Chapter 10
The Future of Learning: Openly Accessible Generative AI Models as a Catalyst for Educational Equity in Sub-Saharan African Countries

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ABSTRACT

The advancement of generative artificial intelligence (GenAI) presents a transformative opportunity to address educational inequalities in sub-Saharan Africa (SSA). The educational landscape is at the crossroads where strategic adoption of free and open GenAI could fundamentally transform learning equity. This chapter builds a case on how emerging openly accessible models are creating unprecedented opportunities that, if well utilized, can bridge educational gaps that plague this region. Unlike the proprietary systems, these openly accessible models may significantly lower deployment costs and offer adaptable architectures for low-resource environments that are synonymous with sub-Saharan Africa. The chapter outlines practical and actionable strategies, including policy reviews and formulation where none exist to including hybrid deployment systems combining offline AI capabilities. Teacher trainings that focus on prompt engineering with open-source tools and public-private partnerships to ensure sustainable implementation.

DOI: 10.4018/979-8-3373-8795-6.ch010

1. INTRODUCTION

This chapter builds a case on how emerging openly accessible models are creating unprecedented opportunities that, if well utilized, can bridge educational gaps that plague the education sector in the sub-Saharan Africa (SSA) region (Evans & Mendez Acosta, 2021). The chapter introduces a conversation on the transformative potential of openly accessible generative AI (GenAI) in advancing education equity in SSA. Persistent educational inequities due to resource scarcity, infrastructure deficits, and systemic exclusion (Mutisya et al., 2021; Zickafoose et al., 2024). Unlike the proprietary systems, these openly accessible models offer distinct advantages for African contexts, including multilingual support for indigenous languages. The models may significantly lower deployment costs and adaptable architectures for low-resource environments that are synonymous with sub-Saharan Africa. When strategically integrated with open educational resources (OERs), technology can act as a powerful equalizer, of course, if guided by sound pedagogy, inclusive design, and sustainable governance (Madhav, 2024).

The chapter presents a brief analysis to demonstrate the practical application of these models. However, it also presents a balanced view of both opportunities and challenges. Challenges still exist that, if surmounted, the region can make significant strides that could not be experienced if the status quo remained. Infrastructure limitations, such as unreliable electricity supply and internet connectivity, may constrain widespread adoption. Questions of cultural relevance persist, and geopolitical dimensions and opportunities of relying on open-source ecosystems also warrant careful consideration (Kulesz, 2024; Weber, 2000).

The discussion begins with a theoretical foundation, followed by an exploration of the socio-political and technological context, including the roles of the United Nations Sustainable Development Goals (SDGs), the internet, generative AI, and the impact of the COVID-19 pandemic. The chapter then examines the systemic barriers to equitable education, the potential of GenAI to overcome them, and the practical strategies for sustainable implementation. It concludes with a vision for future learning in SSA. A future that is shaped by openly accessible technologies, educational resources, and human-centred ecosystems.

2. THEORETICAL FRAMEWORK: A TRIANGULATED THEORETICAL FOUNDATION

The chapter adopts a triangulated model combining Diffusion of Innovations Theory (DIT), Constructivist Learning Theory (CLT), and Sustainable Adoption framework (SAF). This integrated lens allows a holistic, context-sensitive analysis