is engaging in critical evaluation and self-reflection on the experience, which requires metacognitive thinking; and the third stage is taking an action about the issue based on self-reflection and previous assumptions, which leads to a transformation of meaning, context, and long-standing propositions (Lonie & Desai, 2015; Taylor, 2007).

Social learning theory (zone of proximal development, situated cognition, communities of practice)

Torre et al. (2006) provide an overview of current learning theories for medical educators and observe that social learning theory integrate the concept of behaviour modelling with those of cognitive learning, so that the understanding of the performance of a task is strengthened. Accordingly, Torre et al. (2006) hint that social learning theories focus on social interaction, the person, context, community, and the desired behaviour as the main facilitators of learning. The fundamental components of social learning theory therefore are observation and modelling, whereby teachers provide and support learning environments, and clarify the expected behaviours.



The evolution and spread of the coronavirus

The coronavirus (SARS-CoV-2) started in the month of December 2019 in the city of Wuhan and the Hubei province area surroundings in China (Lopes, 2020; WHO, 2020b). With the outbreak of the coronavirus in China, the authorities tasked its healthcare services and manpower to quickly establish emergency clinics and large hospital structures in order to fight the virus (WHO, 2020b; Hageman, 2020) by containing its spread to other parts of the country. China's quick response in putting up the health clinics and hospitals provided a blueprint for the global community to follow.

To combat the spread of the coronavirus, other countries immediately joined the campaign towards preventing the escalation of the pandemic (Huang, 2020). Globally, education and training campaigns emerged to mitigate the spread of Covid-19: such education encompassed preventive mechanisms and strategies necessary for limiting the spread of the virus from person to person, and from country to country (Henley, 2020; OECD, 2020; WHO, 2020a). The practices included the washing of hands, wearing of face masks and maintaining social distancing. South Korea, for instance, took decisive steps to prevent the spread of the virus in their own country, neighbouring countries and the global community (Lopes, 2020; WHO, 2020b). An important measure taken by South Korea was embarking on massive public and community education for its citizens. Practical training measures were provided on the preventive techniques that were important for combating the pandemic in and outside the country (Boseley, 2020; Lopes, 2020).

Another important strategy that was taken by the authorities in South Korea was to limit the movement of its people as a way of avoiding contact with people who were infected with the virus (Boseley, 2020; Lopes, 2020; OECD, 2020). Movement was only allowed for essential services and the purchase of important items that were needed for people's survival. In all these cases, people had to wear the face/nose mask before going out of their homes and in shops and market centres. The education and training provided by countries, including China and South Korea when the coronavirus emerged provides evidence on the importance of educating the public, particularly on health literacy campaigns and its significance for combating pandemics and other public health related challenges.

In many parts of the world, the gradual spread of the coronavirus affected a lot of its population in terms of people's health, education, movement, the economy, business, and local and international travels (Brinca & Faria-e-Castro, 2020; OECD, 2020). In Europe, for instance, almost all countries were hit by the virus, with severe cases recorded in Italy, Spain, Germany, France, and the Netherlands (Henley, 2020; Human Rights Watch, 2020). Most of these countries implemented total or partial lockdowns (Remuzzi & Remuzzi, 2020; WHO, 2020b). In developing countries, including Ghana, the spread of the coronavirus has been recorded (Apanga et al., 2021; Apanga & Akunvane, 2021; Kabiri et al., 2021). As the country started to record cases of virus infected travellers from other parts of the world, including China and Europe, the government in Ghana together with its Ministry of Health started to institute drastic measures at combating the spread of the virus in the country, especially in Accra, the capital, and other regional cities where the virus was detected (MoE, 2020; Puplampu, 2021). With the gradual spread of the virus to the rural communities of the country, measures were implemented to limit the spread of the infection from person to person.



As the number of cases rose, a partial lockdown was implemented in March 2020 by the government in combating the continuous spread of the virus (MoE, 2020). This placed restriction on the movement of people. Only essential services were allowed to operate in the country. Schools were closed, and students were asked to stay home to limit the spread of the virus. Emergency centres were set up by the government and the Ministry of Health to cater for the health needs of people who were infected with the virus (Kumbeni et al., 2021; MoE, 2020). Non-urgent health cases were put on hold to enable health workers to cater to the health needs of people who were infected with the coronavirus.

Methodology

The study employed both qualitative and quantitative approaches. Data was collected using quantitative methods after qualitative approaches were used to set the stage for quantitative data collection with questionnaires. From August to October 2020, a sequence of qualitative engagements unfolded in Eastern Region's three communities. These interactive community discussions led to a pilot study on face/nose mask use. This culminated in a controlled trial evaluation of the effort's impact within these communities. Both controlled and experimental groups were formed. A strategy for distributing and utilizing face/nose masks to counter the Covid-19 pandemic's impact was devised, alongside an adult education intervention. Ultimately, 96 Likert scale-based questionnaires gauged the study's success. Out of these, 30 respondents each were randomly selected from the experimental and control groups. They estimated PPE usage over a 90-day period following the Covid-19 education intervention for adults across the three communities.

A paired T-Test was performed to determine if there was a significant difference between the experiment and controlled group. This approach was intended to demonstrate and measure the study's ability to raise awareness about the use and wearing of face/nose masks in rural Ghana using community people, and men and women leaders as forerunners. The questionnaire for the quantitative part of the study comprised seven items based on the objectives of the study. Other statistical programs like the Statistical Package for Service Solution (SPSS) version 16.0 were used to analyse and interpret the data collected from respondents. The Likert scale questions were encoded before entry into the computer.

Questionnaire Development

The questionnaire used a five-point Likert scale ranging from strongly agree (5 points), agree (4 points), uncertain (3 points), disagree (2 points) and strongly disagree (1 point).

Validation of Instruments

The instruments for the study were assessed for content and construct validity. Each item of the instrument was carefully analysed and checked to ensure that it conveyed the necessary message. During the validation the seven items in the questionnaires were piloted to test respondents' understanding of the questionnaire. Feedback was used to improve the questionnaire for the final survey.

Data Entry and Analysis

Research assistants entered quantitative data resulting from the survey into the Statistical Package for Social Sciences (SPSS). Data entered was analysed and mean responses were examined. Descriptive Statistics (tables of means, and standard deviations) were used to present results.



Ethics

The Ethical Committee of the Humanities of the University of Ghana endorsed the study for meeting the research participant provisions. In line with ethical standards, the participants were provided with information about the nature of the research and their written consent was obtained prior to the commencement of the study. Participation in this study was voluntary and the participants had the choice to withdraw at any stage of the study. Participants were assured of anonymity. Coding was used to ensure that respondents’ identities and the names of their communities were concealed during analysis of the data.

Results

Table 1 shows the categories of respondents that were involved in the study. It is shown that 43% of the respondents were males, and 57% of them were females. This section of the study investigates whether respondents perceived that educating men and women in the three communities about the Covid-19 pandemic and ways to minimise infection such as washing of hands, maintaining social distancing and wearing masks inspired people within the community to take steps to minimise their risk of infection.

Table 1: Distribution of study respondents

Community	Male	%	Female	%	Total
1	12	37.5	20	62.5	32
2	14	46.7	16	53.3	30
3	15	44.1	19	55.9	34
Total	41	42.7	55	57.3	96

As shown in Table 2, 81% of the study respondents believe that the adult education intervention exposed and inspired community people and leaders to act. It is recorded that 70% of the respondents believe the distribution of materials such as masks and sanitizers inspired them to act. Similarly, 78% of respondents confirmed that the sensitization and awareness creation part of the intervention inspired them to take action to minimise the risk of contracting Covid-19.

Table 2: The positive role adult education played in reducing Covid-19

Innovation	Inspired me to do something positive to minimise risk	Indifferent	No Response
Did the exposure to the adult education programme or campaign on Covid-19 pandemic have any effect on you?	78 (81%)	5 (5%)	13 (14%)
Did the distribution of materials (nose masks, sanitizers etc. and adult education on how to effectively use them for protection from Covid-19 make any difference?	67 (70%)	8 (9%)	21(21%)
Did the sensitization effort and awareness			



creation about Covid-19 and how to protect yourself and loved ones went down well with you?	75 (78%)	10 (10%)	11 (12%)
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Concerning the impact of the Covid-19 health literacy education (adult education/awareness creation about the atrocities of Covid-19 and what to do to be protected) respondents rated on a scale of 1 (low) to 5 (high) the level of importance after the adult education campaign in the community. Table 3 indicates that the adult education programme has made an important contribution to creating awareness and sensitizing the members of the three communities about healthy living during the Covid-19 pandemic

Table 3: Perceptions about the role of adult education in minimising risk of contracting Covid-19

Response	Frequency (f)	Percent (%)
Education efforts made some impact	21	22
Education efforts made significant impact	58	60
No response	17	18
Total	96	100

As shown in Table 4, there has been an effect on the level of satisfaction of community people with the education programme. It is recorded that 83% of respondents’ assert that the education programme was satisfactory to individual members of the community; and 81% of the respondents are positive that the effects of the adult education programme on the collective community people is satisfactory. Investigating the effect that the health education programme about Covid-19 had on women leaders in the community, 84% of respondents asserted that the adult education programme was satisfactory. It is recorded that 75% of the respondents indicated that the adult education programme was satisfactory to opinion leaders in the communities. It can be inferred from the responses that the Covid-19 education programme aimed at adults served good purpose to communities and their people.

Table 4: Perceptions of how Covid-19 education intervention for adults impacts people's satisfaction.

Innovative Teaching and Learning Practice	Satisfied	Indifferent	Not Satisfied	No Response
Effect on individual community member’s satisfaction	80 (83%)	5 (5%)	4 (4%)	7 (8%)
Effect on collective community people’s satisfaction	78 (81%)	8 (9%)	5 (5%)	5 (5%)
Effect on women leaders’ satisfaction	81 (84%)	6 (6.5%)	4 (4%)	5 (5.5%)



Effect on other opinion leaders in the community’s satisfaction	75 (78%)	7 (7%)	8 (9%)	6 (6%)
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In Table 5 it is observed that there has been a positive conviction on the part of respondents (88%) that individual community people were adequately engaged by the education intervention provided on the Covid-19 pandemic. It is recorded that 83% of respondents asserted that the education programme was engaging to the community people. Ninety percent (90%) of respondents reported that the health education intervention adequately engaged leaders of women groups in the community to take action to minimise the risk of the virus. It is recorded that 81% of the respondents indicated that the education programme engaged other opinion leaders in the communities. It can be inferred from the responses that the Covid-19 education programme for adults sufficiently engaged the people and their leaders in the three communities

Table 5: Perceptions about the role of Covid-19 education intervention for adults on community members’ engagement for action

Role of Covid-19 Education	Satisfied	Indifferent	Not Satisfied	No Response
Effect on individual community member’s engagement	84 (87.5%)	8 (8.5%)	2 (2%)	2 (2%)
Effect on collective community people’s engagement	80 (83%)	10 (10%)	4 (4%)	2 (2%)
Effect on women leaders’ engagement	86 (89.5%)	2 (2%)	3 (3%)	5 (5.5%)
Effect on other opinion leaders in the community’s engagement	78 (81%)	5 (5%)	4 (4%)	10 (10%)

Table 6 investigates the effects of adult community education intervention on Covid-19 safety practices. Respondents affirm its positive influence on individual community members, the community as a whole, women group leaders, and other community opinion leaders. As detailed in Table 6 below, the majority of the respondents perceived that the community education intervention made some significant contribution to learning and motivation of the community leaders and their members.

Table 6: Perceptions about the role of Covid-19 education intervention to adults on learning and motivation

Innovative Teaching and Learning Practice	Learning and motivation	Indifferent	No Learning	No Response
Effect on individual community member’s engagement	84 (87.5%)	8 (8.5%)	2 (2%)	2 (2%)



Effect on collective community people’s engagement	80 (83%)	10 (10%)	4 (4%)	2 (2%)
Effect on women leaders’ engagement	86 (89.5%)	2 (2%)	3 (3%)	5 (5.5%)
Effect on other opinion leaders in the community’s engagement	78 (81%)	5 (5%)	4 (4%)	10 (10%)

Furthermore, Table 7 confirmed that 85% of respondents perceived that the education intervention promoted healthy community living and that just 8% of the respondents perceived otherwise.

Table 7: Perceptions about the role of Covid-19 education intervention in promoting healthy community living for all

Response	Frequency	Percent (%)
Yes, the intervention promoted healthy community living	82	85
No, the intervention did not promote healthy community living	8	8
No Response	6	7
Total	96	100

Table 8: Test of significance of the variation between the control and experiment group perceived usage of PPEs 90 days after the adult education intervention in the three communities.

Variables	Mean (PPE usage; estimated)	N	One-Sample Test			Paired t-tests			
			Std. Deviation	Std. Error Mean	t	Sig. (2-tailed)	t	df	Sig. (2-tailed)
Control Group	165.00	30	35.568	.06494	25.409	0.000	-205.40	29	.000
Experiment Group	333.00	30	75.891	.13856	24.027	0.000			

Examining the mean values of the experimental and control groups in quantitative analysis, we compare the PPE usage frequency of 30 respondents from each group over the 90 days following the November 2020 Covid-19 education intervention implementation. Table 8 shows the difference in respondents' estimated actual usage of PPEs during the 90-day period



following the intervention accessed using the paired t-tests. Table 8 gives the sample mean and the mean difference, their standard deviations, and standard errors.

At the 95% confidence interval, the T-test indicates that there is a significant difference between the experiment and control group. Thus, there is sufficient evidence to suggest that differences exist between the experiment and control groups in their usage of PPEs believed to have been influenced by the Covid-19 education to adults. The experiment group was exposed to the intervention, but the control group was not exposed to it. Respondents who were exposed to the intervention were taught and sensitized about the importance of PPEs in helping to minimize Covid-19 risks and these may have influenced their decision to engage significantly more frequent use of PPEs than respondents in the control group who were not taught or sensitized about the critical need to use PPEs during the Covid-19 pandemic.

Discussion

The Role and Contributions of Adult Education in Combating the Coronavirus

The United Nations 2030 Agenda, with its Sustainable Development Goals (SDGs) highlights the important role of education in pushing for development that is widespread (United Nations, 2015). This is in terms of inclusive development in all aspects life, including social, economic, political, cultural, technological, scientific, and environmental development (Day, 2020; UIL, 2020), especially in the developing countries of the world where there are high illiteracy rates among mostly the adult population. The SDG Goal number four specifically emphasizes the importance and the need for a comprehensive and an all-encompassing education for all, with a focus on lifelong learning for socio-economic, political, and environmental sustainability (United Nations, 2015).

Under this, adult education and learning is represented as an important facet of education, learning and the lifelong learning approach to inclusive and sustainable development for local communities, people, and the entire global community (UIL, 2020). Adult education plays a significant role in boosting the education and lifelong learning needs of a larger population, such as adults, and other people who might have been left behind in the educational and learning development agendas of countries in the world, especially the developing ones. With a solid foundation for adult education and learning, a stronger infrastructure is built (United Nations, 2015; UIL, 2009) in areas such as health literacy, numeracy skills, environmental sustainability, science and technology for development. This is necessary for transforming people, communities and groups by enhancing capacities and fighting pandemics such as the coronavirus (Day, 2020; UIL, 2020; Wang et al., 2020). In Ghana, efforts of the government and its educational sector, including the Ministry of Education, Ghana Education Service (GES) and other state bodies have been important for transforming adult education and learning in the country to cover many people and parts of the country, including rural communities.

Educational institutions, including the University of Ghana's School of Continuing and Distance Education, University of Cape Coast's College of Distance Learning and Adult Education and Learning Institutions and Colleges in the county have played a vital role in training and imparting knowledge, skills, and practical training for a large number of the adult population and part of the youth who were previously left behind in the educational and learning system of the country (Biney & Okai-Mensah, 2017; Oduro-Mensah & Biney, 2014). This has been significant for the capacity building, self-development, personal wellbeing, and public-driven knowledge for many people in the country. Thus, this has been important for combating the coronavirus in the country, with many people and adults having



essential knowledge and skills on the preventive measures for limiting the spread and escalation of the virus. The measures have included the practice of hand washing, social distancing, the wearing of masks, and mechanisms on checking the movement of people to promote safety practices.

According to the UIL (2020), the United Nations Educational, Cultural and Scientific Organization see adult education as a potential and significant space for promoting development and sustainability agendas. This is in terms of enhancing political, economic, social, cultural, environmental growth, communication and information technology for all people and countries of the world, especially developing economies. In this regard, the “Education for All” Agenda, which is spearheaded by UNESCO, is an important step that was meant to make adult education, learning, training, and overall lifelong learning accessible and inclusive for all people, especially for the adult population and women who have been left out (UIL, 2009, p.67) of the educational, national, and global literacy development.

Developing countries are the focus when it comes to the “Education for All” Agenda, because in most developing economies there is a widespread illiterate adult population who have been excluded from local and global educational goals (UIL, 2020). This goes a long way to hinder the fight for a sustainable development in developing countries, including Ghana. In Ghana, notwithstanding the efforts of governments and educational institutions at pushing for a widespread adult education and learning, there are still large numbers within the adult population who are left out in the educational and learning agenda, and as such lack the needed basic knowledge, numeracy skills, reading and writing skills, as well information and technology-driven knowledge. These skills are required for the purposes of promoting community and the broad national development agenda, which is expected to be accessible and inclusive in nature for all individuals, groups, the adult population, and young people in the country.

Adult education therefore has a substantial role to play in promoting health development and growth in any country of the world. Absence of comprehensive lifelong learning, encompassing adult education that addresses the diverse needs of all learners, hinders the advancement of quality healthcare objectives, especially for marginalized populations within communities and worldwide (Lopes, 2020; McKay, 2020; Lyons & DeLange, 2016). It has been noted by Amina Osman et al. (2017, p.23) that adult education plays a pivotal role in providing opportunities for individuals and groups, and a country’s health and development needs.

Thus, with a large population of the country trained and educated adequately, it becomes easier to promote sustainable healthcare for the population, which in turn makes room for individual, group, and national development of the people (McKay, 2018). Thus, a mutually reinforcing relationship emerges between adult education and health development. Promoting inclusive education, particularly for marginalized populations, enhances both a country’s well-being and healthcare advancement (UIL, 2020; UIL, 2009). Further to this, the wellbeing and sustainability of a country to an extent depends on how best the country can safeguard the people’s health (Amina Osman et al., 2017; United Nations, 2015) and ensure the provision of quality and adequate education in all its dimensions for the larger population.

Furthermore, education and the promotion of adult education and learning could be seen to have a clear relationship with health development and growth (Lopes, 2020). Adult education provides people and groups with life skills and comprehensive knowledge within basic



literacy, numeracy, and technological development, which is significant when preparing to combat a disease outbreak in a community. Through information dissemination and adult education practices, a lot of people can gain substantial knowledge on how to handle emergencies such as taking precautionary measures during pandemics (UIL, 2020; Amina Osman et al., 2017); and in the case of the coronavirus, protecting themselves from the virus and complying with safety measures that are provided on various media outlets, including print and digital platforms. Others can learn practices on good nutrition, adequate exercising and attending to the needs of emergency response in their communities and beyond.

With the outbreak of the coronavirus, it could be seen that a lot of adults were able to understand the measures and systems that were put in place to limit the spread of the virus in Ghana (Kumbeni et al., 2021; Lettor & Akunvane, 2021). This, to an extent, was the result of the efforts that have been implemented and pushed forward by the government, communities, and educational institutions in educating and training sectors of the population on basic literacy, numeracy and technological knowledge required to deal with emergencies, health challenges, and to be able to respond to the outbreak of pandemics in communities and at the national level (Apanga et al., 2021; Kabiri et al., 2021). De Sousa Santos (2020) makes an important point that the outbreak of the coronavirus pandemic has brought devastating consequences on many economies of the world, which he argues has been the deep focus on the market economy, giving less room to promoting equality in terms of people's health needs, education, and other basic needs, especially in developing countries.

A focus on the market is important, however at the same time is it imperative for all governments, key stakeholders, and policy makers to see to the promotion of the basic needs and concerns of the people, including health, inclusive and quality adult education, shelter, access to quality water and source of income (Bowleg, 2020; UIL, 2020; United Nations, 2015; UIL, 2009). This is particularly significant during emergencies and pandemics like the coronavirus, where vulnerable individuals and groups, such as children, women, and adults can lose their livelihoods, leading to dire circumstances.

Conclusion

The study has examined the role and impact of adult education and learning in combating the coronavirus. From the study, it is evident that adult education and learning plays a significant role in the fight against pandemics and in this case the coronavirus. A strong relationship is seen between the promotion of education, particularly adult education and learning, and the benefits of sustainable health. The wellbeing of a country's people is seen to a large extent to depend on how best it can provide education and health that is of adequate quality and accessible and inclusive for all its population both in the rural and urban settings. With a lot of people, particularly adults and women, having the benefits of adult education and learning which is holistic and encompasses all aspects, including social, economic, political, health, cultural, science, information, and communication technology knowledge, it paves way for the people to have the preparedness to respond to the outbreak of pandemics, such as the coronavirus.

In this sense, many of the people, especially adults and women, can receive and comprehend strategies and measures that are significant for combating and preventing the spread and escalation of the virus by employing safety measures, including social distancing, the wearing of face/nose masks, restriction of movements, etc., that are all significant for mitigating the pandemic. It has also been seen that comprehensive education of the country's population through adult education and lifelong learning was significant for combating the virus. This



was evident at the time when the virus was problematic in the country, as the education and training of the larger population in communities for the adults and women who are more vulnerable during pandemics, helped a lot in the campaign against the spread of the virus.

A collective effort and approach from the government, policy makers, and major stakeholders, including educational institutions, civil society, and non-governmental organizations, in strengthening and making adult education and learning inclusive, accessible, affordable, and of quality for all, especially for the adult population who have been left behind in the educational development of the country will be significant for promoting efficient education for all. This will be very beneficial for sustaining the country's development, and its response to emergencies and pandemics.

Future Research Directions

Future research can enhance understanding by combining quantitative and qualitative methods to explore the practical ways adult education can effectively combat pandemics. This is crucial for advancing our knowledge of how inclusive adult education reaches a broader population. By constructing a comprehensive knowledge framework spanning social, political, economic, cultural, health, environmental, and technological domains, we can empower people, especially adults and women, to develop essential capacities.

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Conflict of Interest

The authors report no conflict of interest.

References

- Akyeampong, K. (2009) Revisiting Free Compulsory Universal Basic Education (FCUBE) in Ghana. *Comparative Education*, 45(2),175-195.
- Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience. *American Behavioral Scientist*, 59(2), 254–269. <https://doi.org/10.1177/0002764214550299>.
- Anderson, R. M. (2020). How will country-based mitigation measures influence the course of the COVID-19 epidemic? *The Lancet*, 395(10228), 931–934. [https://doi.org/10.1016/S0140-6736\(20\)30567-5](https://doi.org/10.1016/S0140-6736(20)30567-5).
- Apanga, P. A., Lettor, I. B. K., & Akunvane, R. (2021). Practice of COVID-19 Preventive Measures and Its Associated Factors among Students in Ghana. *Am. J. Trop. Med. Hyg.*, 104(2), 526-531.[doi:10.4269/ajtmh.20-1301](https://doi.org/10.4269/ajtmh.20-1301).
- Baumgartner, L. M., & Sandoval, C. L. (2018). “Being a presence to each other”: Adult educators who foster empowerment with incarcerated women. *Adult Education Quarterly*, 68(4), 263-279. <https://doi.org/10.1177/0741713618774412>.
- Bell, C. (2020). COVID-19 and violent conflict: Responding to predictable unpredictability. Just Security, Art. 69340. Retrieved 01 July 2022 from <https://www.justsecurity.org/69340/covid-19-and-violent-conflict-responding-to-predictable-unpredictability/>.



- Biney, I. K., & Okai-Mensah, C. K. (2017). Lifelong Learning and National Development: The Case of Ghana. *International Journal of Development and Sustainability*, 6(7), 333-349.
- Boseley, S. (2020). More than 1,700 health workers infected by coronavirus in China. *The Guardian*, 14 February. Retrieved 01 July 2022 from <https://www.theguardian.com/world/2020/feb/14/more-than-1700-health-workers-infected-by-coronavirus-in-china>.
- Boulle, A., Bock, P., Osler, M., Cohen, K., Channing, L., Hilderbrand, K., Mothibi, E., Zweigenthal, V., Slingers, N., Cloete, K., & Abdullah, F. (2008). Antiretroviral therapy and early mortality in South Africa. *Bulletin of the World Health Organization*, 86(9), 657–739. Retrieved 30 June 2022 from <https://www.who.int/bulletin/volumes/86/9/07-045294/en/>.
- Bowleg, L. (2020). We are not all in this together: On COVID-19, intersectionality, and structural inequality. *American Journal of Public Health*, 110(7), 917. <https://doi.org/10.2105/AJPH.2020.305766>.
- Brinca, P., Duarte, J., & Faria-e-Castro, M. (2020). Is the COVID-19 pandemic a supply or a demand shock? *Economic Synopses*, 31. <https://doi.org/10.20955/es.2020.31>.
- Brookfield, S. (1986). *Understanding and facilitating adult learning: A Comprehensive analysis of principles and effective practices*. Jossey-Bass.
- Brookfield, S. (1987). *Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting*. Jossey-Bass.
- Center for Disease Control. (2020). Coping with stress. Centers for Disease Control and Prevention. https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/managing-stress-anxiety.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprepare%2Fmanaging-stress-anxiety.html.
- Chamlee-Wright, E. (2010). The cultural and political economy of recovery: Social learning in a post-disaster environment. <https://ebookcentral-proquest-com.proxy.lib.utk.edu>.
- Cranton, P. (2009). From tradesperson to teacher. In J. Mezirow and E. Taylor (Eds.), *Transformative learning in practice: Insights from community, workplace, and education* (1st ed. pp. 182-190). Jossey-Bass.
- Crumley, G., & Schutz, H. (2011). Short-duration mindfulness training with adult learners. *Adult Learning*, 22(2), 37–42. <https://doi.org/10.1177/104515951102200206>.
- Day, M. (2020). Covid-19: Surge in cases in Italy and South Korea makes pandemic look more likely. *British Medical Journal*, 368, m751. <https://doi.org/10.1136/bmj.m751>.
- De Sousa Santos, B. (2020). *A Cruel Pedagogia do Vírus* [The cruel pedagogy of the virus]. Retrieved 01 July 2022 from <https://mega.nz/folder/KocEAK4D#wbKK76PMfpLm9T SWNEB EkA/file/781jSKKC>.
- Depoux, A., Martin, S., Karafillakis, E., Preet, R., Wilder-Smith, A., & Larson, H. (2020). The pandemic of social media panic travels faster than the COVID-19 outbreaks. *Journal of Travel Medicine*, taaa031. <https://doi.org/10.1093/jtm/taaa031>.
- Donge, J. (2003). *Into the Black Box of Ghanaian Education: Why do increase inputs not lead to better educational outputs?* The Hague: ISS.
- Drain, P. (2015). Implications of repealing the Cuban embargo for US medicine and public health. *American Journal of Public Health*, 105(11), 2210–2211. <https://doi.org/10.2105/AJPH.2015.302894>.
- Economist (2020). Unequal protection: American inequality meets Covid-19. *The Economist*, 18 April. Retrieved 29 06/ 2022 from <https://www.economist.com/united-states/2020/04/18/american-inequality-meets-covid-19>.



- Fasokun, T., Katahoire, A., & Oduaran, A. (2005). *The Psychology of Adult Learning in Africa*. CapeTown: Pearson Education.
- Faure, E., Herrera, F., Kaddoura, A-R., Lopes, H., Petrovsky, A. V., Rahnema, M., & Ward, F.C. (1972). *Learning to be: The World of Education Today and Tomorrow*. Paris: UNESCO.
- Field, J. (2000). *Lifelong Learning and the New Educational Order*. Stoke on Trent: Trentham Books.
- Fortune (2020, April 9). <https://fortune.com/2020/04/09/ureal-unemployment-rate-jobless-claims-this-week/>. (Accessed on 01/07/2022).
- Greenhalgh, T., Schmid, M. B., Czypionka, T., Bassler, D., & Gruer, L. (2020). Face masks for the public during the covid-19 crisis. *British Medical Journal*, 369, m1435. <https://doi.org/10.1136/bmj.m1435>.
- Hageman, J. R. (2020). The coronavirus disease 2019 (COVID-19). *Pediatric Annals*, 49(3): e99–e100. <https://doi.org/10.3928/19382359-20200219-01>.
- Handmer, J., Van der Merwe, M., & O'Neill, S. (2019). The risk of dying in bushfires: A comparative analysis of fatalities and survivors. *Progress in Disaster Science*, 1, Art. 100015. <https://doi.org/10.1016/j.pdisas.2019.100015>.
- Henley, J. (2020). Coronavirus precautions around Europe. *The Guardian*, 4 March. Retrieved 30 March 2020 from <https://www.theguardian.com/world/2020/mar/04/coronavirus-precautions-around-europe>.
- Himmelstein, D. U., & Woolhandler, S. (2016). Public health's falling share of US health spending. *American Journal of Public Health*, 106(1), 56–57. <https://doi.org/10.2105/AJPH.2015.302908>.
- Human Rights Watch (HRW) (2020). US: Address impact of Covid-19 on poor virus outbreak highlights structural inequalities. *Human Rights Watch*, 19 March [online article]. Retrieved 29 June 2022 from <https://www.hrw.org/news/2020/03/19/us-address-impact-covid-19-poor>.
- Huang, S. (2020). COVID-19: Why we should all wear masks – there is new scientific rationale. *Medium* [blogpost 27 March]. Retrieved 28 June 2022 from <https://medium.com/@Cancerwarrior/covid-19-why-we-should-all-wear-masks-there-is-new-scientific-rationale-280e08ceee71>.
- International Labour Organization (ILO) (1993). *Resolution concerning statistics of employment in the informal sector adopted by the Fifteenth International Conference of Labour Statisticians* (January 1993). Geneva: ILO. Retrieved 27 June 2022 from https://www.ilo.org/wcmsp5/groups/public/dgreports/stat/documents/normativeinstrument/wcms_087484.pdf.
- Jones, D. S. (2020). History in a crisis – lessons for Covid-19. *The New England Journal of Medicine*, 382, 1681–1683. <https://doi.org/10.1056/NEJMp2004361>.
- Kabir, M., Baffoe, A., Adusei Poku, S., Ofori, K., Adusei, K. O., & Puplampu, P. (2021). Knowledge, Attitude and Practices of COVID-19 Prevention among Adults 18 Years and Above in Kintampo North Municipality, Ghana. *Journal of Infectious Disease and Epidemiology*, 7, 228, 1-16.
- Kock, R. A., Karesh, W. B., Veas, F., Velavan, T. P., Simons, D., Mboera, L. E. G. Dar O, Arruda LB, Zumla A. (2020). 2019nCoV in context: Lessons learned? *The Lancet Planetary Health*, 4(3), E87–E88. doi: 10.1016/S2542-5196(20)30035-8. Epub 2020 Feb 7. PMID: 32035507; PMCID: PMC7128686.
- Kumbeni, M. T., Apanga, P. A., Yeboah, E. O., Lettor, I. B. K. (2021). Knowledge and preventive practices towards COVID-19 among pregnant women seeking antenatal



- services in Northern Ghana. *PLoS ONE*, 16(6). e0253446.org/10.1016/S2542-5196(20)30035-8.
- Lachance, J., Emond, G., & Vinit, F. (2019). Learning to be a sensitive professional: A life-enhancing process grounded in the experience of the body. *Adult Education Quarterly*, 69(1), 24-41. <https://doi.org/10.1177/0741713618807752>.
- Lichtman, G. (2014). #EdJourney: A roadmap to the future of education. <https://ebookcentral-proquestcom.proxy.lib.utk.edu>.
- Lyons, K. E., & DeLange, J. (2016) Mindfulness matters in the classroom: The effects of mindfulness training on brain development and behavior in children and adolescents. In K. A. Schonert-Reichl and R. W. Roeser (Eds.), *Handbook of mindfulness in education: Mindfulness in behavioral health* (pp. 271-283). Springer. https://doi.org/10.1007/978-1-4939-3506-2_17.
- Lancet, The. (2020). Editorial: COVID-19: Too little, too late? *The Lancet*, 395(10226), 755. [OI:https://doi.org/10.1016/S0140-6736\(20\)30522-5](https://doi.org/10.1016/S0140-6736(20)30522-5)
- Laughland, O. (2020). A perfect storm: Poverty and race add to Covid-19 toll in US deep South. *The Guardian*, 12 April. Retrieved 28 June 2022 from <https://www.theguardian.com/us-news/2020/apr/12/coronavirus-us-deep-south-poverty-race-perfect-storm>.
- Legido-Quigley, H., Asgari, N., Teo, Y. Y., Leung, G. M., Oshitani, H., Fukuda, K., Cook AR, Hsu LY, Shibuya K, Heymann D. (2020). Are high-performing health systems resilient against the COVID-19 pandemic? *The Lancet*, 395(10227), 848–850. [https://doi.org/10.1016/S0140-6736\(20\)30551-1](https://doi.org/10.1016/S0140-6736(20)30551-1).
- Leung, C. C., Lam, T. H., & Cheng, K. K. (2020). Mass masking in the COVID-19 pandemic: People need guidance. *The Lancet*, 395(10228), 945. [https://doi.org/10.1016/S0140-6736\(20\)30520-1](https://doi.org/10.1016/S0140-6736(20)30520-1).
- Lopes, H. (2019). ALE is the key for a healthy world. Paper presented at the capacity-building workshop “Developing education systems from a lifelong learning perspective”, held from 28 October to 8 November 2019 at Shanghai Open University in China. <https://doi.org/10.13140/RG.2.2.34102.86084>.
- Lonie, J. M., & Desai, K. R. (2015). Using transformative learning theory to develop metacognitive and self-reflective skills in pharmacy students: a primer for pharmacy educators. *Curr Pharm Teach Learn*, 7, 669–675.
- Lopes, H. (2020). Keynote presentation at the 2nd “UNESCO Learning cities respond to COVID-19” webinar, 24 March. <https://en.unesco.org/events/webinar-unesco-learning-cities-respond-covid-19> (Accessed on 01/07/2022).
- Lopes, H., & Middleton, J. (April, 2020). ASPHER Statement on the strategic use of masks. Brussels: Association of Schools of Public Health in the European Region (ASPHER). <https://doi.org/10.13140/RG.2.2.25528.70403>.
- Lopes, H., Middleton, J., Martin Moreno, J., Chambaud, L., Davidovich, N., Barros, H., Signorelli, C., & Woodhead, T. (2020a). Strategic use of masks as an element of a non-pharmaceutical measures set for a pandemic. ASPHER Technical Report, April 2020. Brussels: Association of Schools of Public Health in the European Region (ASPHER). <https://doi.org/10.13140/RG.2.2.25214.13125>.
- Lopes, H., Middleton, J., Guchteneare, A., & Franco, D. (2020b). ASPHER statement on the use of masks by children. Brussels: Association of Schools of Public Health in the European Region (ASPHER). <https://doi.org/10.13140/RG.2.2.17790.61762>.
- Taylor, E.W. (2007). An update of transformative learning theory: a critical review of the empirical research (1999–2005). *Int J Lifelong Educ.*, 26,173–191.



- Mafuma, N. (2020). Covid-19: Community healthcare workers vital to South Africa's response. *The Daily Maverick*, 21 April. Retrieved 28 June 2022 from <https://www.daily-maverick.co.za/article/2020-04-21-covid-19-community-healthcare-workers-vital-to-sas-response/>.
- Mao, F. (2020). Coronavirus panic: Why are people stockpiling toilet paper? *BBC News*, 4 March. Retrieved 01 July 2022 from <https://www.bbc.com/news/world-australia-51731422>.
- Marzocchi, A. (2020). Coronavirus, muore sindaco nel Bergamasco. In città è emergenza: “Una sepoltura ogni mezz’ora, sembra una uerra”. E il crematorio lavora 24 ore al giorno [Coronavirus, mayor dies in Bergamasco. The city is in a state of emergency: “A funeral every half hour, it seems like a war”. And the crematorium works 24 hours a day]. *Il Fatto Quotidiano*. Retrieved 01 July 2022 from <https://www.ilfattoquotidiano.it/2020/03/14/coronavirus-muore-sindaco-nel-bergasco-in-citta-e-emergenza-una-sepol-tura-ogni-mezzo-ra-sembr-a-una-guerra-e-il-crematorio-lavora-24-ore-al-giorno/5736518/>.
- McKay, V. I. (2018). Literacy, lifelong learning, and sustainable development. *Australian Journal of Adult Learning*, 58(3), 390–425. Retrieved 29 July 2022 from <https://files.eric.ed.gov/fulltext/EJ1199862.pdf>.
- McKay, V. I. (2019). Communities in action: The participation of communities in two South African literacy campaigns. In I. Eloff (Ed.), *Handbook of quality of life in African societies*. (pp. 23–44). Cham: Springer. https://doi.org/10.1007/978-3-030-15367-0_2.
- McKay, V. I. (2020). Learning for development: Learners' perceptions of the impact of the Kha Ri Gude Literacy Campaign. *World Development*, 125, Art. 104684. <https://doi.org/10.1016/j.worlddev.2019.104684>.
- McKay, V., Mokotong, E., & Sham, B. (2003). *Our graves are open: Report on the prevention of HIV/Aids in the informal sector in South Africa*. Compiled on behalf of the International Labour Organisation. Pretoria: International Labour Organisation. Retrieved 28 August 2023 from https://www.researchgate.net/publication/335402316_Our_graves_are_open_Report_on_the_prevention_of_HIV_Aids_in_the_informal_sector_in_South_Africa_Compiled_on_behalf_of_the_International_Labour_Organisation
- McKay, V., & Romm, N. (2007). A systemic approach to addressing HIV/AIDS in the informal economy in Zambia: Methodological pluralism revisited. *International Journal of Applied Systemic Studies*, 1(4), 375–397. <https://doi.org/10.1504/IJASS.2007.019302>.
- McKay, V., & Romm, N. (2008). Active research towards the addressal of HIV/AIDS in the informal economy in Zambia: Involvements in social development. *Action Research*, 6(2): 149–170. <https://doi.org/10.1177/1476750307087050>.
- Middleton J, Martin-Moreno JM, Barros H, Chambaud L, Signorelli C (2020). ASPHER statement on the novel coronavirus disease (COVID-19) outbreak emergency. *International Journal of Public Health*, 65(3), 237–238. <https://doi.org/10.1007/s00038-020-01362-x>.
- Ministry of Education (MoE) (2020). Covid-19 Coordinated Education Response Plan for Ghana. Accra: Ministry of Education.
- Mukhalalati, B. A., & Taylor, A. (2019). Adult Learning Theories in Context: A Quick Guide for Healthcare Professional Educators. *J Med Educ Curric Dev*. Doi: 10.1177/2382120519840332. PMID: 31008257; PMCID: PMC6458658.



- Nakkazi, E. (2019). South Africa reports successful third-line HIV treatment programme. *NamAIDSmap*. Retrieved 29 June 2022 from <http://www.aidsmap.com/news/jan-2019/south-africa-reports-successful-third-line-hiv-treatment-programme>.
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): a review. *Int J Surg*, 78, 185–193.
- Nutbeam, D. (2000). Health literacy as a public health goal: A challenge for contemporary health education and communication strategies in the 21st century. *Health Promotion International*, 15(3), 259–267. <https://doi.org/10.1093/heapro/15.3.259>.
- Nutbeam, D. (2015). Defining, measuring, and improving health literacy. *Health Evaluation and Promotion*, 42(4), 450–456. <https://doi.org/10.7143/jhep.42.450>.
- Oduro-Mensah, D., & Biney, I. K. (2014). Strengthening Lifelong Education for Development: The Case of Ghana. *PAACE Journal of Lifelong Learning*, 23, 73-84.
- Oduro-Mensah, D. (2004). Philosophical Basis of Adult Education in Ghana. In, Asiedu, K., Adoo Adeku, K., and Amedzro, A. K. (Eds.), *The Practice of Adult Education in Ghana*, 3-18.
- Organisation for Economic Co-operation and Development (OECD) (2020). OECD interim economic assessment. Coronavirus: The world economy at risk. Interim Report March 2020. *OECD Economic Outlook*, 2019, Supplement 2. <https://doi.org/10.1787/7969896ben>.
- Osman, A., Ladhani, S., Findlater, E., & McKay, V. I. (2017). *Curriculum framework for the sustainable development goals*. London: Commonwealth Secretariat. Retrieved 29 June 2022 from https://www.thecommonwealth-educationhub.net/wp-content/uploads/2017/01/Curriculum_Frame_work_for_SDGs_July_2017.pdf.
- Oxford University Press (OUP) (n.d.). Vector. In *Lexico.com*, Detroit, MI: Lexico. com. Retrieved 01 July 2022 from <https://www.lexico.com/definition/vector>.
- Porta, M. (Ed.). (2014). *A dictionary of epidemiology* (6th ed.). New York: Oxford University Press.
- Remuzzi, A., & Remuzzi, G. (2020). COVID-19 and Italy: What next? *The Lancet*, 395, 1125–1128. [https://doi.org/10.1016/S0140-6736\(20\)30627-9](https://doi.org/10.1016/S0140-6736(20)30627-9).
- Torre, D. M., Daley, B. J., Sebastian, J. L., & Elnicki, D. M. (2006). Overview of current learning theories for medical educators. *Am J Med.*, 119, 903–907.
- The Washington Post (2020, April 4). <https://www.washingtonpost.com/climate-environment/2020/04/04/native-american-coronavirus/>. (Accessed on 29/06/2022).
- Thompson, E. E. (2019). Communicating a health risk/crisis: Exploring the experiences of journalists covering a proximate pandemic. *Science Communication*, 41(6), 707–731. <https://doi.org/10.1177/1075547019878875>.
- UNESCO Institute for Lifelong Learning (UIL) (2017). *Literacy and numeracy from a lifelong learning perspective*. UIL Policy Brief 7. Hamburg: UNESCO Institute for Lifelong learning. Retrieved 01 July 2022 from <https://unesdoc.unesco.org/ark:/48223/pf0000247094>.
- UNESCO Institute for Lifelong Learning (UIL) (2018). *The power of adult learning and education; A vision towards 2030*. Suwon-Osan CONFINTEA VI Mid-Term Review Statement: Hamburg: UNESCO Institute for Lifelong Learning. Retrieved 28 June 2022 from <https://unesdoc.unesco.org/ark:/48223/pf0000261223>.
- UNESCO Institute for Lifelong Learning (UIL) (2020). *Adult education and the challenge of exclusion*. UIL Policy Brief 10. Hamburg: UNESCO Institute for Lifelong learning.



Retrieved 28 June 2022 from <https://unesdoc.unesco.org/ark:/48223/pf0000372904>.

- UNESCO Institute for Lifelong Learning (UIL) (2009). *Global report on adult learning and education*. Hamburg: UNESCO Institute for Lifelong learning. Retrieved 28 June 2022 from <https://unesdoc.unesco.org/ark:/48223/pf0000186431>.
- UNESCO Institute for Lifelong Learning (UIL) (2012). *UNESCO Guidelines for the recognition, validation, and accreditation of the outcomes of non-formal and informal learning*. UIL/2012/PI/H/3rev2. Hamburg: UNESCO Institute for Lifelong Learning, Hamburg. Retrieved 29 June 2022 from <https://unesdoc.unesco.org/ark:/48223/pf0000216360>.
- United Nations Educational and Cultural Organization Institute of Lifelong Learning (2020, June 24). New in IRE-Adult Learning and Education and the Covid-19 Pandemic. UNESCO Institute for Lifelong Learning.
- United Nations (UN) (2015). *Transforming our world: The 2030 Agenda for sustainable development*. A/RES/70/1. New York: UN. Retrieved 28 July 2022 from <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>.
- United Nations Development Programme. (2007). *Ghana's Human Development Report, 2007: Towards a More Inclusive Society*. Accra: UNDP.
- Vandemoortele, J., & Delamonica, E. (2000). The “education vaccine” against HIV. *Current Issues in Comparative Education*, 3(1). Retrieved 30 June 2022 from https://www.tc.columbia.edu/cice/pdf/25676_3_1_VandemoorteleDelamonica.pdf.
- Vargas, J. G. (Ed.). (2020). *Emergencias pandémicas en un mundo globalizado: amenazas a la seguridad [Pandemic emergencies in a globalized world: security threats] Colección uadernos de Estrategia (series)* (Vol. 203). Madrid: Instituto Español de Estudios Estratégicos (IEEE).
- Wang, H., Wang, Z., Dong, Y., Chang, R., Xu, C., Yu, X., Zhang, S., Tsamlag, L., Shang, M., Huang, J., Wang, Y., Xu, G., Shen, T., Zhang, X., & Cai, Y. (2020). Phase-adjusted estimation of the number of Coronavirus disease 2019 cases in Wuhan, China. *Cell Discovery* 6, Art. 10. <https://doi.org/10.1038/s41421-020-0148-0>.
- World Health Organization (WHO) (n.d.). Ebola virus disease [dedicated webpages]. Geneva: World Health Organization. Retrieved 01 July 2022 from https://www.who.int/health-topics/ebola/#tab=tab_1.
- World Health Organization (WHO) (2007). *Questions and answers on avian influenza in relation to animals, food, and water*. Geneva: World Health Organization. Retrieved 01 July 2022 from https://www.who.int/foodsafety/areas_work/zoonose/avian/en/index1.html.
- World Health Organization (WHO) (2016). *World health statistics 2016: Monitoring health for the SDGs*. Geneva: World Health Organization. Retrieved 29 June 2022 from https://www.who.int/gho/publications/worldhealth_statistics/2016/en/.
- World Health Organization (WHO) (2018). Zika virus [dedicated webpage]. Geneva: World Health Organization. Retrieved 01 July 2022 from <https://www.who.int/news-room/fact-sheets/detail/zika-virus>.
- World Health Organization (WHO) (2020a). Mental health and psychosocial considerations during COVID-19 outbreak. WHO/2019nCoV/MentalHealth/2020 Geneva: World Health Organization. Retrieved 01 July 2022 from https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf?sfvrsn=6d3578af_8.
- World Health Organization (WHO) (2020b). *Report of the WHO-China joint mission on coronavirus disease 2019 (COVID-19)*. Geneva: World Health Organization. Retrieved



29 June 2022 from <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>.

- World Health Organization (WHO) (2020c). Global Health Expenditure Database. Geneva: World Health Organization. Retrieved 01 July 2022 from <https://apps.who.int/nha/database>.
- World Health Organization (WHO) (2020d). Dengue and severe dengue. Geneva: World Health Organization. Retrieved 30 June 2022 from <https://www.who.int/news-room/factsheets/detail/dengue-and-severe-dengue>.
- World Health Organization (WHO) (2020e). WHO Director-General’s Statement on IHR Emergency Committee on Ebola Virus Disease in the Democratic Republic of the Congo. Geneva: World Health Organization. Retrieved 28 August, 2023 from <https://www.who.int/news-room/detail/14-04-2020-who-director-general-s-statement-on-ihr-emergency-committee-on-ebola-virus-disease-in-the-democratic-republic-of-the-congo>
- Wintour, P. (2020). “An absolute disaster”: Iran struggles as coronavirus spreads. *The Guardian*, 3 March. Retrieved 01 July 2022 from <https://www.theguardian.com/world/2020/mar/03/an-absolute-disaster-iran-struggles-as-coronavirus-spreads>.
- Wu, Z., & McGoogan, J. M. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA*, 323(13), 1239-1242. <https://doi.org/10.1001/jama.2020.2648>.
- Yang, J., Schneller, C., & Roche, S. (2015). Introduction, In Yang, J., Schneller, C. and Roche, S. (Eds.), *The Role of Higher Education in Promoting Lifelong Learning*. Hamburg: UNESCO Institute of Learning, 7-15.
- Yee, J., Unger, L., Zadravec, F., Cariello, P., Seibert, A., Johnson, M. A., Fuller M.J. (2020). Novel coronavirus 2019 (COVID-19): Emergence and implications for emergency care. *Journal of the American College of Emergency Physicians Open*, 2020(1), 63–69. <https://doi.org/10.1002/emp2.12034>.
- Zhou P, Yang X-L, Wang X-G, Hu B, Zhang L, Zhang W., (2020). A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*, 579, 270–273.