SUB-MERGING VIRTUAL REALITY INTO AFRICAN KNOWLEDGE SYSTEMS: PROGRESSIVE MOVE TOWARDS RESILIENCE IN GIRL-CHLD TRAINING

BY

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Abstract

The global response to emerging technologies leaves much to be desired in the girl-child education, more so, one of the stabilizing factors for the general well-being of the society is the level of investment in formal, non-formal, and informal women's education. After all, the trained girl-child will eventually become an adult woman. This paper is intended to integrate and submerge virtual reality into the African knowledge system specifically, African technology as an integral aspect of the knowledge system which is yet to gain decisive attention probably due to the lack of documentation and facts that some crafts and vacations are women gender-biased. Several scholars have worked on girl-child education in the aspects of survival rights, emotions, freedom, self-actualization, and equitable child rights, but this work will be moving a step further by introducing the use of virtual reality in the training of girl-child for emancipation, increased productivity, multi-tasking and the development of inherent abilities. At the end of the day, facilitating resilience the innovative tendency of the research work is pertinent to the development of not only African but global knowledge systems. The work would be based on both primary and secondary sources with the adoption of conceptual and theoretical frameworks. The outcome of the research work would be the improvement of the quality of training to enhance the hitch-free transformation of the society even with the exigencies of world emergencies.

1. Introduction

The African knowledge system is an embodiment of knowledge, skills, vocation, and manners tagged as "Intellectual Capital". All human societies, past and present know their physical, social, metaphysical, and spiritual environments, which allows them to produce materials as well as form personal and intergroup relations for sustainability. Such endowments are referred to as Science and Technology. The development of such has become the criteria for classifying societies of the world into either developed, developing, or less developed, in the description of Olaoye (2009) Indigenous knowledge system applies to all aspects of livelihood ranging from food security to social transformation, governance, leadership, beliefs, customs acquired through non-formal and informal education.

The facilitators of the indigenous knowledge system are every older person in the society and sub-consciously, the aspect of home training emphasizes moral values, customs, and norms, specifically hammered in the training of Girl-child in the African context. A girl-child in Africa is supposed to proclaim the image of the "Home" so much so that technology acquisitions are not prioritized. Apart from the fact that the African indigenous knowledge system does not consider its technological aspect as a viable source of national and international development, the Girl Child is also not considered a learner that has natural endowments and inmate tendencies, which need to be expanded, which would be achieved through her interaction with the immediate and remote environments. In a bid to use indigenous education as a device for the development of the potential of the girl-Child, Virtual reality is submerged into the girl-child training towards the acquisition of indigenous technological knowledge. This has a mild relation to the recommendation of digital curriculum to formal education.

The indigenous technology of palm oil extraction and Textile industries are used in a non-formal, casual, friendly, and entertaining environment, where there would be no strict adherence to compelling rules and regulations of a formal setting. The age of a Girl child is classified as pre-schools, Primary and Secondary School ages and in these days of early enrolment of children, up to the early years in the tertiary institution. At these ages, Children's cognitive development space/ domain is expanded. Technology, in the opinion of Olatunji, (2004) is defined as the result of the fusion of mental and physical efforts to produce tools and products that will respond to human needs and services. Whether old or new, technology remains the same; such training will instill confidence in the girl-child, promote her contribution to Gross Domestic Products and encourage emancipation, economic viability, and intellectual maturity that will drive innovation and resilience. This study is an innovation over the 20thcentury "edutech", which is still physical.

2. The Statement of Problem

World exigencies in the last few years reflected complexities and uncertainties ranging from Food, Social Health to environmental insecurities. Of note is the world pandemic experienced between 2019, 2020, and 2021, the antecedents still linger till 2022. The universal nature of the post-pandemic regime is shown in its capability to erupt innovation and decisive change that transcends all categories of people and all societies. More than ever, the virtual space was utilized to achieve training and uninterrupted sessions of knowledge acquisition. Hence, this study perceives the girl-child as one of the vulnerable classes of society that the world emergencies could hinder its training. This brought about the need for sub-merging virtual reality into the African knowledge systems in technology, as against the usual oral arts which are useful tools in the formation and sustenance of African non-material cultural heritage. The need for quality training of the girl child for both innovation and resilience to achieve economic emancipation and viability also instigated the study.

3. Objectives of the Study

The paper intends to submerge the technological aspects of the indigenous knowledge system into virtual reality specifically,

i. Investigate the qualitative girl-child training for resilience.
ii. examine the technological aspects of the African Indigenous Knowledge system
iii. examine the aspects of palm-oil extraction and textile weaving and come up with some virtual video that could train them.
iv. investigate the experimental and control girl-child groups towards innovative tendencies.
v. To utilize virtual reality in some aspects of African indigenous technology.

4. LITERATURE REVIEW

African knowledge systems: Indigenous knowledge systems and African Knowledge systems are used interchangeably. These are experiential, relative, and based on cultural practices. All societies of the world have an indigenous knowledge production system. The Spirit and contents include wholeness and commonality and harmony (Kaya and Seleti, 2013). The global dominance of the western values, knowledge system in research and academic knowledge production referred to the African Knowledge system as mere repetition practices, due to a lack of theory for its explanation. Considering the last comment as intellectual arrogance, (Owusu, 2013) considered the use of IKS in the implementation of research and its outcome, a pertinent factor to sustain the Afrocentric paradigm. To buttress this, the western research method of separating the theory and practice could not run in tandem with African Scholars' perception that the issue of lack of theory and explanation does not arise; African thoughts, ideas, realities out of which Africans derived emancipation, participation in the economy and empowerment and its method of investigation cannot be divorced from the People's History.

African knowledge systems contributed to African civilization but are not fully documented. Oloruntoba, Afolayan, and Yacob-Haliso (2020) locate African Knowledge System within the global hierarchy of knowledge production. The characteristics are communal, collective, and interdependent, and meant to attain peace, progress, and prosperity through (i) Practical Methods of acquisition, interpersonal relations, and emotional channels. However, the limitations are observed as a lack of openness, lack of flexibility to changes, and the undue attachment to traditional beliefs as the spiritual aspects. The urgent need for the adaption of the African Knowledge system was made by Akinwale, (2020) that the condition that sustained it has been modified in the context of contemporary globalization. (Posey et al, 1996) opine that the degree of blending the formal and informal knowledge will naturally evolve transformation, adaption, and dynamism based on contemporary innovation.

4.1 Girl-Child Education

Girl-child is a biological female child from birth to eighteen years of age (Puri, 2016). This is the age before one turns a young adult. This period covers the crèche, nursery, or early childhood (0 - 5 years), primary (6 - 12 years), and secondary school (12 - 18 years). During this time, the young child is completely under the care of the adult who may be her parents or guardians. There was a time when many people believed that it was not necessary to educate girls. Today people realize that girls' education is essential for the human society (Alabi and Alabi, 2014). Over the decades, most

African women have received some sort of informal education white but formal education has been reserved for men who occupy the more important and elite roles in government and society (Johannes, 2010). The modern age is the age of awakening of girls. They are trying to compete with men in all spheres of life. Girls' education is like sowing the seed which gives rise to a revitalized, cheerful, and full-grown family plant. Educated women can bring socio-economic changes. Lack of education denies the girl child, the knowledge and skills needed to advance their status in society. Educating the girl child will enable her to realize her full potential, to think, question and judge independently (Osakwe and Ani, 2014). Several studies have been conducted with respect to girl child education.

Abubakar and Kwashabawa (2021) worked on the securing of girl-child secondary education for sustainable national security major focus on northwestern Nigeria. The study identified approaches to securing girl-child education to support sustainable national security as the provision of a security fence, setting up of security outfit, provision of a school bus, installation of CCTV cameras, and taking serious legal action against girl-child abuse associated cases.

Ekundayo (2019) focused on the connection between culture and education and how it disturbs the African girl child. The work defined the meaning of education also from its etymological perspective to its scholarly point of view. It then showed the importance of education to every individual, nation, and at the international level giving a statistical analysis of the number of people most particularly the girl child who has been repudiated access to education in Africa.

Embwa, Shauri, Sammy and Namasaka (2018) investigated the cultural factors affecting the low access of the girl-child to free primary education in Nigeria with a focus on Bali Local Government Area (LGA). Both qualitative and quantitative data were presented using descriptive statistics. It was established that cultural factors influence the girl child's access to basic education in Bali LGA. Findings showed that over four-fifths (81%) of the households had six and above members of the household.

Examination of the general problems facing a girl-child and the peculiar challenges facing their education opportunities in Nigeria was carried out by Alabi and Alabi (2014). Information used by the authors were collected from published articles, text, and internet sources. The work revealed some cultural and traditional beliefs and practices in Nigeria which establish major barriers to the education opportunities of girl-children and suggestions of some ways of improving girl-child education through holistic methods were made.

The period of Girl-Child is that of transition from childhood to Adulthood; it is a period of extending horizon, self-realization, and emerging independence. According to Shittu, (2003), it is the period of discovering the ways to initiate actions characterized by the development of a sense of competence, awareness, and the discovery of one's potential and the path to follow. The female child has always been the victim of educational inequality throughout the world. The story is changing now that the whole world has realized that Girls' Education is paramount, for the full realization of potential, sustainability, productivity, and resilience, which are the significant factors of survival in the 21st century, the pandemic experience substantiated this further. The underlying philosophy behind empowering the Girl-Child is to eradicate ignorance through productive education without discrimination, (Ojo, 2020).

4.2 Virtual Reality and Information Technology

Awotokun, (2021) discussed the optimistic transformation in the age of knowledge explosion. In his further discussion of the accessibility of knowledge, he exposed the enabling power of Information Technology as a tool for educational improvement. It can create an active process that can be connected to real life, suggesting a change in delivery, usage, absorption pattern for critical thinking, innovation, entrepreneurship skills, and resilience. Obanya, (2005) recommended exposure of Africa to the outside world on a solid. Afrocentric foundation, domesticating knowledge, and techniques.

According to Obanya, the content of indigenous knowledge at all levels should include I.T fluency as a specialized subject, but as a subject that can enhance or aid all aspects of learning. Simply put, A gate to the world pool of knowledge, especially the globalizing tendency and the struggle to belong to Africa to the global village. I.T is the basis for self-reliance, resilience, and a balanced approach between "principle and practice to eliminate poverty and the development of innate ability for innovation and creativity. (Abokede, 2000). Hence, the shift in policy to techno-scientific pursuit through indigenous capacity could imbibe foreign ideas by various African countries.

4.3 The World Pandemic and Resilient Livelihood

The Universal characteristic of a pandemic era is the need for alternative means of survival. The last two to three years gave the picture of the period of stagnation and retrogressions and led to a crisis of high magnitude. The recently experienced Pandemic was contained by peoples' visibility in the virtual world. An increase in digital space activities sustained some sectors of the economy the world over. Through virtual reality, the effect of pandemics was reduced.

5. Methodology

Four-day training organized for 20 girls between the ages of 14-18 years reflecting the informal and non-formal mode with Group focus Discussion outside the classroom. They were divided into 2 groups of experimental and control. The first group was trained in the aspects of palm oil production and cloth weaving using both virtual reality and traditional demonstration methods. The second group were trained without the use of virtual realities but was exposed to the traditional method of demonstration. Oral discussion and an unstructured questionnaire administered with the experimental girl-child groups also formed part of the instruments of research.

i. Research Questions

1. Does the quality of training of the girl-child constitute transformation and stability factors in the society?
2. Is Technology the driving force behind development?
3. How can the integration of indigenous and modern technology bring progress to society?
4. Do innovations come out of quality training with diverse methods?

ii. Theoretical Framework

(1) Social Construction of reality and (2) Gender Education and adaptability

One of the theoretical bases upon which this work rested is the social construction of reality as a theory of change. This is considered in the development aid along the line of causality, implementation, and external factors. This is also in

line with the adaptive theory, due to previous occurrences. The theories are to exemplify the reflection of changes that are patent in society. In the Education Sector, the explosion of I.T knowledge and the occurrence of the world pandemic re-directed the mode of Education delivery System towards change and adaption to the new demand of the new normal. The theory of change and gender equality approaches each other according to the contribution of Buhrers Kalpazidu et al (2020) These theories address change and articulate how change occurs according to Anouka Van eerdewijk (2014) and Jane L Parpart and Eudine Barriteau (2000). The second prominent theory is that of Gender Education and Adaptability, specifically (Feminist Knowledge Production). The belief that African society is a male society encouraged the search for equality in terms of educational opportunities and the development of feminist knowledge production for the full realization of the potential of the girl child. The girl child is the focus of this research, working towards technological empowerment, innovations, and resilience. The above-mentioned theories are explicable twists in the history of ideas, knowledge production, and intellectualism about the attention given to the training of the girl-child.

iii. Quantitative Analysis

A. Experimental Group: Traditional + Virtual Reality

B. Control Group: Traditional

6. Result

The selected Group A was exposed to both the Traditional and Virtual Reality systems and Group B was exposed to the Traditional system only. The experimental group (A) had better performance than those of the control group (B) because of the opportunity of repetition and the instrument of the Test also elicit the innovation which came from the experimental group. Table 1 and Figure 1 show the result of the quantitative analysis for both the Experimental and Control Groups. The two groups represent the number and percentage of performance made by both groups A and B in Palm Oil Production and Textile Weaving. Group A had a higher performance capacity of 73% and 80% while Group B had a performance capacity of 50% and 53% in Palm Oil Production and Textile Weaving respectively.

Table 1: Result of Quantitative Analysis for Groups A and B

Groups	**Performance in Palm Oil Production**	**Performance in Textile Weaving**
A	73%	80%
B	50%	53%

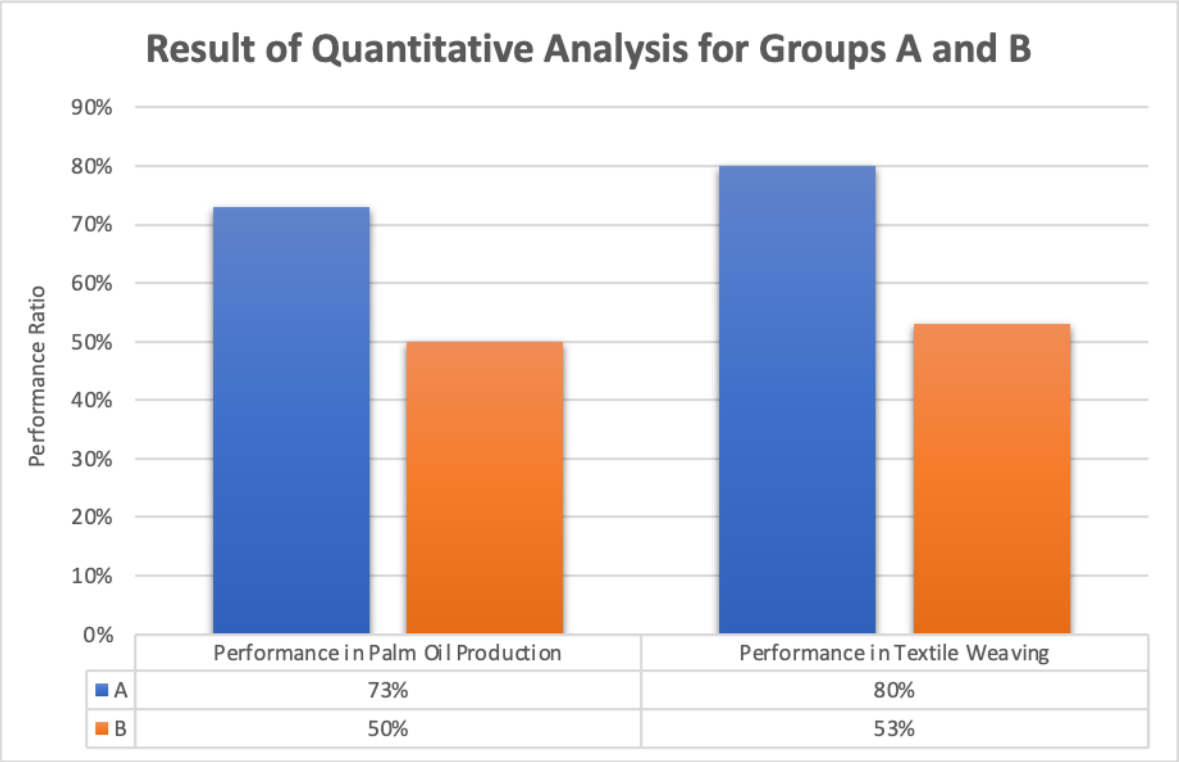

Figure 1: Result of Quantitative Analysis for Groups A and B

The experimental group overcome the limitations of the control group as the exposure to the practical provided by virtual reality technology allowed them to be able to master the practice quickly and effectively carry out the practices in both Palm Oil Production and Textile Weaving. The experimental group (A) carried out the practical at once whereas the control group did it after several attempts. This technology also optimized the performance of the experimental group by improving the learning rate and ability of the girls in the group.

Group focus Discussion

Innovation discussed by Group A

- 20% of members suggested the use of some other sites online where they could learn more about both palm oil production and textile.
- 50% claimed that repetition and the control of the phones and gadgets around zooming allowed them to achieve success.
- 60% of the girl children referred to acquiring better machines that could perform the same function from the developed world and that such could be easily mobile so that one's leisure could be spent weaving some stuff in relation to textile. Such textile materials could be used as school uniforms instead of the type they buy in the market. While cooking, one can make her palm oil fresh piecemeal.
- 60% attempted the use of a blender for extraction and sieve for better products
- 70% thought of better methods of draining and even compressing extracted Palm oil because of the excessive water contents.

- Group A started thinking of prototypes and other dimensions while Group B preferred the conservative physical ways of production due to a lack of the experience with virtual realities

The two groups exhibited confidence in the acquired knowledge and believed they could do the practical work repeatedly

The two groups seemed to be more interested in textile than palm oil production.

7. Conclusion and Recommendations

This study adopted Virtual Reality (VR) Technology to solve the problem of girl-child education in the African knowledge system for emancipation, increased productivity, multi-tasking, and the development of inherent abilities in a girl-child. Virtual Reality Technology's ability to harness the power of adaptive learning rates resulted in improved performance. This system could be employed by education experts as an effective tool for the improvement of the quality of training in underdeveloped learning environments. Future studies might involve applying VR technology to Training allowing people from different professions to help children prepare for their roles in an environment where they are exposed to potential dangers and security issues, thus becoming an important training tool for a range of areas.

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