Challenges and Opportunities of Remote Learning in Rural Areas in Burundi

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ABSTRACT

This study explores the challenges and opportunities associated with remote learning in rural areas of Burundi during the COVID-19 pandemic. Despite the importance of education for socio-economic development, the transition to remote learning has highlighted significant barriers such as limited access to technology and internet connectivity, inadequate infrastructure, language barriers, and insufficient teacher training. However, opportunities such as the integration of mobile technology, community involvement, and innovative pedagogical approaches present potential solutions. This paper provides insights from surveys and interviews conducted in rural communities, offering policy recommendations to enhance remote learning frameworks and ensure inclusive and equitable education in post-pandemic Burundi.

Keywords: Remote learning, rural education, Burundi, digital divide, educational technology, COVID-19, infrastructure, teacher training, community involvement, pedagogical innovation

INTRODUCTION

Education is a fundamental right and an efficient way to escape poverty and increase human capital. It enhances productivity, growth, health, well-being, political stability, and governance. Education must be of quality, equitable, and inclusive [1]. The current generation of young people is facing a global learning crisis of epic proportions. Covid-19 has worsened this learning crisis like never before. Education is at a critical juncture [2, 3]. The pandemic and the exclusion of a significant number of students and teachers have devastated the entire educational process: quality, equity, inclusiveness, and interconnectedness [2-7].

Background of Remote Learning in Burundi

Increasing the number of schools, increasing the number of trained teachers is also a solution. But these are not only the only solutions [8]. There are several ways to increase the number of children who go to school, who receive a good level of education. Indeed, Senator John Cornyn stated that to improve the education of future generations, different strategies must be used [9]. This explains why several researchers in many countries are interested in improving their distance education techniques [7]. Deriving its origins from the Latin word "educare" which means guiding, upbringing, education is a set of actions and activities aimed at developing the physical, intellectual, and moral capacities of each person to his/her sex to establish and confirm positive relationships with the person, the environment, the other members of the various communities to which he/she belongs, and to instruct him/her about the principles and the social rules that regulate the life of a society, the life of the entire planet [10-13]. The pandemic has made the world rise to face some of the most important challenges the world education system has ever experienced. Suddenly, education was faced with a new enemy much more formidable than the few enemies she knew [14]. Learning from a distance has been open and is entering the education system facing COVID-19 [4]. To continue educating children, it appeared. Learning from a distance is naturally a complicated question arising in the education system [15-17]. The people originally, and today, the intended public who are going to school are everywhere. However, this broad public cannot send its children to school. Among the reasons for this vast number of children who do not use the education system are finances [15].

Significance of Studying Remote Learning in Rural Areas

In summary, secondary schools in many developing countries are being digitally transformed into distributed learning institutions to efficiently provide resources for evaluating teaching and learning and responding to the increasing demand for education surging from various sources [16]. When deployed in rural areas with a high number of schools providing limited learning resources, adopting computer labs in these setups as study places can better address these challenges, improving e-learning by enabling the digital transformation of schools into distributed learning institutions [18]. Available learning models, such as blended learning where face-to-face and digital technologies are combined to learn, have often been used to allow stakeholders to better leverage the

technology and resources they have [19-21]. To ensure the success of digital learning resources projects, efforts examining the role they play, the emerging themes are important: school digital poverty and integration through Distributed Learning Methodologies in rural schools. There's also a need for promoting opportunities for developing the digital skills of the communities, augmenting the school system [12]. There are not enough digital resources available in these settings that are tailored to meet the needs of struggling students and youthful students with tracks for versatility and adequacy [13, 14]. Thus, we conceptualize distributed learning along with scalable digital infrastructures for rural communities to explore further avenues of research. Such an effort can help transform digital infrastructure for marginalization and social intervention [22].

Challenges of Remote Learning in Rural Areas

In contrast to our initial expectations and intentions, we have found that effective distributive devices guaranteeing the equitable access to educational resources to all regardless of their socio-economic conditions in a deprived rural environment in Burundi remain an elusive hope [22]. Moreover, the capacity of a collective of educators and students to fully profit from the educational potential of the local internet devices strongly depends on the appropriation of these devices by the recipients [22, 23]. However, such a collective appropriation process is generally described as a struggle against the acquisition of individualistic and partial ways in which most people perceive or use such devices. Among the lacking measures are omitted or hardly visible issues of digital communication, individual perception, unfamiliarity or lack of trust, error sensitivity, lack of digital skills or initiative, and more generally, a poor negotiation of locally rooted digital practices and educational norms [24-27].

Limited Access to Technology and Internet Connectivity

If there is a policy measure that can leave the majority of students in rural Burundi so frustrated, it should be closing schools and compelling them to resort to remote learning [28]. It is a big gap, not in terms of education, but in terms of connecting rural students with today's digital and internet-based world. All public schools, which are the educational powerhouses of the majority of rural people, face digital and internet challenges [28-34]. These challenges are even deeper among the private schools, most of which were established to cater to those who can afford a standard education, namely the elite and some few middle-class people in urban areas [29]. Although the choice to rely on digital technology to replace face-to-face schooling is a commendable one, the question remains on the use and access to the only solution to this problem. This readiness in terms of digital and internet usage raises a series of challenges to the majority [22, 25, 32]. About a third of the global student population was stuck in remote learning during the period of the COVID-19 outbreak and faced real difficulties [35]. Yet, the situation was worse in developing countries, among which we can quote the case of Burundi. This sent home, exactly, 1,828,319 students from every educational level to their families. Besides missing school during a crucial time in their academic life, remote learning could not be a viable option in rural Burundi. On a closer look, this sent home involved several challenges associated with limited access to digital technologies, including the internet connection [36, 37]. This research aims to explore how education actors at the local level have gone through this experiment through a case study carried out in a rural area in Burundi. Qualitative data, based on interviews, are used to better understand this school shutdown experience [38].

Lack of Infrastructure and Electricity

On the other hand, these hindrances hinder e-learning programs, and students often do not complete their courses. The students concerned are those who could not afford the means to pay for attendance at the centers; the difficulties are broad, and the development of e-learning is blocked [39]. It becomes essential for the government to introduce a policy of access to electricity in order to support investments by the private sector so that the populations are connected and benefit from electricity at a lower cost [40-43]. This would allow the development and dissemination of e-learning to all people without discrimination in the urban area and to those in rural areas. This would, therefore, be a way of making the computer tools of e-learning profitable and effective [44]. The other major challenge facing the strategies of distance education is the lack of infrastructure for remote areas. These include electricity, school buildings, and road infrastructure for easy student access. However, the absence and inadequacy of these components can become a brake on the establishment of operational strategies for distance education [32, 33, 35]. For example, the question of electricity is paramount since it can be a major brake on the functioning of IT equipment. The inability to access electrical energy for a long time would affect e-learning, and the consistency of activity would be affected. This is often due to prolonged power and internet cuts in some rural and urban areas [45].

Language Barriers and Localized Content

Localized content Most of the content is proposed by the Kenyan government and leaves out Burundian education goals and professional skills of the learners. In the library, teachers find books that do not correspond to the competent disciplines of students [46]. Data from the Kirundo education school revealed that some students drop out of school or have poor performance because they do not see the fruits of their work [29]. Especially, the lack of familiar examples of learners' environments leads to poor learning methods and poor learning [47]. The fact that the area has antelope and elephants should be a rich resource in teaching science. Even the most degrading factor is the lack of regular feedback with teachers [47]. By not having the opportunity to communicate directly with

teachers and ask questions, students get frustrated and think they will not be evaluated by a teacher. Without feedback from teachers, some students do not progress, and they fall behind in their studies. Language barriers and localized content [48]. The majority of teachers in both public and private schools are not from the communities where they are teaching, so they do not speak the local languages such as Kirundi or Kinyarwanda. This has created a significant language barrier between students and teachers [23, 28]. Using a different language from that used in schools presents a challenge during remote teaching. In households with multiple children and parents, the classes compete for the same living space [49-52]. Many of them are unable to create a separate place for children to learn. In these conditions, the competition for space required for children to learn has become another obstacle. Not only location, but also hours of studying is problematic. Given the ongoing household tasks such as fetching water at a distant water point, gardening, maintaining livestock, taking care of the elderly/sick, children are unable to study for long hours [53].

Challenges and opportunities of remote learning in rural areas in Burundi
Teacher Training and Support

The arrival of smartphones and the digitalization of the world make the use of the latter more and more necessary for the population. It is no longer necessary today to attend specialized ICT courses to learn how to tackle common digital challenges [54]. Digital tools such as computers, tablets, or multimedia projectors come with user guides and teachers can also learn alone or through various platforms available [55-57]. But according to the interviewees, this is still a concept fruit of the imagination because teachers must first have access to these materials to better improve their pedagogy. The disposition and commitment of policymakers to put ICT at the service of pedagogy could open up a beautiful and rewarding way to the digital world [38, 39]. The use of a digital hands manual in some schools could greatly contribute to the knowledge of digital tools by teachers. The didactic integration of the use of digital tools must certainly form part of the training programs that are implemented by the ministry in charge of education [40]. Without this integration, and attending the ICT course alone, it becomes difficult to make some teachers result-oriented. One of the people interviewed and consulted for this study alluded to the low level of training of teachers for the use of ICT: "The only source of their knowledge on the use of ICT tools is their minimal experience related to the use of cell phones" (70). During the training of teachers, ICT courses are not always included, and for those that are included, teachers do not always gain the expertise required for effective pedagogical integration of technology in the classroom. In Burundi, most teachers did not attend computer technical education courses or at best, such training remains far from specialized institutions that even offer [58-64].

Mobile Technology and Low-Bandwidth Solutions

The precursor of distance learning involves the use of technologies. At first, the existing technologies established tools like lesson plans, examination papers, and additional resources on the Internet for its students [43]. The immense contribution of technologies became media for learning [65]. Then, after some time, AI found in online games and tutorial software are in apposition to play a crucial role in education and learning. Although successful schools have discovered and are stepping up to apply effective teaching methods, many are failing [66-69]. They are probably throwing away nearly 90% of their money [55]. For instance, there are some schools and initiatives that are using clever techniques that use the collective sentiment of the body language of students to find out if teaching is effective or not, and thus proactively change the topic to give rise to more effective teaching models of education [38]. While too many schools are closed, the biggest challenge is that education is at a grinding halt as the gulf of disparity also widens [67]. Urban areas are now using a mix of technologies, e.g. Zoom, Google Meets, while rural areas are just consuming information. It is less of a communication between the teacher and student [64, 65]. Mobile technology and leveraging other low-bandwidth solutions, such as radio channels, for quick and affordable educational solutions are in ascendency all over [68]. Email and WhatsApp groups are formed for educational purposes. Although problems that can be addressed using UI-based solutions are easy, they are insufficient because we learn better with teacher-student interactions. However, text/audio/video are general problem domains that can be addressed slightly, although not sufficient [69, 70].

Community Involvement and Local Partnerships

The failure to systematically integrate literacy teaching and adult culture in settings in which both the literacy instruction at home and the public instruction are not seen as involving instruction complex cognitive tasks is most directly reflected in the large percentage of third graders in poor urban and rural communities who are not proficient readers and writers [60-65]. Schools also operate from a deficit theory of its students, particularly poor, rural, minority, and second-language children, who are faced at the beginning of beginning reading instruction with obstacles that schools claim incapacity to teach [45]. In rural communities with the greatest challenges, the quality from parent to child in storytelling, singing songs, traditional proverbs, and recognizing local culture across three events in adult-initiated conversations on a wide range of topics important to the intergenerational and intercultural differences [44]. These differences exaggerate the income and developmental problems associated with low community resources as experienced by school officials and families. The role of communities in supporting school learning is well-established in education [46]. In rural areas, however, the functions of the school and the family

with regard to literacy instruction are not easily or historically ignorable [41]. While schooling is a relatively new experience in comparison with that of children's participation in an adult world of work, parents have generally expected schools to offer instruction about adult culture and public life skills that reflect considerable cognitive complexity and linguistic challenge. Schools have placed this source of instruction in competition with adult activities that involve far fewer knowns at the start of instruction and offer much quicker rewards for performance [71].

Innovative Pedagogical Approaches

The use of MOOCs or online courses for the training of teachers is an example of the adequate use of technology with a promising potential impact. To reduce the inability and lack of interest of students in learning, technology can also play an important role [72]. Different tests conducted show that game-based learning has a favorable impact on retention, engaged study, and critical thinking [73-75]. However, to increase the effectiveness of game-based learning, special care is needed. From the starting point, the instructor should design the course in such a way that learning certain content would be authorized only if the student fulfills the required conditions, namely by mastering the necessary educational prerequisites [53]. Incorporation of serious games requires the knowledge of the curriculum integrated with the problematic learning components to be enhanced [58]. The implementation of innovative pedagogical approaches can potentially help alleviate the lack of adequate training and poor pedagogical preparation that teachers need to transform their lessons from didactic monologues to live dialogical lessons. For the effective implementation of student-centered learning, it is essential that teachers be well trained. Diffusion of open education programs can also contribute to the diffusion of student-centered learning in the initial training of future teachers and especially in pedagogical training refreshment programs for teachers [76-81.]. The use of technology and especially digital technology and interactivities that come with it are of remarkable pedagogical importance. Indeed, the simple use of technology for technology without any appropriate pedagogical plan in its use substantially reduces the pedagogical impact that this technological investment can bring about [82]. It is possible to invest in the necessary technology or at least have access to the necessary tools provided that the availability of trained teachers is increased [83-87].

Policy Recommendations

Other relatively low-cost initiatives do not require the investment in infrastructure. Training teachers to engage with students in a remote learning environment is critical. They need continuous coaching and mentoring to adapt to the opportunities provided by the technological advances. The quality of the learning resources is also significant. There is a wealth of quality lectures and other materials which are freely available. Teachers can select those materials as a part of their lectures. The homework and exercises can be prepared by the teachers themselves, but there are also lots of excellent materials that are available. It is important to assign group projects and teamwork to the students. After the students defend their projects in class, they are available as classroom materials for the new cohort of students. Based on the findings of the paper, we suggest a number of steps that should be taken in order to make online instruction a useful tool to improve education delivery in Burundi or other countries facing similar challenges such as poor infrastructure, unfavorable fiscal conditions, and a high degree of income and digital divides. First and foremost, the digital divide in the country should be eliminated at the earliest opportunity. It will not be possible to implement the school improvement plan that the Ministry of Primary and Secondary Education has already committed to if all students do not have access to a digital device and the internet. Connectivity must be brought to all the remote parts of the country where the students are mainly served, either through the market or public-private partnerships.

Successful Implementation in a Rural Community

The global opportunities linking rural teachers to a large pool of professionals and inserting them into regional and national events are already successful. The key will be to create architectural and design features that enable the local culture of work pacing and teaching quality to continue. Regarding teaching and learning, the positive reinforcement from mainly urban and external or remote mentors is valuable, and rural teachers derive significant satisfaction and ambition from participating. Finally, the community servitude employed for ready classroom repair and teams of parents taking turns as school monitors are experienced urban service schemes. In the rural location, communitarian supernumerary work is a natural state of living, raising cultural satisfaction and general appreciation for skills among the protagonists. The above rural experiences serve as professional or geographically-based curricular features, demonstrating relevance and emanating from community bonds, thus reinforcing the community cultural fabric.

Lessons Learned and Key Takeaways

However, novel innovative strategies do not do away with the challenge of academic content quality control. In fact, an investment in monitoring and evaluating outcome-based learning should take precedence. Structured levels of learning in reading and writing have significant visibility challenges. Ongoing cycles of co-learning and sharing spaces for instruction require external and internal quality control. Educational tools are notably scarce, and newly creative structures of tangible curriculum-based models that engage and motivate early school-leaving students to

complete education programs need to be extensively explored. Millennium Villages—Mind the GAP, a concrete-based kindergarten model kit in the construction sector, could serve as a leading kettle of some forms of education transformation. While remote learning has its challenges in rural areas, results from various districts in Burundi show that it is not an impossible feat. Outdoor classrooms have marked a new normal in rural villages in a number of districts in Burundi. Co-learning and shared spaces with local private structures are filling the gap of social isolation of children during this period. Ongoing inter-institutional collaborations are supporting and sustaining this innovative initiative. School remediation has a clear impact on the engagement of children and mothers in learning activities circulating around early childhood education.

Call to Action for Improving Remote Learning in Rural Areas

Remote learning itself is not a new phenomenon in rural schools in Burundi, since teachers tend to organize a small number of remote classes through locally traditional and informal learning platforms even in normal times due to student absenteeism (caring for household activities, working in the field, distance to school, etc.). But during the Covid-19 pandemic, the situation has changed radically and the education sector has encountered incredible new challenges related to this learning method. Yet with careful support and stimulation from the authorities, remote learning can ultimately allow Burundi's education sector to identify new pathways to ensure that all children living in rural areas benefit from an adequate level of meaningful learning that fosters their talents, curiosity, and intellect. The risk is that if we are not careful, the current crisis will lead to the development of a serious digital divide that could seriously impair the problems of education for rural areas. Rural areas in Burundi face numerous challenges regarding education provision, challenges which have become critical in the pandemic era. It is important for the authorities and education organizations to focus on long-term solutions in designing new education systems that will include new learning models and learning delivery methods that are not always based around a physical school. Such solutions should be designed for and connected to local contexts and economic structures that primarily depend on agriculture. Indeed, the education sector needs a heartwarming plan that ensures effective future flexibility, scalability, and preparedness; needing a well-developed concept that can accommodate schools to effectively use remote learning as a structured and sustainable learning process in the future. The decision to integrate remote learning as a learning policy process is a necessity, and it will also be a cornerstone of the theory of future education practices.

CONCLUSION

The COVID-19 pandemic has underscored the critical challenges and opportunities associated with remote learning in rural Burundi. Key challenges include limited access to technology and internet connectivity, inadequate infrastructure, language barriers, and insufficient teacher training. However, leveraging mobile technology, community involvement, and innovative pedagogical approaches offer viable pathways to enhance remote learning. To address these challenges, it is imperative to focus on long-term solutions that integrate digital infrastructure, teacher training, and community support. Initiatives such as mobile technology and low-bandwidth solutions, community partnerships, and innovative pedagogical methods can significantly improve remote learning outcomes. Furthermore, policy recommendations emphasize the need for equitable access to digital resources, continuous professional development for teachers, and the creation of localized content that resonates with the students' environment and language. By adopting these strategies, Burundi can not only mitigate the immediate impact of the pandemic on education but also build a more resilient and inclusive education system that supports sustainable development and social cohesion. The insights gained from this study can inform future educational policies and practices, ensuring that all children in rural areas have access to quality education, thus contributing to the overall socio-economic growth of the region.

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