

The Administration of Open, Distance and E-Learning (ODeL) in the Context of Environmental Sustainability and Human Mobility

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Abstract

The rate of population growth and global development are threatening the environment due to human activities propelled by survival instinct and ambitious innovations and transformations. These environmental threats are faced by both the global north and global south and manifest as environmental pollution (water, visual, land, soil, thermal, noise, air), rise in global temperature (global warming), release of carbons from industries and automobiles (ozone layer depletion) and disruption of the ecosystem due to deforestation and urbanization. There is a need for strategies to the adverse impacts of climate induced emergencies. The Open, Distance and E-learning (ODeL) system has attained a paradigm shift in recent years and has the potential to promote resilience during turbulent periods. This paper focuses on the enhancement of environmental sustainability through the technology of ODeL in mitigating and adapting to climate-related emergencies. This position paper viewed issues historically and holistically by sourcing secondary data from both print and online sources and arranged them into themes on specific areas for content analysis on the mitigating and adapting strategies that ODeL can use to achieve environmental sustainability. The study discovered that climate emergencies adversely affect the school's health, destroy school infrastructure and retard the teaching and learning process in the school system. The paper suggested green education through ODeL as a vehicle to deliver climate change education to the masses to sustain the environment.

Keywords: Education, Environment, Emergency, Learning, Sustainability

L'administration de l'enseignement ouvert, à distance et en ligne (ODeL) dans le contexte de la durabilité environnementale et de la mobilité humaine

Résumé

Le taux de croissance démographique et le développement mondial menacent l'environnement en raison des activités humaines propulsées par l'instinct de survie et les innovations et transformations ambitieuses. Ces menaces environnementales font face à la fois global et se manifestent par une pollution environnementale (l'eau, le visuel, la terre, le sol, le thermique, le bruit, l'air), une augmentation de la température mondiale (le réchauffement climatique), la libération de carbone par les industries et les automobiles (l'appauvrissement de la couche d'ozone) et la perturbation de l'écosystème grâce à la déforestation et à l'urbanisation. Il est nécessaire de mettre en place des stratégies pour faire face aux impacts négatifs des situations d'urgence induites par le climat. Le système d'enseignement ouvert, à distance et en ligne (EODL) a connu un changement de paradigme ces dernières années et a le potentiel de promouvoir la résilience pendant les périodes de turbulence. Cet article se concentre sur l'amélioration de la durabilité environnementale grâce à la technologie de l'EODL pour atténuer et s'adapter aux situations d'urgence liées au climat. Cette étude a examiné les problèmes de manière historique et holistique en s'approvisionnant en données secondaires provenant de sources imprimées et en ligne et en les organisant en thèmes sur des domaines spécifiques pour une analyse de contenu sur les stratégies d'atténuation et d'adaptation que l'ODeL peut utiliser pour atteindre la durabilité environnementale. L'étude a révélé que les urgences climatiques affectent négativement la santé de l'école, détruisent les infrastructures scolaires et retardent le processus d'enseignement et d'apprentissage dans le système scolaire. Le document a suggéré l'éducation verte par l'entremise de l'ODeL comme moyen de fournir une éducation au changement climatique aux masses pour préserver l'environnement.

Mots-clés : l'éducation, l'environnement, l'urgence, l'apprentissage, la durabilité

Introduction

The practice of preserving the natural environment at the individual, non-governmental and governmental levels for the benefit of the present and future generations is known as environmental protection. The rate of pollution, natural resource depletion, degradation and imbalance in the ecosystem have increased dramatically over the past decades¹. Humans and the environment are dependent on each other and the changes in the behaviour or activities of humans affect the environment just as climate changes also affect humans. Though the global north has modified practices that protect their environment the impacts of their activities are more felt in the global south. These environmental challenges are caused by both natural occurrences and artificial (human) activities including urbanization, depletion of natural resources, overpopulation, deforestation, pollution, chemical hazards, fossil burning and agricultural activities. These activities have created an imbalance in the ecosystem, which this made the environment vulnerable to disasters and disruptions.

Adequate orientation and awareness of safe environmental practices on the use of natural resources is lacking. Though environmental education was introduced, the coverage is limited to only the urban areas with rural, remote areas and marginalised people disenfranchised from this environment-friendly education.

There is a need to spread this environmental awareness and education to everyone without the barrier of geographical location by embracing the paradigm shift and the transformation in educational technology through open, distance and e-learning methodology on the mitigating and adapting strategies to global environmental emergencies. The development of science and technology though having a lot of negative impacts on the environment, is the main source of sustainable solutions to the impacts just like education is the most vulnerable sector impacted adversely by the climate crisis, education is also a major channel of sustainable solutions to environmental challenges.

ODeL can be accessed in different forms synchronously or asynchronously through the virtual classroom, online courses, teacher-student and student-student interactive portals to listen to lectures and instructions and to submit assignments, ask questions and discuss through the use of internet-enabled digital devices like the laptop, tablets, smartphones or Ipad.

¹ Harding, R. Ecological sustainability development: origins, implementation and challenges. *Desalinations*, 2006, 87(1-3), 229-239. <https://doi.org/10.1016/j.desal.2005.04.082>

According to Bosch², the second-generation internet availability makes portable communications available in our comfort zones making ODeL acceptable as the most accessible and flexible education methodology for global citizens in different conditions.

The following research questions were raised based on the mitigating and adaptive roles of ODeL in climate emergencies, human mobility and environmental sustainability.

RQ 1: What are the impacts of climate emergencies on the school system?

RQ 2: What roles does ODeL play in promoting environmental sustainability?

RQ 3: what roles does ODeL play in human mobility?

Objectives

This study aims to find out the mitigating and adaptive roles the administration of ODeL play in combating environment-related emergencies and the methodology of ODeL that can be used to deliver education in emergencies for a sustainable environment. Therefore, the specific purposes of this study are:

- i. To ascertain the impacts of climate emergencies on the school system.
- ii. To ascertain the roles ODeL plays in promoting environmental sustainability.
- iii. To ascertain the roles of ODeL in education continuation during human mobility.
- iv. To discuss the ways forward on environmental sustainability.

Materials and Methods

This conceptual paper sourced secondary data from both print and online resources on how the administration of Open, Distance and E-Learning enhances Climate Change Resilience in the context of Human Mobility and Environmental Sustainability by looking at issues historically and holistically.

² Bosch, T. E. Using online social networking for teaching and learning: Facebook use at the University of Cape Town. Communication: South African Journal for Communication Theory and Research, 2009, 35(2), 185-20

Concept of Open, Distance and E-Learning in Emergencies

According to Ayoko³, “Open, and e-learning (ODeL) are made up of three domains, which are: Open learning (Accessible to every citizen without discrimination or marginalization), Distance learning (No distance location or geographical barrier) and E-learning (Synchronously and asynchronously teaching and learning)”

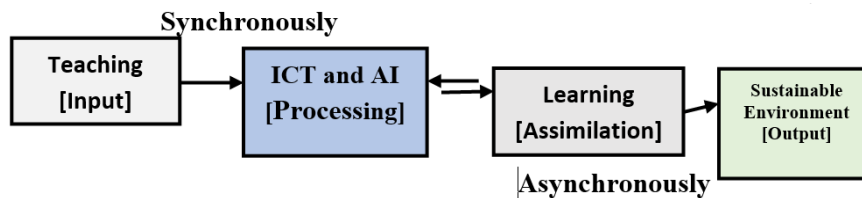


Fig. 1: Model of ODeL for Sustainable Development

Source: Ayoko et al. (2023)

Open, Distance and e-Learning (ODeL) is a mode of teaching and learning process that is delivered remotely through the use of information and communication technology. Students interact among themselves and with their instructors through internet connections from their different and safe locations. According to May⁴, sustainable education is possible through ODeL. ODeL can cover the gap in learning due to school closure that contributes to learning loss and educational inequalities experienced by vulnerable school children bringing a sense of normalcy and psychosocial balance which are critical to the students' wellbeing in emergencies.

As observed by Azeiteiro⁵, education for sustainable development (ESD) can be achieved through the use of ODeL technology. In climate emergencies such as flooding, global warming, hurricanes, climate-related pandemics and natural disasters, ODeL can be a critical bridge to sustain education continuity from any safe location because it allows accessibility, and flexibility, and provides quality education that can be delivered at the individual pace and schedule⁶. The intersections between ODeL and environmental sustainability are:

³ Ayoko, V.O. Open, Distance and e-Learning (ODeL): A Panacea for Effective Actualization of Education for Sustainable Development Goal 4 (SDG4). World Scientific News, 2024, 192, 128-137 <https://worldscientificnews.com/about-us>

⁴ May, R., Cox, V., Kroder, S., & Franklin, G. The Overlooked Dimension of Sustainable Education. Online Submission. 2011. Retrieved from <http://eric.ed.gov/?id=ED529903>

⁵ Azeiteiro, U. M., Bacelar-Nicolau, P., Caetano, F. J. P., & Caeiro, S. Education for sustainable development through e-learning in higher education: Experiences from Portugal. Journal of Cleaner Production, 2015, 106, 308–319.

⁶ Tavukcu, T., Arap, I., & Ozcan, D. General overview of distance education concept. Procedia - Social and Behavioral Sciences, 2011,15, 3999–4004.

Accessibility: students and instructors can teach and learn from their safe locations through the use of artificial intelligence (AI) and information and communication technology (ICT).

Flexibility: the teaching and learning process can be delivered at an individual pace and scheduled synchronously or asynchronously, making it possible to balance education with crisis management.

Cost-effectiveness: It is cost-effective in the long run because the cost of transportation, energy usage, classroom maintenance and buildings are eliminated.

Personalization: It allows for the personal interest and needs of the learners.

In conclusion, ODEL can be a teaching-learning delivery method in crisis management for education continuity during climate-related and other emergencies because it can bridge the gap caused by disruptions in conventional classrooms.

Theoretical Framework

Theory of Sustainability: During the Agrarian period, the thought of sustainable development was born to ensure humans survive through agricultural production⁷. However, the Industrial Revolution ushers in an exponential increase in human population, a high rate of industrial production, and indiscriminate exploitation of natural resources and in return increase in environmental pollution through humans and industrial waste. The rapid human-induced environmental changes make it difficult to maintain balance in the ecosystem, and these have become hazardous for human survival⁸. This results in challenges such as shortages of food, drought, energy issues, environmental pollution and associated health issues, retard economic growths, ecological crisis and social conflicts⁹.

⁷ Zhou, H. (2009) The simple thought of sustainable development and practice in ancient China. *Li Lun Dao Bao*, 12, 39–44.

⁸ Kates, R.W & Parris, T.M (2003) Long-term trends and a sustainability transition. *Proc. Natl. Acad. Sci. USA*, 100, 8062–8067.

⁹ Lyons, R.A.; Rodgers, S.E.; Thomas, S.; Bailey, R.; Brunt, H.; Thayer, D.; Bidmead, J.; Evans, B.A.; Harold, P.; Hooper, M.; et al. (2016) Effects of an air pollution personal alert system on health service usage in a high-risk general population: A quasi-experimental study using linked data. *J. Epidemiol. Community Health*, 70, 1184–1190.

As a result of these problems, the search for lasting development and survival of humans and other members of the ecosystem became paramount¹⁰. This leads to the concept of sustainable development as a socioeconomic transformation guide¹¹.

The Sustainability concept is complex but very essential for the lasting survival of our planet. Better decisions and practices on environmental protection, natural resource exploitation, equity and inclusion, quality education, well-being and consideration for the future can be achieved through sustainable awareness. The major concepts in the sustainability theory are:

Interdependence: The society, economy and environment though independent are all interdependent and interconnected and decisions in one aspect can impact the others.

Equity: The need of the present must not compromise the needs of the future regardless of Gender, race, religion, status or nationality.

Resilience: The zeal to absorb stresses, trauma and shock and adapt to varying conditions and continuity abilities during crises and adversities.

Participation: All stakeholders must work towards achieving the global goal of sustainable futures

The theory is a concept that can sustain the future and present generation by making decisions that will be just on resource consumption and environmental protection for the continuity of human existence.

Results

RQ 1: What are the Impacts of Climate Emergencies on the School System?

Education is a right of our children and not a privilege. "The climate crisis is an education crisis". The ambition of providing quality and continuous education to children is affected by recurring climate crises such as droughts, wildfires, extreme heat, rising sea levels, floods and so on. The schools are the most affected because students spend most of their time in the school environment.

¹⁰ Zhao, J. (1991) The theoretical analysis of sustainable development. Ecol. Econ., 12–15.

¹¹ Klarin, T. (2018) The Concept of Sustainable Development: From its Beginning to the Contemporary Issues. Zagreb Int. Rev. Econ. Bus, 21, 67–94.

Climate-induced emergencies can lead to learning loss due to school closures during climate events such as overflowing, hurricanes and wildfires. These disruptions can also lead to mobility issues because it will be difficult for easy shuttle teachers and students to the schools. Climate emergency can also affect critical infrastructure such as power supplies and can cause serious damage to school buildings, teaching aids, and road network.

According to WHO¹², climate experiences such as heat waves, extreme precipitation and changes in seasonal and geographic characteristics affect the well-being of school children. The Heat stress caused by global warming due to the increase in global temperature affects the health and well-being of the students and teachers and makes it difficult for them to concentrate on the teaching and learning process. According to Vergunst¹³, "The threats associated with climate change can additively, interactively and cumulatively increase the risk of psychopathologies in the young, starting at conception and continuing right through to adulthood."

Both the direct and indirect impacts of climate emergencies on the health and nutrition of children can have adverse effects on their education. Food scarcity caused by droughts or wildfires can result in malnourishment which is linked to poor brain development in children. School children are most exposed to climate-related diseases caused by dehydration, heat rashes, extreme heat exposure and other environmental pollutants.

These can badly affect the cognitive and language abilities. climate events that compromise the water and sanitation of the school environment can lead to diseases like dysentery, cholera and diarrhoea among the students and teachers.

As opined by Paulson & Barnett¹⁴, climate crises such as air pollution-induced asthma can result in higher absenteeism of students and teachers and also those who are displaced or lost their place of residence and sources of livelihood may start to miss classes due to the socioeconomic effects. In addition, air pollutants can cause associated health issues such as dizziness, headaches, tiredness and loss of concentration in the classroom.

¹² World Health Organization (2009) *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks*. World Health Organization; Geneva, Switzerland

¹³ Vergunst, F et al. (2023) Climate Change and Children's Mental Health: A Developmental Perspective, *Clinical Psychological Science*. DOI: 10.1177/21677026211040787.

¹⁴ Paulson J & Barnett C (2010) Who's in charge of children's environmental health at school? *New Solut.*, 20, 3–23. doi: 10.2190/NS.20.1b.

Teachers job performance can be retarded while dealing with stress and adapting to the crisis. The zeal to deliver quality education will be diluted because the teachers are often worse hit by school-related climate emergencies. The financial implication of climate emergencies on the school, the host communities and the government to renovate, repair or reconstruct damages is a burden.

The impacts of climate emergencies on the parents are also carried down to the children.

The impact on the livelihood of parents results in the inability to pay school fees or cater for the educational requirements of the children. This may result in school dropout, child labour and child marriage. Climate displacement or migration can lead to permanent breaks from school because refugees or displaced people may not have access to education due to language, cultural or legislative barriers to the place of settlement.

RQ 2: What Roles does ODeL play in Promoting Environmental Sustainability?

In recent years, ODeL has attained a paradigm with many countries having Open Universities to give access to the population of admission seekers into higher education programmes.

According to Egwuasi¹⁵, universally, ODeL is a call to mass literacy, public orientation awareness and a strategy for delivering quality education as revealed by the current trend in Asia, Africa, European and American countries where courses like environmental technology, environmental management and environmental science that expose the learners to methods and practices of environmental maintenance and protection are thought in Open, Distance and e-Learning institutions. An example in India is Indra Gandhi National Open University (IGNOU) which creates sustainable agriculture and environmental awareness by offering training and courses for different segments of the society on biodiversity, environmental studies, food and nutrition security, environmental impacts assessment and sustainability science through its school of agriculture¹⁶.

¹⁵ Egwuasi, P. I., Emit, P. J & Obot, J. F (2006). "Preference for Open Distance Learning for Enhanced Access and Balanced Development in the 21st Century Nigeria" Nigerian Journal of Educational Administration and Planning. 6 (2), 190 -2039.

¹⁶ Anbalagan, G & Srivastava, R (2016) Developing Environmental Awareness Through Open and Distance Learning System. Pakistan Journal of Distance & Online Learning, 1(1), 49-57.

ODeL can also promote environmental sustainability by delivering regular courses or massive open and online courses (MOOC) on environmental-related courses such as green economy, behavioural modifications, geography, climate change, public health, sustainability, global warming, biodiversity, and ozone layer depletion.

The causes and impacts of environmental challenges, the behavioural change and best policies to mitigate and adapt to the unrecoverable changes in the environment and the skills and sustainability opportunities can be suggested¹⁷.

Taking part in Open, Distance and e-Learning projects and activities is another innovative way ODeL can promote environmental friendliness and awareness by directly engaging students in projects and activities that task them to analyse, explore or give suggestions and solutions to environmental problems. Examples are environmental case studies, games, discussions, simulations, puzzles and computer-based tests by collaborating with other learners, enthusiasts and climate experts from different locations or fields. This creates room for the promotion of global thinking and responsibilities, cross-breeding of experiences, ideas and perspectives on climate challenges and promotes teamwork, exposure, smooth relationships, communication channels, creativity and critical thinking on ways forward.

ODeL is a reservoir of various online tools, portals and platforms for climate change education and environmental awareness. Open educational resources (OER) are databases and repositories that house well-researched and relevant studies, resources and information on environmental topics.

Online visualising tools like maps, calculators, charts and graphs can be channeled to estimate the impact and features of environmental occurrences. Networking activities to link and communicate with peers can be achieved through ODeL forums and communities. ODeL can deliver a wide range of innovative resources on environmental education to different locations even in the remotest areas through webinars and e-learning events and conferences, e-learning courses, scholarships, grants and vacancies in the environmental domain. According to Anbalagan¹⁸, the environmental awareness of teachers teaching in ODeL settings is important and current trends in environmental curriculum, evaluation methodology, instructional designs and material development can be done through the ODeL framework.

¹⁷ Harizan, M.D & Hilmi, M. F. (2019). Effectiveness of Distance Education on Sustainability from Learners' Perspective. *International Journal of Innovation, Creativity and Change*, 8(6), 167-181

¹⁸ Anbalagan, G & Srivastava, R (2016) Developing Environmental Awareness Through Open and Distance Learning System. *Pakistan Journal of Distance & Online Learning*, 1(1), 49-57

The discharge of life-threatening substances directly or indirectly into the environment is known as environmental pollution. Pollution can be caused both by natural and mostly by artificial means due to human activities. Pollution of the environment can have very hazardous implications on the entire ecosystem balance. The forms of environmental pollution are thermal pollution, noise pollution, visual pollution, water contamination, air pollution and land pollution. ODeL has the potential to positively control the rate of emission and deposit of pollutants to the environment.

According to Herring¹⁹, the ODeL as an environment-friendly initiative can reduce the rate of greenhouse gas emission and control global warming by reducing the rate of moving from one point to the other through the use of automobiles that emit carbon into the atmosphere.

ODeL methodology allows students and teachers to interact at their safe locations without the stress of movement. Furthermore,²⁰ in their study confirmed that e-learning courses can produce 90% less CO₂ emissions than traditional campus-based courses. The global efforts to protect the ecosystem and natural resources by the reduction of greenhouse gas emissions can be achieved through the methodology of ODeL by saving lands for construction and reserving the rate of water and energy consumption.

ODeL also preserves the forest by reducing the consumption of papers and other materials consumed in conventional schools by embracing soft copies more than hard copies in all academic and administrative processes. ODeL is cost-effective for the students, instructors and the institution because there are drastic reductions in the use of textbooks, school building construction, infrastructure purchase and maintenance and the rate of electricity consumption. Wastages are also reduced and natural resources are conserved, unlike in the traditional school system where piles of waste that are detrimental to the environment are generated. As observed by Campbell & Campbell²¹, ODeL prevents the use of public facilities and regular contact with people, this prevents contamination and transmission of infectious diseases. Taking courses through ODeL mode may result in positive behavioural change towards environmental

¹⁹ Herring, Horace and Roy, Robin (2007). Technological innovation, energy-efficient design and the rebound effect. *Technovation*, 27(4) pp. 194–203

²⁰ Roy, R. Potter, S. and Yarrow, K. (2004) Towards sustainable higher education: environmental impacts of conventional campus, print-based and electronic/open learning systems, in Murphy, D., Carr, R., Taylor, J., Wong, T.M. (eds.), *Distance Education & Technology: Issues and Practice*, OUHK Press, Hong Kong, 129-145

²¹ Campbell, J., & Campbell, D. (2011). Distance Learning is Good for the Environment: Savings in Greenhouse Gas Emissions. *Online Journal of Distance Learning Administration*, 14(4), 1-6

sustainability because ODeL has sustainability characteristics such as affordability, accessibility and equity.

RQ3: What are the Roles of ODeL in Human Mobility?

The phenomenon called human mobility is part of voluntary or forced events experienced by humans. The complex impacts of climate change on human mobility have attracted the attention of policymakers and researchers. Climate-related (im-)mobility such as displacement, planned relocation, forced migration and trapped population are of different types and each requires different mitigative and adaptative measures in terms of the impacts on lives, properties and pursuits. The mitigating roles of Open Distance eLearning (ODeL) in delivering quality educational opportunities to displaced people is crucial to their acquirement of new skills, qualifications and knowledge that can position them to quickly adapt to the new communities especially in locations without traditional schools to improve their chances of employment. ODeL can also support displaced individuals with resources to establish a network of like-minded by linking other displaced people with the needed information on human rights and the governing laws of their new environment. The flexibility and accessibility feature of ODeL makes it particularly the right mode of quality education for displaced individuals because it can be easily accessed from any location on the globe with internet facilities and can be personalised to the needs of the displaced people. ODeL has been channelled to support displaced people in the following instances:

Digital Skills Training: To position displaced people for better employment opportunities, non-governmental organizations such as the International Rescue Committee and Jesuit Refugee Service have taken advantage of ODeL to provide high-demand technical and vocational skills like digital marketing, coding, graphic design, baking, tailoring and data processing to displaced people

Virtual Higher Education: The University of Edinburgh's Refugee scholarship programme and the University of Geneva's online program for refugee students are examples of higher institutions that offer ODeL opportunities remotely for displaced people through the Virtual Higher Education initiative.

Language Learning: The European Commission's Online Language Support programme and the UNHCR's Talking Classrooms Initiative and Continuing Education are good examples of language learning initiatives through ODeL to assist

displaced people in becoming accustomed to the host communities' languages for easy integration and access to social services.

Refugee Education Programmes: the opportunity for youth and school children to access learning contents and educational resources through ODeL portals. An example is the Connected Learning in Crisis Consortium which uses the platform of ODeL to deliver certified higher institution-level content to displaced learners in camps and urban settings.

The employment of technology to bridge the distance between the school and the students for continued education during climate-related emergencies is referred to as Education-in-Climate Emergencies. ODeL methodology can be used to facilitate effective teaching and learning processes during climate disruption when the teachers and students are distant apart, even in the remotest of locations. ODeL has already been tested to be valuable in education-in-emergencies (Xiao, 2018) and there is no difference between conventional and ODeL²².

ODeL involves a summation of information and communication technologies available, including the application of artificial intelligence (AI)²³.

During the COVID-19 emergency, most countries abandoned traditional education methodology for ODeL because teachers and students were dispersed in different locations due to the ban on social gatherings in public places including schools. The educational institutions were able to maintain and connect with their students by embracing ODeL for the continuity of quality education delivery.

The special distancing enabled by ODeL controlled the spread of the deadly virus and also made sure that the students were not disenfranchised educationally²⁴. ODeL makes education easily accessible in the context of climate change education by sustaining the delivery of skills, information and knowledge that relate to necessary mitigative and adaptive mechanisms that are essential to health and wellbeing during climate-related emergencies.

²² Russell, T. L. (1999). The no significant difference phenomenon: As reported in 355 research reports, summaries and papers. North Carolina State University.

²³ Bozkurt, A. (2019b). Intellectual roots of distance education: a progressive knowledge domain analysis. *Distance Education*, 40(4), 497-514. <https://doi.org/10.1080/01587919.2019.1681894>

²⁴ Lizcano, D., Lara, J. A., White, B., et al. (2020). Blockchain-based approach to create a model of trust in open and ubiquitous higher education. *Journal of Computing in Higher Education*, 32, 109-134.

Access to healthcare education and survival training is frequently disconnected within displaced populations during climate change emergencies due to the unexpected and life-threatening disruptions that may affect critical school infrastructures which may lead to the closure of the schools, ODeL can be a barrier breaker in the delivery of quality education to the displaced and climate marginalized population on topics such as sustainable practices for wellbeing, adaptation measures and necessary first aids for infections and control.

In areas where the available schools cannot accommodate the displaced population, ODeL can be used to deliver education. Educational institutions that embrace ODeL have the potential to promote climate change resilience that will empower the citizens to address the climate crisis.

Overall, climate emergencies can have a significant impact on the school system, and the government needs to put in place necessary mitigative and adaptive measures to prepare the schools for this crisis. The government and education stakeholders should invest in climate risk reduction to build a sustainable climate-smart school system for our children.

Discussion

As opined by Ayoko²⁵, globally, ecological crisis, digital transformation and population increase are changing the eco-balance. The need to protect the future by the practices of the present is cogent. This can only be achieved by mass education of the global citizens on the impacts and implications of this crisis through sustainable education methodology. Education as a weapon to combat these menaces to achieve the desired change in practices must be affordable, accessible, equitable and qualitative for mass acceptance and appreciation. These can only be provided by the ODeL methodology of education delivery. ODeL is the most logical strategy to deliver these global sustainable targets. The current global climate issues and experiences have informed the awareness of the direct and indirect impacts on all aspects of life (education, health agriculture, biodiversity, livelihood and socioeconomic) it will impose on the coming generations. This has initiated survival strategies such as going green and sustainability practices.

²⁵ Ayoko, V.O. Open, Distance and e-Learning (ODeL): A Panacea for Effective Actualization of Education for Sustainable Development Goal 4 (SDG4). *World Scientific News*, 2024, 192, 128-137 <https://worldscientificnews.com/about-us>

Green practices are welcome ideas in the global south because of the birthrate (population) and level of natural wastage. The manufacturing and consuming activities of man are the main cause of climate change and it can only be controlled by imbibing green practices in all endeavours.

The concept of practices applies to the management of energy, green teaching and learning practices, green industrial and manufacturing services, green livelihood and agricultural practices, green construction and architecture and so on^{26,27,28}. Education plays a distinct role in character modifications by creating awareness of the link between man and the environment, the environment and sources of energy, and the economy and the environment through climate change education. The achievement of a sustainable development goal (SDG) is dependent on green environmental sustainability which in all is dependent on Education for Sustainable Development (ESD). The green environment can only be maintained when people's activities are curtailed within the ecological setup of the planet by recycling, reducing and reusing. According to Aithal & Priti²⁵, the twin target of sustainable development goals (SDG) and environmental sustainability can only be achieved through the employment of science and technology because understanding the concept of climate change such as pollution, gaseous emissions, global warming, ozone depletion, desertification, deforestation and so on can only be through scientific and technological interventions, especially in impact assessment, detection and solution.

In addition, the dissemination of green education can be achieved by incorporating and using green technology initiatives such as ODeL for mass orientation and awareness of green practices through research, workshops, and collaborations between teachers and learners on energy conservation, efficiency and renewable.

Conclusion

The Education in Emergencies (EiE) approach should implement critical climate mitigative and adaptative action to address the shocks on the children and youths to ensure safe and continued education, especially for displaced populations, minority groups, people with disabilities, refugees and other people affected by climate

²⁶ Sridhar, A. & Aithal, P.S. Innovations in Effective Management of Energy using Green Technology, *International Journal of Conceptions on Management and Social Sciences*, 2015, 3(2), 18 - 22.

²⁷ Aithal P. S & Priti, J. Strategic Rethinking of Management Education: Green MBA Model, *International Journal of Management, IT and Engineering*, 2016, 6(1), 55-73.

²⁸ Aithal P.S & Preethi J. How Service Industries Can Transform Themselves into Green Business Industries, *International Journal of Management Sciences and Business Research (IJMSBR)*, 2015, 5(4), 150-158.

disasters through the philosophy of ODeL to reach the marginalised children and youth with quality, affordable and accessible education

ODeL as a friendly approach to the environment reduces the rate of carbon footprint, discourages deforestation by exhibiting paperless practices, conserves energy by reducing the rate of power consumption, is affordable due to cost-effectiveness, accessible from any location even in emergencies, enables virtual collaborations synchronously or asynchronously and enables a platform for lifelong learning.

Without any doubt, ODeL enhances greener and sustainable environmental practices. On these notes, it is suggested that sustainable development policymakers and governments in different countries should support the application of ODeL not just as an adaptation approach but also as a mitigating approach by investing in the technology and manpower needed for standardized open, distance, digital and online education. The scope of ODeL can also be widened to cater for other social crises such as school dropout, gender imbalance, insecurity, human mobility, disability, marginalisation and cultural practices that are disenfranchising the populace from traditional education, especially in the global south.

Recommendation

Adequate technical and financial resources to monitor, review and evaluate ODeL strategies and modalities regularly during emergencies should be made available. This will give room for capturing approaches according to the trend.

Supportive technology should be incorporated in the design of ODeL for people living with disability to break disability limitations and become more inclusive. The quality and learning outcome of ODeL should be well evaluated and Monitored to the best extent during emergencies and access to open educational resources that are appropriate to context, languages and countries should be maintained.

ODeL should embrace multiple-modality learning strategies. This should be regularly updated based on digital transformation, changing technologies, labour market requirements, and the needs of the learners and facilitators.

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Conflict of Interest

There is no conflict of interest in this study.

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