

Analysis of How the African Family Dynamics Impact Academic Performance in the Sub-Saharan Country of Liberia: The Need for Electronic-Learning (E-Learning)

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Abstract

The challenges facing the Liberian educational system after more than thirteen years of civil war, still have not been addressed. Despite efforts by successive governments to improve the system, the country still lags behind most other African countries in education statistics, with high levels of out-of-school children and unqualified teachers. The lack of resources and limited access to education have a significant impact on students' academic performance. This pilot research focuses on two specific factors that affect academic performance of students in high school: the mother's education and family size. Although more study is needed to better understand the impact of family dynamics on education, however e-learning presents an immediate cost-effective approach to addressing this urgent issue.

Keywords: e-learning, digital Learning, remote learning, family structure

INTRODUCTION

After more than thirteen (13) years of carnage that was the Liberian civil war, the Liberian educational infrastructure is still struggling to emerge. " ...Liberia is significantly behind most other African countries in nearly all education statistics. It has one of the world's highest levels of out-school children, with an estimated 15 to 20 percent of 6–14 year-olds who are not in class...only 54 per cent of children complete primary education" (UNICEF, n.d.).

During the civil war, many adults lost their livelihoods and became unemployed, were forced to abandon their families and flee, or sadly lost their lives. The resulting family structure became quite unlike that of the pre-war era. " More than 250,000 people were killed... and nearly a million were displaced, of a total population of 3.5 million... In 2008, five years after the war ended, there were an estimated 340,000 orphans in Liberia, 18% of the total child population of the country... Most paternal orphans were cared for by their mothers." (Levy et al., 2022). Moreover, some educators lost their lives, others sought safety abroad or transitioned into other careers. This resulted a talent vacuum in the teaching profession and thus this was seen as an economic opportunity for people who stumbled into the teaching profession. According to UNICEF (n.d.), " The lack of untrained teachers is yet

another ripple effect from the civil war. Quality learning cannot take place in Liberian schools where 36 percent of primary teachers and 29 percent of secondary instructors are unqualified." As if things were not already abysmal, successive Liberian government administrations continue to struggle with how to optimize the limited allotted educational resources. This cumulative effect of this ever since the war ended in 2003, is an educational system that severely lags within the sub-region.

Having grown up in such an environment and eventually graduating from a university in the United States, this lingering disparity remains a major challenge for many. Consequently, there is an urgent need to research, vet and install a cost-effective means to bridging this gap in education. Rapidly restoring education remains the only hope for a better life for thousands of students feeling trapped in an educational relic.

In this regard, about five years ago, my wife and I created the Institute of Basic Technology (IBT), the only nonprofit, hands-on STEM laboratory supporting local high schools in Monrovia, Liberia. To date, IBT has supported over twelve high schools in the capital city of Monrovia, totaling about two thousand (2000) students in almost six (6) years.

To further understand and articulate the specific, prevailing hinderances in education, IBT launched a pilot research project during the 2016-2017 academic year. Key among the issues, identified, was understanding how the family structure which evolved and emerged after the civil impacted learning. To date most of the research done on the educational sector focus on improving the classroom settings, teacher training, access to updated curricula, child rehabilitation, etc. (Markowitz and Guftason-Wright, 2020; Levey et. Al, 2022; May, 2017; UNICEF, n.d.). However there remains little or no research on the impact of the post war family structure on education.

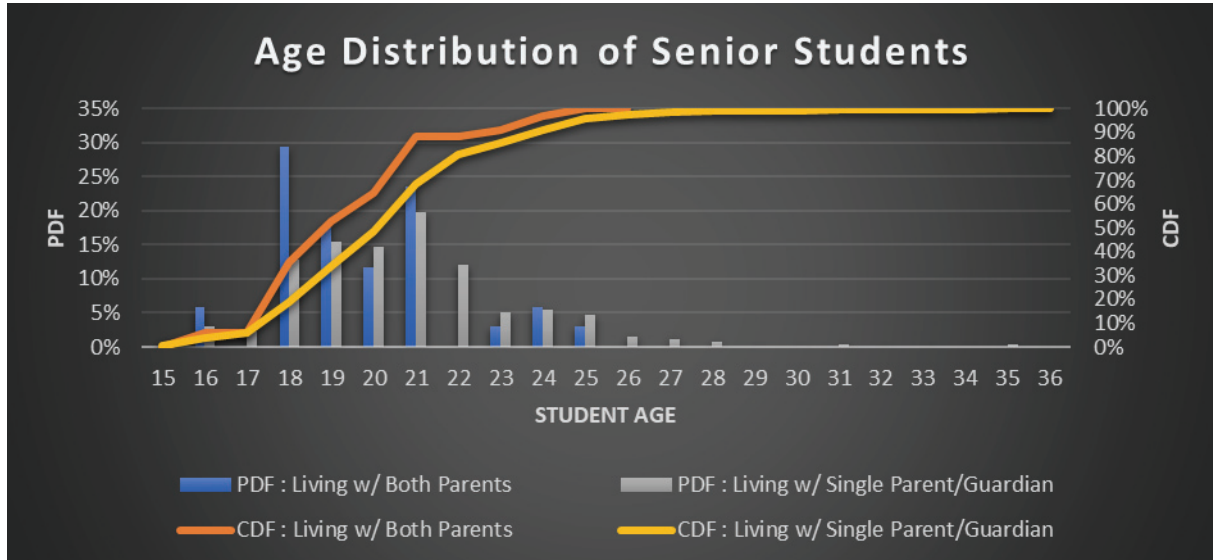
Demography

During the period of conducting this research, it was noted that Liberia's official statistics on population demographics revealed that around 63% of the population was below the age of twenty-five (25) years old. To rephrase, only approximately 37% of the population constituted those aged twenty-five (25) years and above (Wikipedia, 2006). However, it is important to mention that the interruption caused by the war implies that the data available in 2006 was the most reliable for the year when the pilot program commenced.

Figure 1 below shows the age distribution of senior students participating in the IBT STEM program from four (4) partnering school. From the age distribution of four hundred (400) high school students sampled, it can be seen that the average is twenty-one (21) years for students living with a single parent or nineteen (19) years if living with both parents. When taken in context of Liberia's demographic distribution, it can be inferred that the country has a lot of its economic potential stuck in high school. In other words, the economic prospects of a lot of young people remains hopeless for students trapped in an educational system in need of repairs.

Also in the figure, it can be observed that the ages to the right tends toward older students living with single parents or students who live by themselves. A possible explanation for the latter, is that most the people in this category were those who became orphaned as a result of the war. Thus becoming single parents with little to no education, due to economic activities surrounding transactional sexual relationships (Levey, 2022). Often, these groups must make pragmatic decisions about money vis `a vis education. It should also be noted here that single parent or guardian, very loosely refers a parent or any person providing legal guardianship to the student.

Figure 1: Age Distribution of High School Students



Therefore given the population distribution and the implied economic challenges, there is a need to explore cost-effective means of bridging the educational gap as a conduit to helping this population bootstrap themselves out of poverty. Electronic learning (E-learning) appears to emerge as a viable candidate.

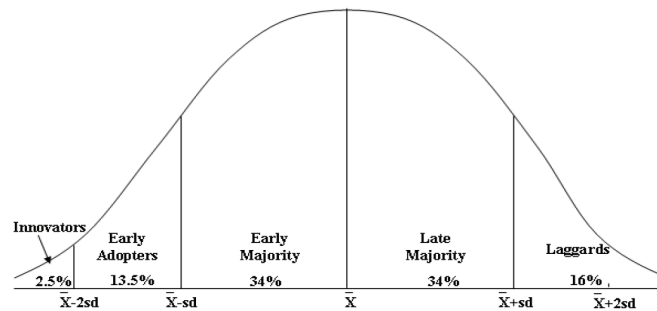
Scope and Problem

This is an exploratory study aimed at identifying the hindrances to e-learning posed by the family makeup of high school students in Monrovia, the capital city of Liberia. The data used in this study comes from a pilot program carried out between August of 2017 to June of 2021. This paper seeks to explore digital learning or e-learning as a cost-effective solution to mitigating the impact of the family structure on education.

This study uses Everett Rogers Diffusion of Innovation (DOI) theory to frame the challenges to adopting digital learning in Liberia. DOI basically argues that the adoption of new innovations occurs in a five-stage process, including knowledge, persuasion, decision, implementation, and confirmation. Rogers also introduced the concept of "innovators," "early adopters," "early majority," "late majority," and "laggards," to describe the different types of individuals who adopt new innovations. The theory also emphasizes the importance of communication and social networks in spreading new ideas and innovations. It suggests that early adopters play a crucial role in the adoption process, as they act as opinion leaders who help to influence the decisions of others in their social networks (Sahin, 2006, para. 37). This paper argues that the Liberian educational system is in the Late Majority stage, however not necessarily for the reason(s) stated by DOI, but rather for socioeconomic reasons.

Figure 2 below, visualizes the Roger's theory of Diffusion of Innovation.

Figure 2: Roger's Diffusion of Innovation Diagram



Adapted from Sahin (2006, p. 6)

The problem is that the new family structure which emerged after the Liberian civil war, is negatively impacted by a mother with no education and at least five (5) children in the home. The research questions explored are broken down as follows:

- To what extent can e-learning compensate for the educational disadvantages of parents with lower levels of education in Liberia?
- What strategies can be used to overcome the challenges of using e-learning to compensate for the educational disadvantages of parents with lower levels of education in Liberia?

The purpose of this research is to conduct an exploratory study, analyzing the impact of the new family structure on high school education and how digital learning could serve as a cost-effective solution. The sources of the data used in the ensuing analysis was made possible through the partnership with the local high schools in Monrovia, the capital city of Liberia.

Literature Review

To date most of the research done on the educational sector focus on improving the classroom settings, teacher training, access to updated curricula, child rehabilitation, etc. Moreover these studies have largely focused on using the existing learning infrastructure void of access to the internet to access updated contents or a means of availing access to students to carryout self-driven studies or research . (Markowitz and Guftason-Wright, 2020; Levey et. Al, 2022; May, 2017; UNICEF, n.d.). Very little research has been done looking at the effect of parents on education. One such article dwelled on how the parents' perception on the value of education impacted the students' learning. The article went on to assert that if the value were positive, this led to intergenerational mobility and income (Agupusi, 2018).

In the age of the Fourth Industrial Revolution, where technology is dominant and the emergence of AI chatbots like ChatGPT, there needs to be a paradigm shift, nothing made this point more than the COVID-19 pandemic. The COVID-19 pandemic brought to light a major deficiency within the Liberian educational system. Specifically, the pervasive lack of agility and readiness when it came to offering distance learning or e-learning in Liberia. For example when students had to stay home during the peak of the pandemic, the Liberian government's strategy was to conduct a teaching by radio program (Markowitz and Guftason-Wright, 2020). Students from each grade level, had to listen to the radio at a specific time of day when their lessons would be broadcast. This asynchronous presentation posed a series of challenges for the students as they had no way to ask follow up questions, they were at time unfamiliar with the teacher(s) and if they missed their allotted class slot, they had no recourse, etc.

Our organization, IBT also sought alternatives to remote learning. The Institute of Basic Technology chose audio conferencing via phone calls as a viable option for distant learning. It selected this method for three reasons:

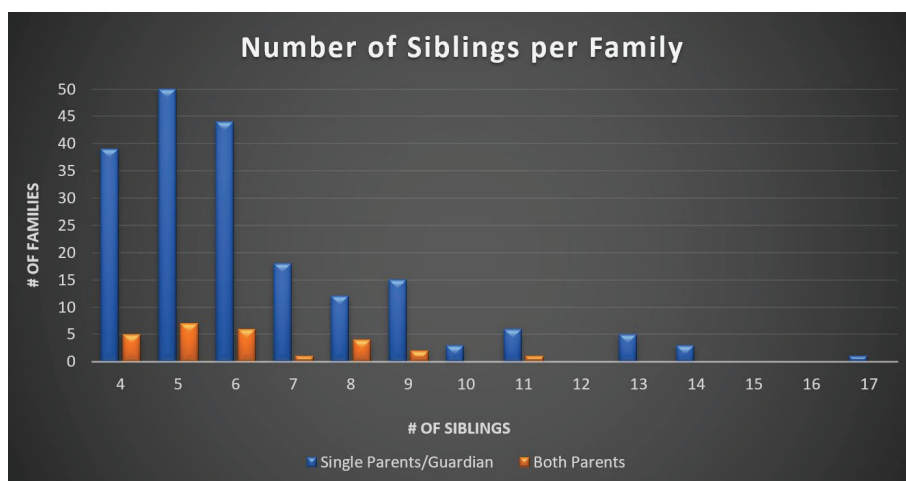
- Most high school students do not own smartphone/devices. The smart devices are often owned by their parents
- The cost of purchasing mobile data is prohibitive for most high school students.
- Audio calls provided a relatively cheaper means of getting real time feedback during lectures.

However these solutions provided by the Liberian government and IBT fell short in supplementing students learning. In the case of IBT's solution, students often had to drop off the call when their prepaid services were exhausted and the had no means to pay of new minutes. Secondly each conference call was limited to five (5) persons per conference line. Thus there was a need to explore another option.

Results

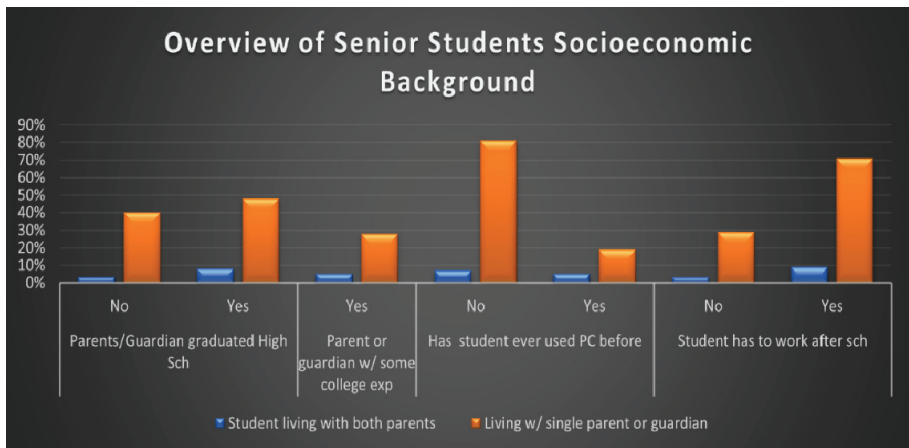
In this pilot study, a descriptive statistical analysis was conducted to examine the results and obtain insights for future, more comprehensive work. The data analyzed various aspects of family structure that affected academic performance, including the number of siblings a high school student had, the size of the family, the student's socioeconomic background, and the impact of parental education. As illustrated in Figure 3, single-parent households typically had an average of five (5) children in addition to the high school student participating in this study. The outlier showing eleven (11) or more sibling could infer a situation in which the student subject is referring to extended family members in the household such as cousins. A situation not uncommon in some Liberian household.

Figure 3: High School Student Number of Siblings



In addition, figure 4 shows the impact of a larger family, single parent home. Basically, these students have limited access to computers. It can also be observed that in single parent, a single parent is equally likely to graduate or not graduate from high school. Most of these students also tend to work after school or serve as surrogate parents because of the family size. This is namely because these studnets are often the oldest of the children in the home.

Figure 4: High School Student Socioeconomic Background



For this pilot program, all participating students were required to take an assessment test consisting of sixteen (16) questions covering the subjects of Biology, Chemistry, Mathematics, and Physics. Upon analyzing the results of these tests, a significant correlation was observed between family size and academic performance. As illustrated in Figure 5, students who came from families with no more than four siblings and whose parents had at least a high school education achieved a B average. Conversely, those with more than four siblings and whose mothers had no education scored at a C+ level. Notably, students whose mothers had obtained at least a high school education consistently outperformed their peers, regardless of gender.

Figure 5: Impact of the size of the family on Academic Performance

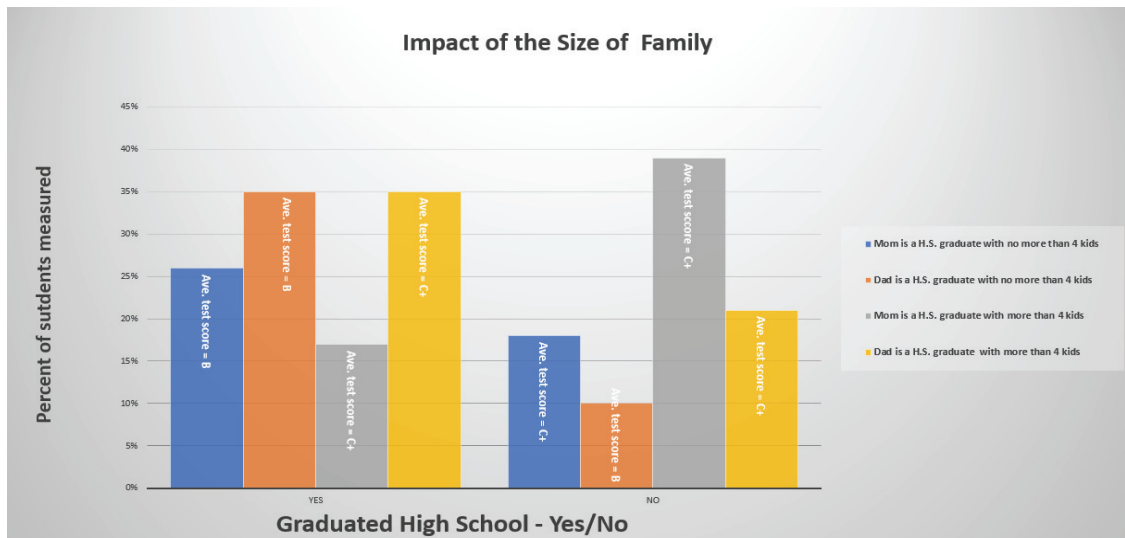
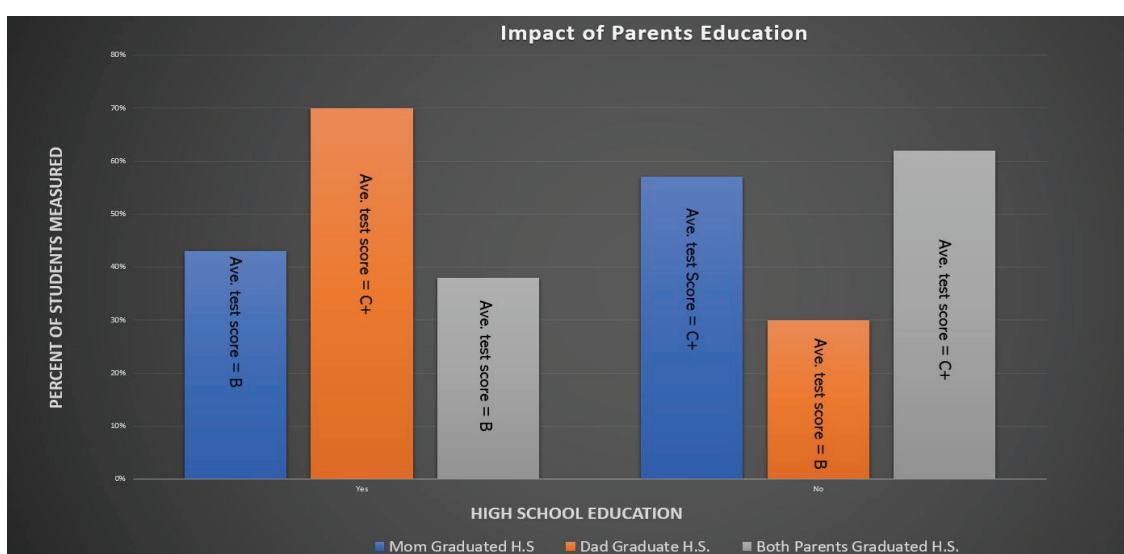


Figure 6 further corroborates the observations from figure 5 about the parents' education. As can be seen below, there was virtually no difference in academic performance between a household where the mother is educated and the one in which both parents are educated. In other words, the education of the mother is a determining factor in how well the student performs.

Figure 6: Impact of a Parent Education



Discussion

An analysis of the information discussed in the foregoing graphs points out three (3) key issues:

- Mother's education is a major indicator of how well a high school student will fare academically without any intervention. Specifically, when the mother has not received any formal education, the student is likely to achieve no more than a C+ average. This outcome can be attributed to the mother's role as the primary "educator" within the household and her limited ability to provide academic support to her child due to her lack of educational background. This issue is especially pertinent for single mothers in this demographic, who often spend the majority of their time operating retail stalls in local markets. Further examination of this phenomenon is necessary.
- Secondly, when a student is the eldest of five (5) or more siblings, the size of the family becomes a significant factor. In such circumstances, the student is likely to serve as a surrogate parent at home, or hawking in the street to supplement the family income. To compound this further, the cost of internet data, smart devices, and other related expenses make it almost impossible for these students to engage in any self-study after, thus leading to lost study time. This situation becomes even more challenging when the mother is uneducated, as discussed earlier. The cumulative effect of these issues becomes particularly worrisome.
- In patriarchal societies such as Liberia's, it is often assumed that the father's education is the primary factor influencing a child's academic performance. However, emerging evidence suggests that this may not be the case. Historically, men (fathers) are more likely to receive formal education and pursue advanced college degrees compared to women (mothers). While it may seem intuitive that the person with the most education would have the most significant impact on the student's educational outcomes, analysis of the current data suggests otherwise.

In summary, the family structure does significantly impact the students' academic performance. However, due to the absence of cost-effective after-school tutoring or access to the internet for self-study, there is a pressing need to explore alternative cost-effective models.

E-learning has become increasingly popular in sub-Saharan Africa as a solution to the challenges faced by traditional pedagogical systems. The increasing need for an innovative pedagogy has led to the growth of e-learning in the region. E-learning provides increased access to education for

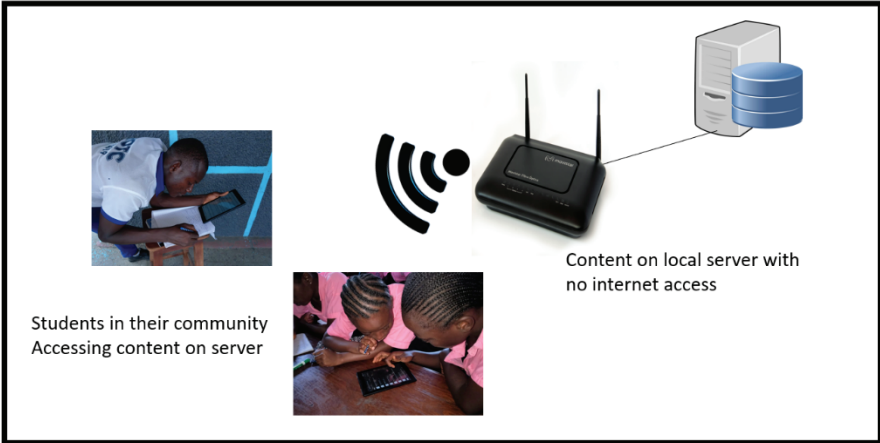
individuals who would otherwise be unable to attend traditional schools (Kotoua et al., 2015). Furthermore, e-learning provides opportunities for professional development and skill-building, which is crucial for economic development in the region (Nhando, 2016). Harvard International Review (2020), suggests that online education is an increasingly-utilized tool for tackling a lack of educational attendance in sub-Saharan Africa for its benefits of no travel time, cheaper costs, and flexible hours.

However, despite its benefits, sub-Saharan Africa still faces challenges in implementing and expanding e-learning. The region's ICT-related infrastructure, including electricity, telecommunications, computers, and trained personnel, often proves to be inefficient. According to a survey by the AVU, internet connectivity in tertiary institutions in Africa is inadequate, expensive, and poorly managed. As a result, the region is yet to realize the three pillars of the ICT revolution: connectivity, capacity, and content (Gunga and Ricketts, 2006). However it is expected that with the arrival of the Africa Coast to Europe (ACE) high speed fiber optics connectivity, most of the broadband internet connectivity issues will be addressed (ACE, 2018).

Thus, to make e-learning cost-effective, there is a need to approach it as a communal solution to bridging the gap in education. One implementation of this approach, albeit an expensive one, is to provide each high school student with a smart device to access teaching materials online. The government and nonprofits operating in the country could work with the local phone companies to allow internet traffic to specific educational websites. Smart devices can then be limited to accessing only the online learning platform/site thus limiting data usage and distractedness of the students. In addition, the cost of such implementation could be subsidized with the students paying a nominal, one-time rental fee during the academic year.

An alternative implementation could be building local e-learning community centers, where computer servers with locally hosted educational contents are placed in various communities. The community centers could be managed and maintained by the government or local nonprofits, and could also serve as a gathering place for students to collaborate and learn together. This approach would also help to address the issue of electricity availability in certain areas, as the community centers could be equipped with solar power or other alternative energy sources. Overall, the implementation of local e-learning community centers offers a promising solution for providing students in sub-Saharan Africa with access to quality education. Figure 7 below offers a simplified layout of this concept.

Figure 7. Local Community e-Learning Center



Conclusion

In conclusion, this pilot study sought to pioneer the need for research objectively measuring and articulating the impact of the family structure on learning in sub-Saharan Africa. There still very little known scientific perspective about how the family dynamics plays a role in learning outcomes.

Moreover, COVID-19 showed that the current educational infrastructure in Liberia is still in need of a major overhaul, not just to return to prewar status, but to also be positioned to prepare students for learning in the 21st century. At a bare minimum, there is a need to address the issues of access for remote learning in Liberia. The future of e-learning in sub-Saharan Africa is promising, and its continued growth and development will play a critical role in promoting economic development and improving access to education.

References

- Africa Coast to Europe. (n.d.) Submarine cable. <https://ace-submarinecable.com/en/submarine-cable/>
- Agupusi, P. (2019, April). The effect of parent's education appreciation on intergenerational inequality. *International Journal of Education Development*, 66, 214-222. <https://doi.org/10.1016/j.ijedudev.2018.09.003>
- Gunga S.O. & Ricketts, I.W. (2006, October 20). Facing the challenges of e-learning initiative in African universities. *British Educational Research Association*, 38(5), 896-906. <https://doi.org/10.1111/j.1467-8535.2006.00677.x>
- Havard University. (2020, July 04). Ending poverty in sub-Saharan Africa with online education. Havard International Review. <https://hir.harvard.edu/ending-poverty-via-online-education/>
- Kotoua, S., Ilkan, M., & Kilic, H. (2015). The growing of online education in sub saharan Africa: Case study Ghana. *Social and Behavioral Sciences*, 191(2015), 2406-2411. DOI:10.1016/j.sbspro.2015.04.670
- Levey, E.J., Harris, B. L., Laird, L.D., Kekulah, I., Borba, C.P., Henderson, D.C. & Becker, A.E. (2022, January 13). Orphans in post-conflict Liberia: Seeking care in fractured communities. *Transcult Psychiatry*, 59(3), 235-248. doi: 10.1177/13634615211066696.
- Markowitz, E. & Gufstason-Wright, E. (2020, December 01). Public-private partnerships in education at a time of crisis: Lessons from Liberia and around the globe. Brookings. <https://www.brookings.edu/events/public-private-partnerships-in-education-at-a-time-of-crisis-lessons-from-liberia-and-around-the-globe/>
- May, S. (2017, October 26). Education lessons from one of the world's toughest places. World Economic Forum. <https://www.weforum.org/agenda/2017/10/liberia-is-one-of-the-worlds-worst-places-to-learn-heres-how-thats-changing/>
- Nhando, D. (2016, February 19). Utilizing open education resources to advance online learning in sub-saharan Africa. eLearning Industry. <https://elearningindustry.com/utilizing-open-educational-resources-advance-online-learning-sub-saharan-africa>
- Sahin, I. (2006, April). Detailed erview of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. *Eric*, 5(2), 14-23. <https://eric.ed.gov/?id=EJ1102473>
- UNICEF. (n.d.). Basic education. <https://www.unicef.org/liberia/basic-education>
- Wikipedia (n.d.). Demographics of Liberia. https://en.wikipedia.org/wiki/Demographics_of_Liberia