

# Effectiveness of Digital Technology in Geography Syllabus in Tanzania's Ordinary Secondary Schools

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## Abstract

Despite the pervasiveness of digital technology in all aspects of teaching and learning materials, Geography syllabus remains ineffective in its execution in Tanzanian's Ordinary secondary schools. This study aimed to assess the effectiveness of digital technology in the Geography syllabus in Tanzanian Ordinary secondary schools. The study focused on two objectives: to examine Geography topics that use digital technology instructional materials in Tanzanian's Ordinary secondary schools and to compare the Geography topics that use digital technology instructional materials and the performance of the Certificate of Secondary Education Examination. The study used documentary analysis methods including analyzing the recent five years National Examination Reports; Candidate's Item Response Analysis and current Geography syllabus. The data was analysed by using a quantitative approach where graphs, percentages and Spearman's rank order correlation coefficient techniques were applied. The findings revealed that the topics that used digital technology instructional materials in the Geography syllabus had satisfactory and moderate positive correlation coefficient between the topics that used digital technology instructional materials and the performance of the Certificate of Secondary Education Examination. The study recommended to unfold the Geography syllabus and then inculcate digital technology instructional materials for those topics that appeared to have inadequate digital instructional materials; to include all topics in the Geography Certificate of Secondary Education Examination particularly those using digital technology instructional materials and to use 'Kiswahili' as lingua franca language in digital technology instructional materials as teachers and students have pitfall in English language proficiency. The report concluded that, in order to pursue the utilization of digital technology in Geography syllabus educational philanthropists should be resilient to allocate sufficient funds in ordinary secondary schools in order to purchase digital facilities such as; computers, projectors, printers, television, radio, and smartphones and construct digital Geography classrooms with reliable internet connectivity and electricity supply.

**Keywords:** Digital technology, Geography Syllabus, Effectiveness, Ordinary secondary schools.

## Introduction

Like other countries, Tanzania envisages to improve her education quality, particularly secondary school education in all aspects, including integrating digital technology in learning and teaching. About 19 and 17 years ago, since Global e-school and Communities Initiatives (GeSCI) was launched by the United Nations task force in 2004, with the aim to ensure that the Ministry of Education in Tanzania integrates

digital technology in teaching and learning in Tanzanian secondary schools then followed by “WHITE PAPER” submitted to Ministry of Education Vocational Training in 2006 covered Basic Education schools, teachers education, non formal education and University education aimed to evaluate infrastructures, curriculum, content, method of training, capacity building, management and support. Through these two conferences the Ministry of Education under its agencies namely; Tanzania Institute of Education (T.I.E); National Accreditation of Technical Education (NACTE); Commission for Science and Technical (COSTECH); Tanzania Education Authority (T.E.A); Administration Development of Education Management (ADEM) and Tanzania Commission for University (T.C.U) continue to devise and share various initiatives to improve digital technology in teaching and learning in secondary schools. From those two conferences Tanzania implemented Information Communication Technology Education policy of 2007 which enabled to deploy various digital technology facilities such as radio, mobile phones, computers and internet in Tanzania secondary schools (Swart & Wachira, 2010). Furthermore the participation of Non Government Education Agencies (NGEA) accelerate a speed to boost up these initiatives. Some of these NGEA’s are; Ubungu provides video content and mobile app; Education Quality Improvement Program phase two (EIQIP2); provides website with continuous professional; One billion provides various synchronous platforms; Kitkit school provides tablet-based individual uses; Elimu Tanzania provide app; Christianity Social Services Commission (CSSC) provides tablets and computer and preloaded with content; Profuturo provides local offline learning system, Eneza education provides basic mobile phones so as to give extra learning and revision questions to students; English literacy provides e-reader; opportunity education technology provide smart phones and cheap tablets (Groeneveld & Taddele, 2015). Despite both Government and Non government agencies efforts to intergrate digital technology in teaching and learning in secondary schools the situation is still miserable unsatisfactory to implement digital technology in education particularly in Geography subjects syllabus as most important pillar in teaching and learning instructions. (Davis, 2021; Tety, 2016; Tokatli & Kesli, 2009; Tuimur & Chemwei, 2015)

### **Literature Review.**

Tokatli & Kesli (2009) Syllabus means “Plan exactly what students at a school or college should learn in particular subject.”

Swarts & Wachira (2010) in their study they found a lack of electricity infrastructures particularly in rural areas, a lack of digital content, a shortage of resources, few schools installed computers, an absence of coordination mechanisms to deployment of digital technology facilities, review curriculum and syllabi, high cost of internet, shortage of bandwidth, lack of specific data showing ratio of computers and lack of fund to replace facilities.

Groeneveld & Taddese (2015) their resent report showing absence of data connectivity of computers in secondary schools. Moreover the report said less efforts made by government in enhancing integration of digital technology in teaching and learning in secondary schools

Manyengo (2015) in his study found the problems of Digitalization in Tanzanian secondary schools are power connectivity, internet connectivity and digital Infrastructures

Tuimur (2015) Instructional materials involved; chalkboard, models graphs, charts, maps, pictures, diagrams, cartoon, slides, filmstrips, radio, Television, audiotapes, magazines, computers and real objects

Kira & Mahumbwe (2015) regardless Tanzania Telecommunications Limited (TTCL) own by government fail to provide internet connectivity in ordinary secondary school. In their report highlighted that teachers

used internet for e-books, articles, encyclopedia, sample of experiments, tell students where materials available and use Yahoo for downloading teaching materials

Tety (2016) despite report explained the important of instructional materials, the report also analysed class size, lack of text books, audiovisual, software and hardware and lack of electronic instructional materials including; radio, tape recorders, Television, video tape recorders as hindrances of intergrating digital technology in teaching and learning.

Kihonza et al (2016) they concluded that lack of sustainable power supply, insufficient resources and unreliable internet connections are hindrances in intergrating digital technology in teaching and learning in Tanzanians Ordinary secondary schools.

Davis (2021) defined instructional materials as the tools which enable teachers to design teaching and learning instructions. Moreover revealed the functions of these instructions such as act as vehicles to teachers to learn via their own practice and these materials showing professional learning experience

Selemani et al (2021) this study revealed computer ratio per student range from 20:1 to 110:1. On top of that the report findings 145,334 are desktops available in both public and non public secondary schools with 2,338,457 students. Similarly to other studies internet connectivity, lack of reliable electricity and limited computers rooms were among the great challenges demotivate the usage of digital technology in teaching and learning in Tanzanians secondary schools.

Momen et al (2023) in their report highlighted digital technology educational aids are Google meet, zoom, audiobooks, YouTube, Facebook, Instagram and WhatsApp.

Patrobas et al (2023) in their study concluded precautions of digital technology in education; professional development, electricity in schools, readiness, overcrowded classrooms and socio-economic conditions. Moreover report findings showing the most visited application Akhan Academy, SOMA, Goggle classroom, and Shule direct.

### **Study objectives**

The researcher conducted this study with the following objectives:

1. To examine Geography topics that use digital technology instructional materials in Tanzanian's Ordinary secondary school
2. To compare the Geography topics that use digital technology instructional materials and the performance of the Certificate of Secondary Education Examination.

### **Statement of problem**

Despite initiatives made by the Tanzanian Ministry of Education and Vocational Training (MoVET) to integrate digital technology into the Geography syllabus these instructional materials remain ineffective in its execution. Therefore, this study aimed to assess the effectiveness of digital technology in the Geography syllabus in Ordinary secondary school

### **Hypothesis**

Ho: There is no relationship between digital technology instructional materials with performance in the Certificate of Secondary Education Examination

Ha: Digital technology instructional materials increase the performance of the Certificate of Secondary Education Examination.

**Research Methodology**

This study used the documentary analysis method including recent five years National Examination Reports to assess performance; Candidate’s Item Response Analysis to examine topics that students scored high marks; Current Geography Syllabus to determine topics that used digital technology instructional materials and other related Literature Reviews for justification of paper. Furthermore, the study used a Quantitative approach including statistical tables and percentage data in the first study’s objective and Spearman’s rank order correlation coefficient for the second objective.

**Findings and Discussion**

**Objective One:** To examine Geography topics that use digital technology instructional materials in Tanzanian Ordinary secondary school.

**Table 1 Topics and type of digital technology instructional materials in each form**

| <i>Form</i>       | <i>Topics used digital technology</i>  | <i>Types of digital instructional materials</i>       |
|-------------------|--|---|
| <i>Form One</i>   | Concept of Geography; The solar system   | Video, CDs, technological devices parable; watch      |
| <i>Form Two</i>   | Human activities; Agriculture; Water management and economic; Sustainable use of forests resources; Sustainable mining; Manufacturing industry; Sustainable use of power and energy resources; | Photographs, pictures, audiovisual, film, video show, |
| <i>Form Three</i> | Forces affect the Earth; Soil; Photography reading and interpretation  | Models/ video, pictures, photographs                  |
| <i>Form Four</i>  | Climate and natural region; Human Population; Settlement and Environmental issues.   | Pictures, graphs, photographs and video               |

According to the Table 1 all topics from form one unto form four used digital technology instructional materials. Form one has the following topics: Concept of Geography and The solar system; the kind of digital technology instructional materials were; Video, CDs, technological devices parable; watch. In form two topics Human activities; Agriculture; Water management and economic; Sustainable use of forests resources; Sustainable mining; Manufacturing industry; Sustainable use of power and energy resources. The table shew photographs, pictures, audiovisual, film and video show. Moreover form three topics including: Forces affect the Earth and Soil. Finally form four including: Climate and natural region; Human Population; Settlement and Environmental issues. (Tanzania Institute of Education, 2016) Unfortunately the majority of topics to all forms used common type of instructional materials namely: video, film, pictures, photographs, cassettes and CDs. The use of these type of instructional materials admitted also by Tety (2016); Tuimur (2015). So far the study shew the Geography syllabus ineffective in

using digital technology applications in teaching and learning such as Google meet, zoom, audiobooks, YouTube, Facebook, Instagram and WhatsApp. (Momen et al., 2023).

**Table 2 Percentage of Geography topics used digital technology instructional materials in Tanzanian Ordinary secondary schools.**

|  | <i>Form One</i> | <i>Form Two</i> | <i>Form Three</i> | <i>Form Four</i> | <i>Total</i> |
|--|-----------------|-----------------|-------------------|------------------|--------------|
| <i>Geography topics that use digital instructional materials in percentage</i> | 33.33%          | 88.88%          | 42.85%            | 80%              | 62.96%       |
|  |                 |                 |                   |                  |              |

Table 2 indicated 62.96% was general rate of topics which used digital technology instructional materials to all forms. Table 2 showed that the highest rate was in form two for 88.88% and form four for 80%. Dissimilarly to form three for 42.85% and form one 33.35%. According to National Examination Council of Tanzania (NECTA, 2017, pp. 7-9) by the end form two Geography course candidates required to sit for Form Two National Assessment (FTNA). In order to control repetition rate and exalt the yoke of students to learn Geography (Mzinga & Onyango, 2021) in form three peradventure the Ministry of Education and Vocational Training permitted majority of topics to use digital technology instructional materials while form one the topics that use digital instructional materials dwindled, peradventure form one students focus on mastering English language proficiency. Similarly to form four class, according to The National Examination Council of Tanzania (NECTA, 2019, pp. 19-22) students required to sit for Certificate Secondary Education Examination (CSEE). Perhaps the Ministry of Education and Vocational Training permitted majority of topics to use digital technology instructional materials for dwindling mass failure of exams; increase transition rate in Advanced secondary school and other courses pertinent with Geography subject in tertiary education level. General study revealed midst satisfactory in the use of digital technology instructional materials in sense that form one and form three seemly less digital technology instructional materials in Geography unlike form two and form four.

**Objective Two.** To compare the Geography topics that use digital technology instructional materials and performance of Certificate of Secondary Education Examination.

**Table 3 Comparison of digital technology instructional materials and performance of Certificate of Secondary Education Examination**

|  | <i>2022</i> | <i>2021</i> | <i>2020</i> | <i>2019</i> | <i>2018</i> |
|--|-------------|-------------|-------------|-------------|-------------|
| <i>Digital Technology topics that use digital technology instructional materials</i> | 53.3%       | 67.7%       | 53.3%       | 62.5        | 40.0        |
| <i>The Performance of Certificate of Secondary Schools Examination</i>               | 61.10%      | 60.55%      | 53.90%      | 53.13%      | 53.03%      |

The study sought to compare the digital technology instructional materials and the performance of Certificate of Secondary Education Examination. In order to make comparison the study used Spearman’s rank order Correlation coefficient in sense that all assumptions were considered including stochasticity; data were non monotonic and central limit theorem. Thus justify it’s usage in this study. The research formulated both Null Hypothesis and Alternative Hypothesis.

Ho: There is no relationship between digital technology instructional materials with performance in the Certificate of Secondary Education Examination

Ha: Digital technology instructional materials increase the performance of Certificate of Secondary Education Examination.

**Table 4. Showing computation of Spearman’s rank order Correlation coefficient**

| <i>Recent five years National Examination Council of Tanzania</i> | <i>Digital Technology topics that used digital technology instructional materials</i> | <i>The Performance of Certificate of Secondary Schools Examination</i> | <i>x</i> | <i>y</i> | <i>x-y</i> | <i>d</i> | <i>Square d</i>       |
|---|---|--|----------|----------|------------|----------|-----------------------|
| 2018  | 40  | 53.03  | 1        | 1        | 1-1        | 0        | 0                     |
| 2019  | 62.5  | 53.13  | 4        | 2        | 4-2        | 2        | 4                     |
| 2020  | 53.3  | 53.90  | 2.5      | 3        | 2.5-3      | -0.5     | 0.25                  |
| 2021  | 67.7  | 60.55  | 5        | 4        | 1          | 1        | 1                     |
| 2022  | 53.3  | 61.10  | 2.5      | 5        | 2.5        | 2.5      | 6.25                  |
|   |   |  |          |          |            |          | Ed <sup>2</sup> =11.5 |

$$rsp = 1 - \frac{6 \div n\{n.\text{square} - 1\}\{\text{total deviated square} + \text{summation of } m(m.\text{square} - 1) \div 12}}{n^2}$$

rsp = Sperman rank order correlation coefficient, n = Sample size  
 = Summation of square deviated value, Em = Summation of tied values, m = Tied value.

The values in formula; n=5, total squared deviation =11.5, total tied square=2, tied values=2. Then fix the values in formula

$$\text{The } rsp = \frac{1 - 6 \div 5 \{5\text{square} - 1\} \{11.5 + 2(2\text{square} - 1)\} \div 12}{25} = 0.4 \text{ as statistical value.}$$

According to (Jackson, 2009, Pp.60, 142-155; Kothari, 2004, Pp. 71, 283-313); 0.4 statistical value fallen between 0.30-0.69 indicated moderate positive correlation coefficient

The table value of *rsp* for one tailed test was 0.800 under sample size (n) of 5 and 0.05% significance level (Rohatgi & Saleh, 2015, pg. 665.), The table value was greater than Statistical value therefore we fail to reject Null Hypothesis and we accept Alternative Hypothesis. Hence we conclude that there was positive significance relationship between Geography topics that use digital technology instructional materials and performance of Certificate of Secondary Schools Examination for recent five selected years.

Notwithstanding, the performance of Certificate of Secondary Education Examination don’t rely in digital technology instructional materials only however it was most important pillar in teaching and learning

(Davis, 2021; Tety, 2016; Tuimur & Chemwei, 2015; Tokatli & Kesli, 2009). Moreover the performance of Certificate of Secondary Education Examination depending on other multiple factors including; Proficiency of Instructional language; (Mugaya, 2018; Gran, 2007; Hiza & Paschal, 2023, CIRA's, 2022; 2021; 2019) Competence of teachers on mastering Geography subject, class size, parents historical background, socio economic development (MoEST, 2018, Pg. 25; Kira & Mahumbwe, 2015; Patrobas et al., 2023) on top of that the use of digital technology demands intensive prerequisites for its effectiveness. The study showing unreliable internet connectivity and Electricity supply; lack of Geography digital classrooms and ineffectiveness of teachers' apprenticeship were pitfalls for application of digital technology instructional materials in teaching and learning. (Swart & Wachira, 2010; Kamble, 2013, Momen et al., 2023; Patrobas et al., 2023; Tarimo & Kavishe, 2017; Selemani et al., 2015, Rumanyika & Galan 2015, Manyengo, 2015;). Therefore, moderate positive significance relationship justified that not only digital technology instructional materials could embark satisfactory performance of Geography Certificate of Secondary Education Examination but there were other multiple factors as mentioned in this paper.

### **Conclusion:**

In order to pursue the utilization of digital technology in Geography syllabus in lower secondary schools all education philanthropy and centurion should be resilience to allocate sufficient funds in schools. The fund will assist to purchase digital technology facilities such as computer, laptops, projectors, printers, Television, radio, and smartphones; fund will also assist to construct digital Geography classrooms with reliable internet connectivity, electricity and conduct Geography staffs in service apprenticeship.

### **Recommendation:**

The study shows some of topics inexistent for all five years while had digital instructional materials. The good parable was first form one Geography topic. If this topic could exist in exam could add the performance of students. This situation denied the right of learners to score good performance in National Examination. Thus the study recommend that all examination moderators should incorporate all topics of digital technology instructional materials in Geography Certificate of Secondary Education Examination. The study showed 17 (62.96%) Geography topics from form I-IV used digital technology instructional materials out of 27 (37.04%) topics. The other topics used only text in teaching and learning. Thus the paper recommend to unfold and re-plait Geography syllabus by fixing all topics with the use of digital technology instructional materials as the study revealed that those topics used digital technology instructional materials students performed better than remains ones.

Finally, the study discovered the English language proficiency was major key hindrance in interpreting Geography syllabus for both teachers and students. The study recommended to use 'Kiswahili' language as medium of instructional in lower secondary schools. Unfortunately enough more than 98% of Tanzanians speak 'Kiswahili' as mother tongue language in urban areas (Gran, 2007; Hiza & Paschal, 2023) and lingua franca in both rural and urban areas. Not only that many philosophers admitted that the use of native language was predetermined factor for learners' centered approach. (Mugaya, 2018). Bad enough the form one students exacerbated to waste six weeks in learning English language immediately after enrollment instead of commencing to learn Geography topics as per syllabus indicates.

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