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WOMEN EDUCATION IN THE 21ST CENTURY: THE ROLE OF TECHNOLOGY

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Abstract

The importance of women's education cannot be overemphasized, as it serves as a cornerstone for the development of a nation's economy. It empowers vulnerable individuals to explore opportunities within social and natural resources, paving the way for emancipation. In the 21st century, education has increasingly emphasized globalization, ICT, and the knowledge economy. This paper highlights the pivotal roles of technological innovations in women's education across various realms, including vocational, formal, and non-formal education, as well as distance and higher education. Technology has the potential to support transformative learning, enabling learners to grow, change, and develop. Incorporating technology-based learning into women's education could significantly contribute to the development of women as national resources for economic, political, and environmental growth. Therefore, it is recommended for implementation in Nigeria's education policy and curriculum. Technology should be integrated and deeply ingrained into all approaches and methodologies employed for women's education. Furthermore, the education of girl children should expose them to technology and science subjects early on, starting from the formative years of elementary school through the tertiary level.

Keywords: Women Education; Technology; 21st Century Education, ICT, Adult Learning

Introduction

Adult learning and education began with the aim of providing literacy to every adult who could not read or write. Its initial components were reading, writing, and arithmetic, with a particular focus on older people in society (Ajayi, 2019), a demographic in which women were disproportionately represented (Zua, 2021). Over time, women have increasingly been at the forefront of adult learning planning and implementation (Ifeanacho, 2021). Today, this has evolved from mere adult literacy initiatives to encompass formal and non-formal education for women. Women have been central to the "literacy for all" movement, which seeks to create a literate environment and society essential for achieving the Millennium Development Goals and subsequently, the Sustainable Development Goals. These goals include poverty eradication, reduction in child mortality and maternal morbidity, population growth control, gender equality, sustainable development, peace, and democracy (Baffoe et al., 2019; Shapiro & Tenikue, 2017). Women's education has thus

garnered significant attention from scholars across various fields, who have emphasized its importance for women's development and emancipation, as well as national socio-economic development.

Considering the crucial role of women's education in household, community, and national socio-economic, environmental, and political development, alongside the growing influence of technology in education, there is a pressing need for more comprehensive and equitable access to schooling. This includes the demand for and expansion of online and distance education programs, particularly in light of economic challenges. Presently, women are more vulnerable to various challenges of modern society, particularly those associated with technology, especially in the workplace (Kecojevic et al., 2020; Yoosefi Lebni et al., 2020). This vulnerability stems from a digital divide between men and women, resulting in a limited understanding of technology, lower levels of digital literacy, fewer digital skills, less online presence, and a lower likelihood of owning mobile or technological devices among women (Acilar & Sæbø, 2023). Consequently, women are underrepresented in fields experiencing job growth, such as engineering and information and communications technology (Fauziah, 2023; Larsson & Viitaoja, 2019).

Despite the low representation of women in paid jobs, on average, 11 percent of women are at risk of losing their jobs due to automation, compared to 9 percent of their male counterparts. This could result in an estimated 180 million women's jobs being displaced globally by technology within the next 20 years (Brussevich et al., 2018). This is a significant problem that cannot be overlooked. Understanding the impact of this trend on women's lives, their children, households, and society, as well as recognizing the numerous advantages of technology in education, underscores the importance of redirecting women's education towards acquiring the necessary technological skills to navigate global automation waves. This includes bridging the digital knowledge and literacy gap between men and women.

Women Education

Education remains a fundamental right for every citizen, regardless of gender, due to its catalytic roles in socio-economic and human capital development. It catalyzes reducing poverty, ignorance, and exclusion (Ojobanikan, 2019), with its impact particularly crucial for household, community, and national development. However, numerous constraints and barriers exist to education, with women facing more obstacles (Ojobanikan & Omolewa, 2020). Historically, societies such as Britain, India, and various African regions exhibited biases against women's education to varying degrees. In traditional African societies, women's education was often marginalized and considered unnecessary since women were not expected to carry on their father's name. Instead, they were relegated to domestic roles, including child-rearing and household chores, with limited access to land ownership and participation in community affairs (Ojobanikan & Omolewa, 2020; Akubilo & Omeje, 2012). However, post-colonial efforts and considerations for women's education, especially through adult and lifelong learning initiatives, have yielded positive results in terms of literacy, development, and empowerment for women.

Women's education encompasses all forms of education provided to women, including young girls and adult women, to acquire knowledge, skills, and attitudes necessary for personal, familial, and societal change (Shapiro & Tenikue, 2017). Its scope is broad, covering various educational domains such as schools, colleges, vocational, formal, non-formal, technical, higher, tertiary, professional, and health education (Ifeanacho, 2021). The extensive coverage of women's education underscores its numerous benefits, including economic and social development, empowerment, mental capacity development, access to wealth sources like land and property ownership, improved quality of life, better

health outcomes, self-esteem, equity, and justice for women and children, informed decision-making in career and marriage choices, participation in associations, and reduction of poverty (Aja-okorie, 2013).

The importance of women's education is evident in the adoption of the Millennium Development Goals, where achieving most goals relied heavily on women's education, except for goal eight (Ifeanacho, 2021). Goals three, four, and five, in particular, rested largely on women, recognizing that only an educated mind could drive development in all its facets (Ojobanikan, 2019). While the Millennium Development Goals made significant progress, their non-attainment led to the formulation of the Sustainable Development Goals, which continue to prioritize women's education for achievement (Akinola & Oluwaseun, 2013).

21st Century Education

In the 21st century, education places a strong emphasis on technology-aided teaching and learning processes, to foster critical thinking and the application of science and technology to address contemporary societal challenges. Critical thinking, teamwork, and problem-solving skills are prioritized to enhance educational development and facilitate solutions to the complex problems of modern society (Onebunne, 2022; Barba-Sánchez & Atienza-Sahuquillo, 2018). Furthermore, there is an emphasis on leveraging technology and science to enhance teaching and learning processes, creating opportunities for independent and self-directed learning (Blaschke, 2012). Teachers are encouraged to utilize technology-driven strategies and modern pedagogies andragogy to promote better understanding and participation in classroom instruction. Technological instructional materials play a crucial role in aiding comprehension, assimilation, and performance. Additionally, technology strategies provide opportunities for remote learning, overcoming barriers of time, space, and location (Agboola et al., 2016). Shifting from rote learning and memorization to the adoption of modern pedagogies and technology-based learning is also fundamental in 21st-century education.

Professional development for teachers is a key focus of 21st-century education, along with providing materials and resources to both teachers and students (Haug & Mork, 2021). Teachers undergo training and re-training to stay updated with discoveries, developments, and technologies, enabling them to effectively adapt their knowledge to real classroom situations and support curriculum implementation (Zaragoza et al., 2021). Additionally, there is an emphasis on providing materials to move away from traditional rote learning methods for both teachers and students (Onebunne, 2022).

Women's Education in the 21st Century

In the past, up to the middle of the 19th century, women's education primarily focused on educating women and girls to excel as household workers and custodians of traditional values in some parts of the world (Mollel & Chong, 2017). However, there has been a gradual paradigm shift in the perception of women's roles and their education since the onset of the Industrial Revolution (Venne & Hannay, 2017). There is now greater emphasis on educating girls and women to match the educational opportunities available to boys and men. Campaigns against gender disparity in education have gained international attention, particularly evident in the Millennium Development Goals of 2000 and subsequently, the adoption of the Sustainable Development Goals (Spaiser et al., 2017). Parents are being sensitized to prioritize their children's education without gender bias (Mau et al., 2020), while governments and non-governmental organizations are employing various strategies to bridge the gap in education between males and females, from enrollment to completion, and from primary to tertiary levels (Jue, 2019).

Women's education encompasses both literary and non-literary education and is intricately linked with economic, social, and environmental changes, holding significant importance for personal, social, and national development (Ifeanacho, 2021). Educated women are recognized as key agents for bringing about the socio-economic and environmental changes needed in the 21st

century. Moreover, it is widely acknowledged that technology plays a critical role in driving education for productivity and global economic growth, a concept known as the knowledge economy (Onebunne, 2022). Women's education is no exception to this development. It is therefore crucial to steer women's education from basic to higher and tertiary levels, leveraging modern technology to empower more women, provide greater access, and promote women's empowerment, self-reliance, human capital, and capacity for emancipation.

This recognition is rooted in the understanding that only educated women can create literate environments and societies essential for achieving the Sustainable Development Goals, including eradicating poverty, reducing child and maternal mortality, curbing population growth, achieving gender equality, and fostering sustainable development, peace, and democracy (Price-Dennis et al., 2017). Recognizing these important roles of women's education, governments worldwide and numerous non-governmental organizations have undertaken various projects to advance and expand women's education, including special school programs and literacy initiatives targeted at older women, with the hope of enlightening and educating a higher percentage of women.

Technology and Women's Education in the 21st Century

Aligned with the focus of this paper, the information and communication technologies term "ICTs" refers to the use of computers and communication technologies to support teaching and learning. 21st-century education places significant emphasis on integrating technology into teaching and learning processes, benefiting all groups (Yilmaz, 2021). Women's education stands to gain immensely from ICTs, which encompass a range of technologies from laptops wirelessly connected to the internet to cell phone web browsers, personal digital assistants, and low-cost video cameras (Labaran, 2017). ICTs make learning materials easily accessible and available to women, with the potential to expand education's reach regardless of time, space, or person. This shift extends beyond traditional teaching methods to blended learning, fostering creativity, productivity, and democratic participation while catering to women's diverse abilities and backgrounds (Cherner & Curry, 2019).

ICTs have significantly influenced 21st-century education, impacting teaching, learning, research, access, and flexibility in teaching and learning methods across all educational domains. Women's education stands to benefit greatly from ICTs, facilitating accelerated, enriched and deepened skills and motivation for both teachers and students. Additionally, ICTs engage learners by relating school experiences to practical work scenarios and creating economic opportunities for present and future society (Hernandez, 2017). They support competency and performance-based curricula that utilize affordable technologies, enhancing the global learning environment (Hernandez, 2017). The use of ICTs enhances women's learning environments, particularly in developing countries, motivating and preparing generations of women for lifelong learning and self-directed career development (Onebunne, 2022).

Teachers play an expanded role with ICTs, utilizing computers, phones, and the internet to access unlimited information and materials for lesson planning, content improvement, and pedagogical development (Holiver et al., 2020). Learners also benefit from access to online resources, broadening their understanding and knowledge of subject content through self-directed learning supported by technology (Blaschke, 2012). New media technologies such as Facebook, WhatsApp, YouTube, and Twitter provide platforms for interaction between teachers and students, bridging local and international learning settings through online classes, teaching, conferences, and seminars (Trusov et al., 2019). Additionally, the use of modern technological tools and equipment like smart boards, projectors, and videos enhances women's learning experiences, aiding attention, understanding, retention, and application of

learned material to real-life situations (Shahzad et al., 2021).

Theoretical Framework – The Theory of Women in Development

The Women in Development theory (WID) gained prominence in the 1970s, advocating for the improvement of women's education and the overall promotion of women's empowerment, social and economic independence, justice and equity, as well as equal access to sources of wealth and ownership of family land and capital properties. Its principles and goals include gender equality, empowerment of women, recognition of women's rights, integration of a gender perspective, and capacity-building for women. This theory has remained influential in advancing women's causes, particularly in the areas of education and empowerment. International organizations and bodies such as the United Nations Development Programme (UNDP) and the World Bank have worked with this theory for over three decades to promote women's empowerment (Lee et al., 2019).

The essence of the Women in Development theory lies in the belief that education empowers the mind. Education develops and equips individuals with the necessary knowledge, skills, and attitudes to effectively undertake and address development activities and issues. The theory also posits a correlation between education and employment, social and economic independence, as well as assertion and participation in formal sectors of life, whether it be formal employment, community participation, or other social aspects (Matthews, 2015). As a result, the theory advocates for the full inclusion of women in education, across all spheres and at all levels, to empower women.

The Women in Development theory has achieved success, as many of its approaches have led to the development of policies and strategies promoting women's equal access to education and participation in formal sector employment (Rathgeber, 1989). Its relevance in the 21st-century teaching and learning process, especially in women's education, cannot be overstated. It emphasizes the need to empower women through education for the overall development of women, their families, their societies, and their nations at large (Lee et al., 2019).

Important Roles of Technology in Women's Education

Cognitive development: Technology supports the development of cognitive processes and skills involved in literacy, reading, and studying, thereby enhancing women's education by increasing their studying abilities and capabilities (Wagner & Kozma, 2005).

Access to education: Technology opens up more and equal access for women's participation in educational activities. Women who may have been deprived of access to education due to distance, location, or responsibilities can now access educational opportunities and advancements through ICTs and the Internet at their convenience. It also facilitates independent and self-directed learning (Parker, 2020).

Support for distance learning: Technology enhances distance learning and the skills required for it, enabling women to study at their convenience, irrespective of distance, time, and space. It also makes learning materials available remotely, along with other resources (Wagner & Kozma, 2005).

Learner participation: Technology provides powerful teaching and learning strategies that enhance learner participation and engagement in learning activities. The use of media equipment coupled with ICTs and the internet offers opportunities for acquiring critical technological skills, fostering critical reflection and innovations necessary to make every woman relevant and supporting development in society through active participation in the teaching and learning process (Tuma, 2021).

Closing the gender inequality gap in the technology world: Women's presence in technology-related industries and organizations has been reportedly low due to their poor knowledge of technology. This is often attributed to early childhood influences, where boys are encouraged to play with toys like cars, robots, and computers, while girls are

encouraged to play with dolls and playhouses (Schlombs, 2022). This perception affects girls' choices in school subjects later in life, with girls often gravitating towards arts subjects while boys dominate science subjects (Schlombs, 2022). The goal set by Anita Borg, a pioneering computer scientist, to achieve gender-equal representation in the technology world by 2020 was not met, highlighting the need to support women's education with technology now. There is still ample opportunity for women to be adequately trained and equipped in the technology world for the overall benefit of nations worldwide. The technology sector offers various non-technical roles and opportunities that women can access to contribute to making the world a better place, bridging the existing gender disparity (Schlombs, 2022).

Development of problem-solving skills: Technology enhances the development of critical and logical thinking skills for independent, decisive, and creative decision-making, leading to the application of knowledge in real-life situations (Afari & Khine, 2017).

Economic opportunity: Technology equips women with the necessary technological knowledge to compete for high-paying jobs in the labor market. Technological know-how has become a requirement for obtaining well-paid jobs, making it imperative for women's education to prepare them for such opportunities, thereby changing their economic status from traditional roles to well-paid professional workers (Duggan, 2015).

Household education development: Women with knowledge of technology can bring about change in household education, as they are often responsible for their children's homework, some of which now involves technology. Additionally, accessing online materials and resources for their children's educational development becomes easier, enhancing the early technological knowledge of their children (Escueta et al., 2017).

Equal opportunities: Through technology, women, regardless of caste, race, gender, or religion, can have equal opportunities with their male counterparts in all spheres of life. Women and men would be treated equally based on their knowledge, competence, and technological know-how. Moreover, more women would become open-minded and capable of accepting new knowledge, ideas, and facts analytically for stronger decision-making (Onebunne, 2022).

Empowerment: Education is a key factor in turning weakness into strength (Onebunne, 2022), and technology empowers individuals to become competent and professional, capable of working alone and producing results. Technology offers various tools, ideas, and know-how to understand and solve problems. Women equipped with technology can stand up against gender bias, marital violence, or employment disparities, leveraging their improved knowledge to make decisions and present cases via technology (Onebunne, 2022).

Conclusion

There have been concerted efforts in women's education from the past to the present, with considerable success in closing the disparities that exist in the education of men and women, particularly in terms of equal access to education for male and female children, especially in enrollment and completion of primary and secondary school education. However, women, especially adult women, still lag in higher and advanced learning in many nations worldwide. This disparity has also limited their presence and representation in certain careers, especially in technology-related industries and workplaces. The importance of women in the technology world cannot be underestimated. Women possess the ability and capacity for innovations that could significantly contribute to making the world a better place by leveraging their potential in the technology field to create inventions.

Women tend to perform exceptionally well when provided with responsibilities, resources, opportunities, influence, and power. This characteristic enables women to thrive in diverse situations. To achieve gender equality and promote women's inclusiveness and representation across all sectors of life, it is imperative to grant more women access to quality education and technology. It is suggested that technology should be

incorporated and integrated into all approaches and methodologies employed for women's education. Digital literacy and skills should be integrated into all women's educational and empowerment programs. Furthermore, girl children's education should introduce and immerse them in technology-based and science subjects from elementary schools to the tertiary level. All stakeholders, including governments and non-governmental organizations, should invest more in women in STEM fields. Additional funding should be allocated to women's technology-based education. Importantly, governments at all levels should enact policies that facilitate women's access to technology-based education to bridge the digital gender divide and bring about gender changes in the landscape of work.

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