The Development of an Informative Model for Namibian Women in ICT Careers

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ABSTRACT

Information and communication technologies (ICTs) were identified by the United Nations as tools that enable and enhance economic development and sustainable development. Women are a social group that plays an important role in development from the family level through to community and national institutions. Despite their contribution in social and economic development, women happen to lack digital exposure and career guidance in challenging information technology careers. The challenge motivated the need to explore the occupational experience of Namibian women in information technology and factors influencing their information technology career growth. The study used qualitative research approach and a case study design focusing on Windhoek the capital city of Namibia. The sample size was 35 female workers from IT professions in Windhoek and 20 female students. The data were collected by means of questionnaires. The results showed that IT female's workers and IT students are less represented in IT challenging jobs and IT challenging courses that include Artificial Intelligence (AI), Cybersecurity, Networking and Programming. Furthermore, the results showed that women in IT take fewer challenging positions such as computer technicians and system administrators due to the lack of skills and appropriate tools. Finally, IT female workers are being undermined due to the traditional belief that women are less efficient, hence, they do not rise to higher positions. Following the results, it was concluded that social and cultural factors affect women in the ICT profession and it is possible to develop the informative model for Namibia women in ICT through identification of challenges and developing strategies for overcoming the challenges. Following identified gaps, it is recommended stakeholders including the government and other institutions must maintain the involvements of the Namibian girl child in specialized ICT courses at grass root level from primary schools, through secondary schools up to tertiary institutions and avoid any form of gender segregation when enrolling ICT students.

Key Words: Women, ICT, Cyber Security, Programming, Artificial Intelligence

INTRODUCTION

Information and communication technologies (ICTs) have been recognized by the UN as instruments that support and promote economic growth, which can lead to the advancement of women's empowerment (Musungwini, Zhou, & Musungwini, 2020). ICTs are essential to the creation of a new social order, which eventually leads to significant contributions from both men and women and their participation in the economy.

Information technology, according to Women in IT (WIIT) South Africa, is the cornerstone of the future digital workforce, powering every system that governs health, safety, education, the environment, commerce, banking, and more. It also presents millions of specialized IT professionals with job and business opportunities. WIIT seeks to help women in IT professions advance into more specialized IT occupations by addressing the barriers that girls face in realizing their own prospects in the field (WIIT, 2020).

According to López-Becerra, Gómez, et al. (2020) ICTs have a significant impact on economic growth and development,. As a result, in order for women and girls to achieve their goals and contribute to economic development, they must have access to the right information. This can only be done by empowering women by giving them access to essential information and involving them in social, economic, and environmental

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development. A study by Zacharia & Irakleous (2020) states that there are, on average, just 12% of women working in fields like cybersecurity and artificial intelligence globally. There are still prejudices and stereotypes in the cybersecurity and AI fields.

There have been numerous attempts to promote parity, some of which have been successful. These encouraging methods have only been used in a few countries and with a relatively small sample size, so their applicability is rather limited. According to Peluso, Baird & Kesterson-Townes (2019), there is a problem with women seeking employment in cybersecurity and artificial intelligence (AI), which make up the majority of digital technology domains.

According to the UN Development Programmer, ICT skills will soon be necessary for about 90% of jobs. In order for women to take advantage of these opportunities on an equal basis with men and to be able to significantly contribute to their own, their families', and their country's development, it is necessary to comprehend the obstacles that women face as they pursue careers in ICT from elementary school through university, as well as in their employment and advancement within the ICT sector (Musungwini, Zhou & Musungwini, 2020).

Women and girls must have access to the correct information in order to accomplish their objectives and support economic development, as communication technologies (ICTs) are crucial to economic growth and development. This is only possible if women are given access to vital information and are actively involved in social, economic, and environmental development initiatives (WIIT, 2020). In a 2017 Price Waterhouse Cooper study, women said that one of their first choices for a career was in technology. Nevertheless, the same report revealed that 78% of the students who participated in the study were unable to pursue careers in specialized fields like artificial intelligence, programming, software development, and digital networking (Jon, Laura & Sheridan 2017).

UN stated that, information and communication technologies (ICTs) are instruments that nearly every human being may use to promote sustainable development and economic growth, which advances society and makes it possible for women to realize their dreams (Musungwini, Zhou & Musungwini, 2020). ICT is seen as the emergence of a new social structure that eventually leads to the participation and contribution of both men and women in the economy.

Despite the fact that ICTs are beneficial to both men and women, women face more obstacles when it comes to pursuing jobs in information technology since they are less exposed to digital technology and are not given the same career guidance (Musungwin & Zhou, 2020). A Malinga (2019) survey revealed that only 20% of South African women work in formal jobs, with the majority (51%) working in the ICT industry. Pokpas (2019) highlighted that men are more competent when it comes to some specialized ICT working environment such a programming, AI, Cybersecurity, Digital Forensics & Systems Security, innovation entrepreneurs and telecommunication networks. He also indicated that there are many stereotypes that are creating barriers for women to access IT specialized areas and thus putting obstacles in the way toward economic sustainable development and women’s empowerment.

However, the existing literature (Musungwin &Zhou, 2020; Malinga, 2019; Pokpas et al., 2019) could not establish reasons influencing challenges women are facing when pursuing ICT careers. In the Namibian, the situation is similarly concerning. According to Libe (2020), only 30% of the ICT workforce in Namibia comprises women, highlighting a significant gender gap. This suggests that even while women work in the ICT industry, many barriers and difficulties prevent them from fully participating in and progressing in this area.

The purpose of this research was also to identify any barriers or adverse effects that women may encounter when pursuing a career in information technology. The research also sought to determine the precise barriers that prevent women working in ICT from moving up the corporate ladder. Creating a useful model for Namibian women working in the ICT industry.

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METHODOLOGY

The research methodology, focused on an exploratory design under the pragmatic paradigm to examine the experiences of women in Namibia's IT sector. A mixed-method approach was employed, integrating quantitative data from student questionnaires and qualitative insights from interviews with IT professionals, ensuring comprehensive analysis through triangulation. The research population included female IT professionals and students from Windhoek's universities, with a convenience sampling technique yielding 35 participants. Data were collected using questionnaires and semi-structured interviews, processed with Microsoft Office and ATLAS software, and validated through construct validity and triangulation. Ethical standards were rigorously upheld, with informed consent, anonymity, and secure data handling. However, the study faced limitations such as respondent availability and potential bias from convenience sampling, which affected the generalizability and completeness of the findings.

The Model for Namibian women in IT / ICT careers

Chanakira (2021) stated that, Namibian woman who works as a mobile app developer for Green Enterprise Solutions, a Namibian IT company, and women are just as skilled at technology as men are. What prevents women from pursuing technologically demanding courses like programming, though, is a culture that is unsupportive and undervalues their abilities. Consequently, it is imperative to begin assisting women in order to fully embrace technology by fostering a supportive culture in homes, schools, and the workplace. Chanakira expressed her happiness at Green, saying that they are helped in pursuing complex areas of technology and are given the chance to flourish.

ICT is a field where many women are disregarded despite their outstanding accomplishments. Stakeholders, including the government and other organizations, can enhance the progress of women in technical professions by giving them access to a wide range of skill development opportunities and organized advice on professional growth. In the IT industry, multiplicity is essential because it helps companies design safer, better products that take into account the needs of the entire community rather than just a select few. Regardless of their IT degrees, the majority of women in technology work as receptionists, switchboard operators, or in administrative roles. Twenty percent of women over the age of thirty-five hold junior operational IT positions in many organizations. It is important that young girls and women working in this field have equal access to tech short courses and training programs provided by their individual employers.

The data analysis of the research study revealed that action must be taken to address the issue of Namibian women's underrepresentation in demanding IT/ICT professions and management roles. Additionally, action must be taken to encourage Namibian girls to pursue careers in ICT/IT, as this will help them develop an interest in challenging fields like artificial intelligence, programming, web portal design, networking, digital technology, and others. As a result, the researcher developed a guiding model that seeks to help in the aforementioned ways.

From a young age, the Namibian girl child must be exposed to or develop an interest in the ICT field. Additionally, they should have a more comprehensive understanding of IT so they can select the appropriate IT-specific courses. All of this is done in the hopes that they will be able to compete in the IT job market after graduation and favourably impact the economic growth of the nation. There are four parts to the model.

1. The implementation of ICT syllabus at primary education

2. Groom a girl child at secondary education on ICT careers

3. Awareness program at secondary education about ICT careers

4. Enhancement of women in IT careers or professions

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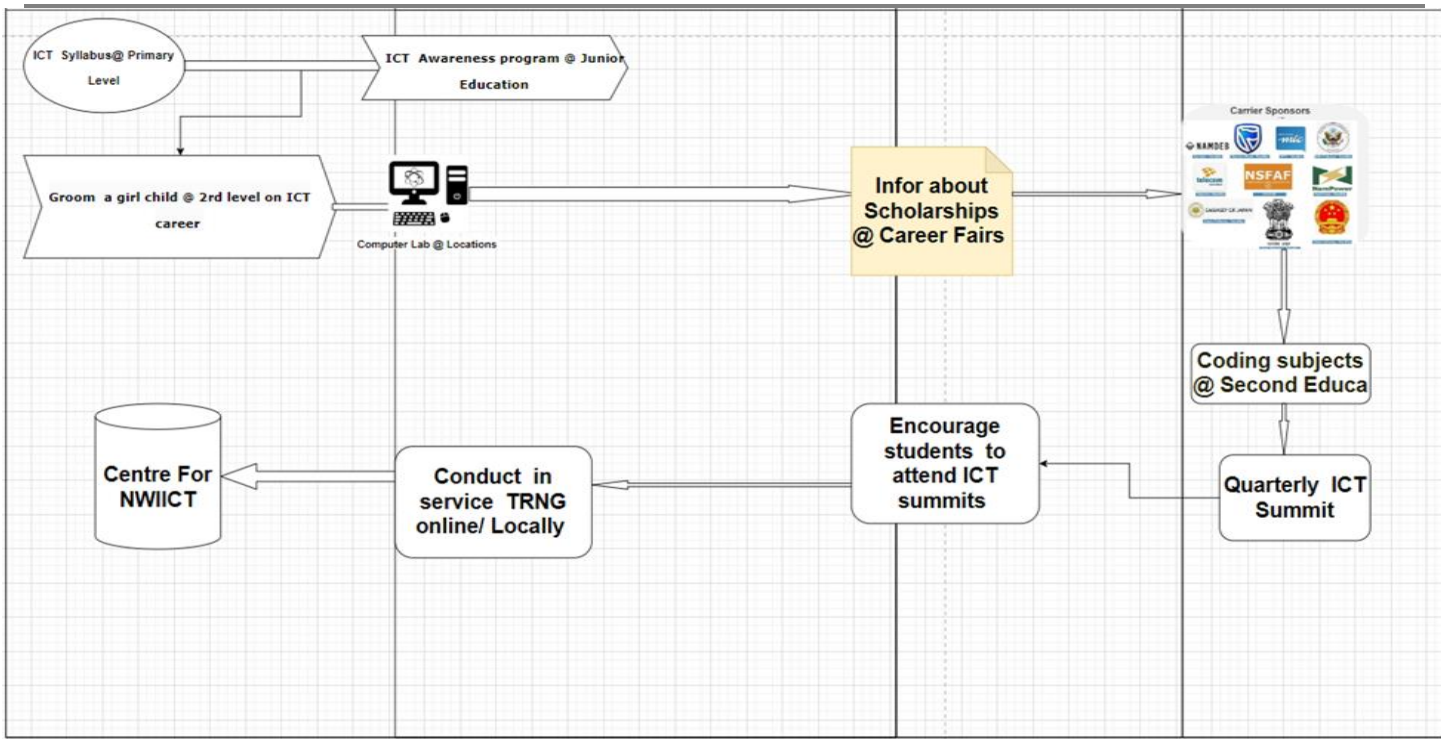

Figure1: Model for Namibian women in IT / ICT career

ICT syllabus should be introduced at Primary education

From the findings the study reveals that most of the students do not have ICT background like most of the students they came to know the computer box at university, which was real a challenge for them they have to familiarize or to undergo through computer basic literacy training before an introduction to programming or coding, that leads to some students repeating the first year because of failing programming which is a prerequisite or mandatory course, failing it of course one cannot proceed to the next year.

In order for students to understand the function and significance of ICTs as they relate to themselves, their jobs, and society at large, the fundamentals of ICT should be taught in elementary schools and incorporated into the curriculum. Organizers of job fairs ought to place a strong emphasis on bringing information about potential opportunities in ICT to students by hosting fairs at elementary schools. Primary school students should be made more aware of the need to incorporate ICTs into other subject areas across the curriculum and to use moral and ethical approaches when using technology. Policies that support this practice should also be in place. In countries like Zimbabwe, the junior education syllabus for ICT varies over eight years, with the current version being revised to take effect in the next eight years.

Groom a girl child at secondary education on ICT careers

Subsequently the world is going towards digital evolution that has drastically transformed our society and economy and Covid-19 has also further increase the use of digital technologies in almost in every area aspect of life starting from moving offices at home, online education even for secondary education, even medical doctors in some cases they do online prescriptions. Therefore, there's a lot to be done assist the Namibian child to prepare for their future so that a girl can able to enjoy and contribute equally to the development of this country by making use of technologies. This can only be achieved if this is practiced

1. Our government (ministry of education basic art and culture) could set up the provisional budget that can be used to facilitate the program of ICT education at primary education and secondary level.
2. Network infrastructure that can able learners at secondary education to access internet, for them to have more information about ICT and even do their given projects. This can be IT equipment's such as computers and any asset that can support the use of ICT education especially in rural areas at least in some towns they are library where one can access to computer and internet.

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3. Teachers should receive training in teaching IT and ICT courses, particularly programming. Currently, we can train IT graduates who are homeless to teach ICT subjects, and we can further train them to be proficient in specialized fields.
4. There is a need to seek donors those can support the education of ICT to be conducted in schools like UNDP and any other stakeholders those have interest in this. This is based on the merits identified under the Digital Transformation Strategy for Africa Model.
5. Career fairs should provide information on scholarships and bursaries for ICT courses. Learners should be encouraged to attend ICT summits and conferences, these should not only be for students at universities and those already employed, but also for learners at secondary schools. By doing so, it can help them to identify their career future and discovers new opportunity in life.

Awareness program at secondary education about ICT careers

1. Awareness programs should be conducted at secondary schools with appropriate information about availability of funding organizations that can provide them with scholar ships, bursaries not only NSFAF that is currently providing loans for almost every Namibian that pass matric
2. Should be the responsibility of the Ministry of Information and Technology to disseminate information about scholar ships at career fairs even at the shows and exhibitions', explaining in details that organizations like Nam Power, NAMDEB, Standard Bank and countries like India and China can fund the study if one pass very well without paying back the money
3. The office of the Prime Minister Department of Public Service e- government Management (Dopes-GM) Project Innovation Research and training can also come up with the innovative ways on how to assist the two mentioned ministries on how to execute this process of awareness and providing the necessary information needed by learners at secondary schools on how to engage into ICT world carefully in order to impact their future positively and effectively.
4. Award competition for initiatives- learners at secondary schools should give projects to develop various apps and any project within the IT environment just broaden up their thinking and entrepreneurship way of living using technologies, this can-do country wide and the best learners can be founded or even be given fund to start up with their business right from right there. This can motivate and encourage learners to focus more on ICT that can able them to go for challenging courses within IT world.

Enhancement of women in IT careers and professions

1. Computer Lab centre should be set at locations for IT students to practice during weekends &holydays
2. The IT summit should be conducted bi- annually for more interactions and opportunities discoveries
3. Students should encourage to attend IT conferences and summit those happening internationally.
4. Subjects such coding, Digital networking's etc. should be strictly be taught in every program from year one to the final year. This is supported by the merits identified in the Women in IT model of 2020.
5. In service training for certified IT courses should done online or the consultant should come train in Namibia, to give the opportunity to every woman who wish to participated since the research have pointed out that most women don't feels comfortable by leaving their family special children and spouses going abroad for three months to one year for training.
6. The research has revealed that there's a need of a Centre for women in ICT sector to be established in Namibia where women can interact with each other and sharing of information those pertaining to their career. This would be beneficial to them since according to the findings systems are already in place to aid them advance careers in ICT, but require to be embraced with the aid of the generated model.

The above model depicted the way forward in regard to women in ICT. It is imperative for there to be regular ICT summits, preferably at a quarterly basis in order to dissect the progress made and determine new ways to improve. Inadequate skills were one of the things discovered to be of concern by this researcher. Regular training and upgrading of skills as well as learning of new skills is imperative for women in ICT to reach their highest potential. A centre for women in ICT would also help close the gap, this centre can serve as a learning and networking centre where women meet regularly to study new trends, share information, encourage each other, and work on pursuing opportunities such as scholarships and internships.

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CONCLUSION

This reserach presented the model for Namibian women in IT/ ICT sectors, students pursuing careers and, then what should be done for the Namibia girl child to be involved in ICT/ IT specialized programs. The above model depicts activities or actions that need to be implemented in order for female representation in the ICT sector to improve.

With respect to representation of females in the ICT field, it is concluded that female workers and IT are less repented at management level. Students are less likely to take up more challenging jobs and challenging courses. Most students in higher learning institutions are doing fewer challenging courses in IT such as Business Information System, Business informatics and Computer Science while only a few are pursuing the more specialized disciplines of AI, Cyber Security, software Engineering and System Networking Administration. This suggests the reason for less IT female workers in challenging IT engineering jobs. There are not enough students registered to these specialized fields. The social factors such as family life, support from colleagues, sexisms and a lack of funding further contribute to the number of women in the ICT sector. Therefore, to be tangible change, a collective effort needs to be made by all stakeholders, from government, institutions of higher learning, the corporate sector, women in ICT and aspiring students. Also, there is a need for similar studies to focus on the inclusion of ICT as a subject at primary school level. A study assessing the lessons that can be learned from countries with a high number of women in the ICT specialized sector would also add value to the literature on this topic.

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Ethical Considerations

Ethical Approval: All the participants signed a content form as a way of giving approval to take part in the research.

Conflict of Interest: All authors have not in conflict of interest.

Data Availability

Statement: Not available.