

Transforming Learning Experiences

A Project in Liberian High Schools with Computer-based Simulations (CBS)

Josiane Ndjock

“GloCo offers an opportunity for meaningful dialogues and cross-cultural knowledge sharing, inspiring a sense of responsibility in each of us to contribute to the betterment of our communities.”

Abstract: *Access to quality education (SDG 4) remains a major challenge in Liberian schools due to outdated curricula, teacher shortages, and limited instructional time. The computer-based simulations (CBS) project introduced a novel learning approach by using technology to make education more interactive and engaging. Over 16 weeks, 35 high school students from diverse backgrounds worked together to create a virtual village, using digital tools.*

As a strategy for integrating technology into secondary education, the CBS project helped bridge learning gaps by promoting hands-on and student-centered activities. Through group tasks, remote support, and classroom presentations, students developed cognitive, linguistic, and digital skills, as well as creativity, problem-solving abilities, and confidence. Feedback showed that simulations can increase student autonomy, performance, and cross-cultural skills. They provide teachers with new ways to make learning visible, making them a promising solution for under-resourced schools.

Keywords: *Computer-Based Simulations; Student Autonomy; Quality Education*

Team Members

Josiane Ndjock | Mazen Halabi

Motivation

Significant progress has been made in expanding access to primary education worldwide, with enrolment rates in developing regions reaching 91 % by 2015 (GPE, 2015). However, in many parts of Sub-Saharan Africa, education systems remain fragile, particularly in conflict-affected and economically disadvantaged areas. Liberia, one of the poorest nations in the world, faces substantial educational challenges due to a prolonged civil war, the Ebola epidemic, and the impact of COVID-19. Despite government efforts, such as the 2005 Free and Compulsory Education Act and the 2016 privatization of public basic education, progress remains limited. Alarming, Liberian students consistently rank among the lowest in regional assessments, as demonstrated in the 2013 and 2016 WAEC university entrance exams, where failure rates reached nearly 100 % (Oduor, 2016).

As an educational consultant in Liberia, direct observations in schools reveal deep-rooted structural weaknesses, including:

- Incoherent curricula that fail to align with standard educational frameworks.
- A severe shortage of qualified teachers, inadequate learning materials, and high dropout rates. Students often express boredom and disengagement, struggling with outdated textbooks and traditional teaching methods.

- Limited instructional hours due to student absenteeism, as many learners must support their families financially. This reality highlights the need for flexible learning solutions that allow students to engage with lessons beyond the classroom.
- Logistical barriers and cultural resistance (Uwagaba, 2023) continue to hinder technology integration in Liberian schools, despite growing recognition of Information and Communication Technology (ICT) as a crucial learning tool.

The motivation for this project stems from ongoing discussions about the significance of ICT in schools. Koç(2005) argues that ICT enables students to communicate, collaborate, and share their work anytime and from any location, without the constraints of time, space, or resources. Similarly, Brush et al. (2008) highlight ICT as a tool that allows students to explore learning topics, address problems, and develop solutions within the learning process. Fenner and Newby (2000) add that each constructs their own world uniquely, thereby generating rules and mental models to make sense of their experiences. Learning is a process of seeking meaning. The success of learning lies in each learner's ability to construct their own meaning rather than memorize and repeat the teacher's meaning. From this perspective, the computer-based simulations (CBS) project was introduced as a targeted ICT intervention, offering an innovative, student-centered approach to overcoming curriculum limitations, time constraints, student disengagement, and low performance. By leveraging simulations, the project provides students with immersive, real-world learning experiences that foster engagement, collaboration, and critical thinking. Designed specifically for high school students approaching national exams and higher education pathways, the project integrates interactive learning tools, role-based scenarios, and digital resources to enhance accessibility, practicality, and alignment with 21st-century skills.

The CBS Project: Living Together in an African Village

Simulations in Education: A Hands-On Approach

Simulations offer a fresh, interactive way to learn by combining digital tools, role-playing, and real-world problem-solving. They engage students in ways traditional teaching methods often can't, especially in schools with limited resources. Our project was inspired by the French adaptation of computer-based simulations, known as *simulations globales assistées par ordinateur (SGAO)*. This method is based on the idea that students learn best by simulating reality and actively creating knowledge (Caré, 1997). The CBS project applied this approach to create a dynamic, student-centered learning experience.

Implementing the CBS Project in Monrovia, Liberia

We piloted the CBS project following an alleviated teaching and learning scenario to integrate technology into learning (Vetter, 2015). The theme, “*Living Together in an African Village*,” provided students with a space to build a global village by blending diverse worldviews. Despite their differences, they found common ground and a shared sense of belonging by imagining and bringing to life a village where they could all live.

All the work had to be created online using open sources, so the project was designed with a step-by-step approach to keep students engaged and ensure meaningful participation:

- **Weeks 1–4:** Setting the foundation—Naming the village, designing the environment, and setting up administration.

Fig. 36: Building a village

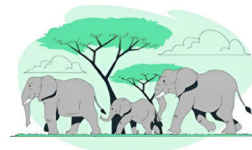
Timbramain panoramic view



The village is generally green due to its forests and mountains. There are trees everywhere and a river running along the village. The houses are made of red clay and powered by solar or wind energy.



At the village roundabout, there is a shopping center where you can buy everything, and a clinic. The animals are not far: mainly lions and elephants. However, Timbramain is the only village in Liberia to have a strange animal that looks like a large mouse but barks like a dog, eats meat, and lives with the Timbramain people: the souchi (mouse-dog).



©Freepik

- **Weeks 5–8: Building identities—**Creating characters, assigning professions, and shaping village life.

Fig. 37: *The professions in the village.*

Professions of the village



Daily life

History teaches that the Timbramain people engaged in various professions to sustain their families and community, with agriculture being their primary source of income. They practiced hunting, gathering, fishing, and livestock farming, raising cattle and poultry. Hunting was a family activity, often carried out using *souchis* (mouse-dogs) with bells and large nets, as well as traps such as lassos, snares, and spike-filled pits. Fishing was conducted in diverse ways, including poisoning the water, using cast nets, fishing lines, and traps. The products from these activities were used for food and medicinal purposes, showcasing the resourcefulness of the Timbramain people in utilizing their environment.



Today, the village has modernized, and so have its inhabitants. There are increasingly more artisans and small trades, such as tailors, hairdressers, pastry chefs, and others.



The *Toc-Toc* has hired a secretary from the capital to record the village's disputes. A general practitioner has also been brought in, and although the villagers still suffer from simple headaches, the entire village takes pride in having a doctor. Additionally, the Liberian administration has opened a police station in Timbramain because the *Toc-Toc* can no longer handle the numerous complaints from the people.



- **Weeks 9–12:** Adding depth—Exploring gastronomy, urbanization, and resolving conflicts.

Fig. 38: The village gets more complex.

Urbanization Issues in the Village

The Timbramainese, with the help of the Toc-Toc, have made significant progress in improving living conditions. However, more efforts are needed to implement a greater number of development projects in this village, which is often distracted by unnecessary quarrels.



Highways



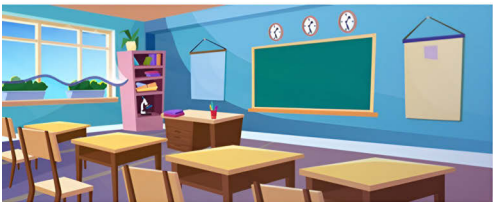
Electricity for all



Cooking gas for all



Drinking water



Quality schools and Education

At the moment, 70% of families in Timbramain live without these benefits. More and more young people are leaving the village to pursue studies in the city or to find respectable jobs and a better life. Unfortunately, this migration has reduced the population of Timbramain, and the village now has more elderly people than young people.

©Freepik

- **Weeks 13–16:** Bringing it all together—final presentations and reflections.

For 16 weeks, students spent about 48 hours on the project, working remotely for two hours each week and one hour in class under the consultant's supervision. In-class sessions provided opportunities for feedback, while communication was maintained through the *Remind.com* application.

Apart from enhancing language skills, the project wove together multiple subjects, with related teachers guiding students in different areas:

- **Geography:** Mapping landscapes and planning urban spaces.
- **Moral Education:** Learning governance, decision-making, and conflict resolution.
- **Economics:** Managing resources and trade.
- **History & Cultural Studies:** Exploring traditions and customs.
- **ICT:** Using online tools, collaborating on *Remind.com*, and creating presentations.
- **Social Sciences:** Understanding human interactions and societal roles.
- **Creative Arts:** Designing village maps, character profiles, and event planning.

Connection to the Framework of GCED and SDGs

Computer-based simulations (CBS) offer significant potential in education, particularly in under-resourced contexts. By combining role-playing with digital tools, simulations create engaging, interactive learning experiences that foster cognitive autonomy, intercultural communication, and social cohesion, while promoting the quality of education (SDG 4) and peaceful and inclusive societies (SDG 16). By involving students from diverse cultural and skill backgrounds, the project demonstrates the power of collaboration. It underscores the importance of collective

efforts in overcoming educational and societal challenges (SDG 17). As mentioned earlier in this paper, through the CBS project, students created a global village where, despite their differences, they could find a sense of belonging and connection, support one another, and develop global citizenship skills.

Simulations allow students to experiment, make decisions, and experience the consequences in a created environment. This hands-on approach helps build critical thinking, teamwork, and empathy; skills necessary for addressing global challenges. Through collaborative activities, students learn to engage with different perspectives, build relationships, and appreciate diversity. In doing so, they develop the confidence to participate actively in their communities.

With the targets of SDGs in mind, the following points highlight the contribution of computer-based simulations to education:

- **Inclusive learning:** Digital simulations do not require expensive resources. By using readily available ICT tools (such as smartphones), they offer students from diverse backgrounds the opportunity to participate fully, regardless of socioeconomic status. The pilot model demonstrates that CBS projects can be scaled nationally.
- **Development of 21st-century skills:** Through role-playing and interactive scenarios, students enhance their problem-solving, critical thinking, and communication skills. These skills prepare them not only for academic success but also for real-life situations.
- **Safe space for learning:** In simulations, students can explore ideas, learn from mistakes, and improve their understanding without the fear of judgment. This encourages shy or hesitant learners to participate more actively.
- **Promoting global citizenship:** By simulating real-world contexts such as villages or enterprises, students learn about interconnectedness and global issues. They understand how their actions can impact others, fostering a sense of responsibility and empathy.
- **Learning through play:** The element of play embedded in CBS makes learning more enjoyable and memorable, allowing students to con-

nect emotionally with what they learn, and fostering lifelong learning.

Lessons learned

The results were visible. Students became more engaged, even in subjects they had little interest in before, to the point that some began considering them for future university studies. The classroom environment improved too; students were more cooperative, making teaching easier. Teachers found the project refreshing, as it encouraged research in a fun way and provided them with a new approach to tackling complex topics. One of the biggest takeaways was how independent the students became. They were having fun in the learning process, without even realizing they were building knowledge. As a final touch, their completed work was printed and displayed on the school billboard for the rest of the year, a recognition of their creativity and hard work. They celebrated their achievements and reinforced the impact of interdisciplinary learning within the community.

The implementation of the CBS project at a high school in Liberia revealed several limitations that affected its deployment.

Lack of parental understanding and support:

One of the most significant challenges was the minimal support from parents, mainly due to a lack of understanding of the project's objectives and educational value. Some parents were reluctant to allow their children to use personal devices for the simulations, limiting students' participation and output. Therefore, organizing a parent-teacher meeting before the project launch is necessary to help explain the objectives, the benefits, and the essential role of parental support. Regular updates through newsletters, group chats, or school events could sustain parental engagement throughout the project. When parents understand

the educational value, they are more likely to support their children's participation.

Maintaining the momentum

The CBS project covered 16 weeks of school but lasted six months due to interruptions such as vacations, holidays, and exam periods. The breaks disrupted the project's momentum, making it challenging for students to refocus when sessions resumed. Considerable effort was needed to regain engagement after each interruption. Integrating online discussions and reflective activities over holidays could bridge the gap during breaks and help maintain momentum.

Limited access to the ICT lab and scheduling conflicts:

The project relied on the school's ICT lab, but as a language project primarily, it clashed with regular computer science classes. Despite the ICT teacher's cooperation, the lab was unavailable on some days, causing delays and missed sessions.

If the project is presented to the Head of Studies early, they can ensure it is formally incorporated into the ICT lab schedule and involve all relevant teachers. This has the potential to foster collaboration and increase support.

Many of the challenges encountered during the project stemmed from its innovative nature in Liberia, where technology is often seen as entertainment. Overcoming these limitations by actively involving and sensitizing parents, teachers, and the community can create a more cohesive and impactful implementation of CBS projects in the future (Luna & Del Valle, 2023).

For further reading: Open and Online Sources to implement the village CBS project

The following online resources were used to support the implementation of the Village CBS project and could help others implement it:

Village Concept

<https://bop.fipf.org/wpcontent/images/stories/dossiers/village.pdf>: Read more on executing a village CBS project. It is in French, but easily translatable.

Collaborative tool for idea sharing

<https://www.remind.com/>: This is a platform for real-time communication and collaboration; ideal for school settings, with inclusive access and privacy.

Free access tools

<https://www.freepik.com/>: A website offering free images and graphics for visual content.

<https://www.postermywall.com/>: A free tool for designing professional posters.

<https://en.wikipedia.org/wiki/Gbarnga>: Outlines the key elements in presenting a region.

References

- Brush, Thomas, Krista D. Glazewski, & Khe Foon Hew (2008). Development of an instrument to measure preservice teachers' technology skills, technology beliefs, and technology barriers. *Computers in the Schools*, vol. 25, pp.112-125.
- Caré, Jean-Marc (1997). Inventer pour apprendre : les simulations globales. *Lidil*, 16, 107–126. <https://doi.org/10.3406/lidil.1997.1709>

- Fenner, Anne-Brit & David Newby (2000). "Approaches to materials design in European textbooks: Implementing principles of authenticity, learner autonomy, cultural awareness". European Centre for Modern Languages of the Council of Europe Publishing.
- Global Partnership for Education (2015). *Final assessment of the MDG impact on education*. Global Partnership for Education. <https://www.globalpartnership.org/blog/final-assessment-mdg-impact-education>
- Koç, Mustafa (2005). Implications of learning theories for effective technology integration and preservice teacher training: A critical literature review, *Journal of Turkish Science Education*, vol. 2, pp.2-18.
- Luna, Raquel, & Jasper Del Valle (2023). Role of parent-teacher partnership in learners' academic performance. *International Journal of Educational Research*, 4(2). <https://doi.org/10.53378/352977>
- Oduor, Michael (2019). Massive exam failure in Liberia: only 1 student out of 42,000 passes national exams. *Africanews*.
- Uwagaba, Joseph (2023). Exploring the barriers to Artificial Intelligence adoption in sub-Saharan Africa's Small and Medium Enterprises and the potential for increased productivity.
- Vetter, Anna (2015). 5 types de dispositifs en FOAD : YouTube. [online video].