



THE CHALLENGES FOR IMPROVING STATISTICAL LITERACY IN DEVELOPING COUNTRIES; CASE STUDY OF TANZANIA.

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Abstract

Statistics and general numeracy are increasingly becoming a necessary competency for modern life and the lingua franca of day-to-day transactions. Hence, improving statistical literacy is essential if future economies are to function efficiently and if citizens are to actively participate in and contribute to society. An insufficiently statistically literate public and business community cannot avail and utilize the available data. In turn, they cannot use data to inform their decisions, hold their elected representatives to account, or properly understand or critically assess local and global events. The challenge is becoming more urgent. As societies and economies are becoming more globalized and complex, statistics are becoming more complex in parallel. The increasing volume of data being disseminated from new sources, such as social media, brings new further challenges for those who struggle to distinguish fact from fiction. These changes are happening rapidly. The challenges for improving statistical literacy are of particular importance for the developing world, where they are disproportionately impacted by lack of resources, globalization and climate change. Improving statistical literacy in developing countries will be an essential element for achieving the Sustainable Development Goals and improving their development status. This paper shall examine a case study from Tanzania, including level of statistical education, successful initiatives to improving statistical literacy, the main challenges and blockages to progress from Tanzania perspective but also suggestions and recommendation made to improve statistical literacy in a country.

Keywords: **Keywords:** statistical literacy, ISLP, developing countries, quantitative skills.



1. Introduction

The ISLP is a project of the International Association for Statistical Education intended to provide information, conduct, promote and encourage activities on statistical literacy around the world. The mission of the International Statistical Literacy Project (ISLP) is to support, create and participate in statistical literacy activities and promotion around the world. To facilitate communication among many countries and projects, which is a forum where those interested in acquiring or providing statistical literacy can meet (in a virtual sense), exchange needs, information and resources, and learn to disseminate statistical literacy in their communities.

Statistical literacy is seen as a prerequisite to have a statistically literate population, in order to enable citizens to engage in meaningful discourse, understand what the government is doing, and participate in decision making and to make informed choices. Currently, in a modern world, Statistics is the soul of scientific enquiry. It is applied by researchers across a wide spectrum of science, engineering, business, technology, medical, government, economic and financial settings. These research projects ultimately produce tangible benefits-such as developing new drugs for diseases and improving agriculture crop yields-that significantly improve the wellbeing of the world's population.

At the same time, statistics is an invisible science-unknown to the general public in Tanzania and, perhaps more troubling, not valued as a key contributor to research by most scientists in other fields. Though, Statistics has grown and is continuing to growing in its importance to and impact on modern life. With the increasing role of information technology, our society is inundated by a data deluge, and statistics professionals are society's true experts for extracting usable information from the mass of clutter and noise in these vast data sets. Despite this rising importance, the statistics profession is poorly understood by the public, media and many in leadership positions in the public and private sectors. For example, most in these aforementioned groups understand the role of information technology in gathering data and managing data bases. However, the role of statistics in correctly making inferences from large data sets is less widely recognized.

2. Statistical Education in Tanzania

The ability to read and interpret summary statistics in the everyday media: in graphs, tables, statements, surveys and studies is still under scratch level in Tanzania. This is noted and shown in new data from the UNESCO Institute for Statistics (UIS) indicate that while literacy rates have improved the goal will not be met. According to the new estimates, there are 757 million adults, including 115 million youth, who still cannot read or write a simple sentence. Roughly two-thirds of them are female. UNESCO (2015) declares that since 2000 literacy rates for adults (aged 15 years and older) have improved, reaching 85% globally, but sub-Saharan



African and South and West Asia still have the lowest rates. In countries like Afghanistan, Mali and Senegal, the adult literacy rate is below 50%.

However, educational institutions in Tanzania are playing a great role to push forward and promote statistical education, data and statistical literacy in a country.

2:1 Eastern Africa statistical training Centre (EASTC)

Eastern Africa statistical training Centre (EASTC) worth a special mention with its vision “To be a leading training Institution and resource Centre in Official Statistics and Information Technology in Africa” Since its establishment in 1965, the Eastern Africa Statistical Training Centre has been conferring Foundation, Certificate and Diploma qualifications in Statistical Studies. Now for the first time in 47 years, the Centre has introduced a Bachelor's Degree in Official Statistics since 2012 with the 2012/2013 intake. The registration of almost 50 students commenced on the 1st of October 2012, MA in official Statistics and PHD in official statistics since 2014 and 2016 respectively. PhD program in Official Statistics aimed at producing top-level Official Statisticians and Researchers to serve the African National Statistical Systems, to prepare leaders and managers of Statistical Offices in Africa who have vast experience in Official Statistical activities, and to enable them to acquire academic qualifications which make them be official researchers. Eastern Africa Statistical Training Centre serves eighteen Countries which are on the Eastern and Southern side of Africa, namely Botswana, Ethiopia, Kenya, Lesotho, Malawi, Seychelles, Somalia, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe, South Africa, Mauritius, Namibia, Eritrea, Sudan and South Sudan.

2: 2 Tanzanian Data Lab (DLab)

The Tanzanian Data Lab (DLab) is an open working space where data from multiple sectors and sources can be combined, processed, and shared to drive better policies and decision-making. The DLab is a center of activity, connecting the data revolution to national priorities, global commitments and diverse programs and investments. It serves as an anchor for the Data Collaborative for Local Impact (DCLI) program, enabling data analysis and use to become more prominent in decision making in Tanzania. This is funded and operating under the United States President’s Emergency Plan for AIDS Relief (PEPFAR) and the Millennium Challenge Corporation (MCC) are partnering to support innovative approaches to ensure evidence-based decision-making for programs and policies that address HIV/AIDS, global health, gender equality and economic growth in Sub-Saharan Africa. In April 2015, the \$21.8 million “Data Collaborative for Local Impact” (DCLI) program was launched and the first two projects are underway in Tanzania. These projects are funded by PEPFAR and are being implemented by MCC.



2:3 National Bureau of Statistics (NBS)-Tanzania

National Bureau of Statistics (NBS-Tanzania) through its newly enacted 2016-Statistical Acts has been taking initiatives to educating the public on the importance of statistics to society, and raising the profile of Statistics by developing more effective and responsive regional Statistical Offices and National statistical system, Aid in seeking for public support for Statistical activity, explaining the role of statistics as a resource for evidence-based policy and decision making and illuminating the role of statistics in result-oriented and innovative management, Monitoring and Evaluation, and planning.

2:4 Mathematical Association of Tanzania (MAT)

The mathematical association of Tanzania (MAT) is non-governmental subject association registered from 1966. Abbreviated as MAT and its equivalent Swahili name is “Chama cha Hisabati Tanzania”. Activities of the association are: To conduct regional seminars and one national mathematics seminar every year, usually in September, write mathematics books, organize research competition, organize mathematics contests (Junior & Senior), and conduct Pi day celebrations. Also, the objectives of MAT/CHAHITA are: To effect improvements in the teaching of Mathematics and its applications, unite members and provide means of communication for this purpose and educate the society on the importance of mathematics and its applications.

3. Momentum gained toward improvement of statistical literacy.

Tanzania joined the Global Partnership for Education in 2013 that covers the period 2008-2017, these GPE-funded programs have led to the following outcomes: Developed a new curriculum for reading, writing, and arithmetic, trained 18,680 teachers and facilitators in the new curriculum and provided 16,000 primary schools with new learning materials, this has improved the arithmetic (numerical skills) among young people in primary and secondary schools. This has been considered as a requirement for every individual toward understanding simple quantitative and qualitative information and how takes for someone to be statistically literate.

Also, The ISLP-Tanzania has aimed to extend teaching of statistical literacy to other spheres of life in Tanzania, the main target groups are as follows: citizens and the media, educational institutions (secondary school and upper secondary school-age students), universities and research institutions, decision-makers, libraries, and national statistical agencies, the perspective of the last target group is “how to bring promotion of statistical literacy more visibly on the agenda of all national statistical agencies. Striving to promote recognition of the importance of statistical literacy across the country in different aspects of lives and in the past



few years statistics educators have emphasized the place of statistical literacy in statistics and numeracy education reforms. And, Tanzania for the first time has participated in 2016/2017 statistical literacy poster competition as a one step forward to improving statistical literacy in a country, ISLP-Tanzania has been mobilizing people through written ISLP-project proposal that is already shared to different governmental and non –governmental organizations. In addition to that, upon the first announcement of the poster statistical competition 2016/2017, more than 100 university students shown their interest to support and participate in promoting statistical awareness through the community.

ISLP-Tanzania participated during the Open Data Day (OD Day) designed for showcase and exhibition in Tanzania, each year in March the Open Data community celebrates OD Day. It is an annual celebration of open data all over the world and essentially organizations / groups from around the world organize local events on the day. This event included showcase and share the use of open data in Tanzania, however it was more of an opportunity to ISLP, that ISLP-Tanzania managed to show the benefits of Statistical literacy on open data and how it can encourage the adoption of open data policies in government, business and civil society. Good enough, the activities and outputs related to OD day event shall be open for everyone to use and re-use. For this year, the OD day will was conducted on March 4, 2017.

4. Challenges against statistical literacy improvement in Tanzania

Evidence-based decision making at all levels of society is impossible without access to information and knowledge, but what is this information worth?, even if it is constantly mentioned in TV news and newspapers, if many people do not even understand the meaning of the figures? One main task of official statistics is to inform people about the development of economy and society. To fulfil this mission, it is essential to train them to understand the figures and to open the access to the world of quantitative thinking and measurement .UNESCO's programs point to increasing information and knowledge for all people in order to reach "literacy for all" .Surprisingly, the debates on goals, measurement, evidence-based decision making and bridging the information and knowledge gap, hardly mention the words "statistical literacy" and that is one fact making the flow of information between national and international offices and statistics educators difficult.

At the beginning of the twentieth century H. G. Wells wrote: "Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write". How true! Lancaster (2011) concluded in *How Statistical Literacy, Official Statistics and Self-directed Learning Shaped Social Enquiry in the 19th and Early 20th Centuries* that we are still striving to achieve this in the modern technological age of the twenty-first century.



Statistical literacy is a term used to describe the ability of an individual or a group to understand and comprehend statistics. The field of statistical literacy is not new: For more than 30 years researchers have been discussing this interdisciplinary topic in fields such as mathematics, statistics, pedagogies, psychology and linguistics for instance. The discussion is based on the fact that statistical literacy requires many abilities, the most important of which are mathematical and statistical skills, the competency to understand the figures correctly and to distinguish between valid and misrepresented data. Furthermore, it enables people to assess the information that the figures provide and finally to understand what the actual data reveal about society.

Not only are there varying abilities required for statistical literacy, there are also many factors which affect an individual's ability to comprehend statistical information. According to Murray & Gal, (2002), these comprise person-related factors such as educational background, literacy skills, world knowledge and individual beliefs on mathematical and statistical issues including how critical or accepting they are of information coming from different public and media sources, as well as statistical anxiety (Bradstreet, 1996) and math phobia (Phillips, 1988) as most people associate statistical ability with mathematical ability (UN, making data meaningful part 4, 2012)

While the challenge of competency is primary, another general challenge is that of literacy at the level of the general population and those who inform. These are journalists, Members of Parliament and employees of Non-governmental organizations. A targeted program on statistical literacy and appreciation of statistical thinking is being developed and promoted through International statistical literacy project (ISLP).

Nonetheless, ISLP-Tanzania is also facing some financial difficulties, this is accelerated by low understanding and appreciation of all matters related to statistics and its application among the stakeholders (sponsors), Lack of volunteerism spirit, poor or lack of political commitment and less efforts shown by National statistical office as hubs for promoting and supporting statistical literacy in a country.

5. Recommendations and conclusion

5 :1 recommendation

To facilitate the spread and installation of a strong profile for data/statistical literacies through ISLP project in Tanzania, ISLP statistical poster competitions have to be integrated to National Bureau of statistics and the Ministry of education, sciences and technology. Also, little fund from ISI should be dedicated for the facilitation and start up activities every year during the competition. The importance of political commitment and the centrality of National statistical offices should not be ignored and taken for granted, this shall play a great role as a hub and vital pivot towards having statistically literate community in Tanzania. This can be done through



identifying opportunities and co-investing in statistical value creation so that the ISLP is enabled to harvest value appropriately and in perpetuity thereby increase participation and statistical literacy.

5:2 Conclusion

In earlier decades, most of the work on statistical education was done in primary and secondary schools with a focus on statistical literacy, statistical reasoning, and statistical thinking. Yet only in the last decade NSO awareness of statistical literacy has been present. Some NSOs have shown a broader responsibility than the mere production of data. They are increasingly proactive in improving statistical literacy and making data more accessible. There are also several actions by other statistical institutions, statistical societies like Tanzania Statistical Association (TASTA) and education institutions (universities and research institutes) to improve statistical literacy but a lot remains to be done in the future to improve the statistical literacy of different segments of the population. The cooperation of all actors dealing with statistics, especially between ISLP, NSOs and academics, is important for hastening the process of improving statistical literacy in Tanzania. Understanding statistical concepts and methodologies is essential for the proper and efficient use of statistical data collected and published by statistical office and other authorized institutions. To ensure the better use of statistical data much effort must be put into improving statistical literacy in society (Ferligoj, 2015).

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