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Examining Digital Divide in Secondary and Primary Education Online Content Users Based in Tanzania

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Abstract
This paper determined the digital divide among secondary and primary education online platforms in Tanzania. The study addressed three key aspects: first, it determined the contribution of facilitating conditions in the digital divide among secondary and primary school learners. Secondly, it determined how the quality of existing secondary and primary education digital platforms defines the current status of the digital divide. Lastly, the study provides steps to be taken by stakeholders of education in addressing the digital divide in the context of secondary and primary education. The study used the qualitative approach. First, it used government reports and other organisational publications to obtain statistical information on facilitating conditions for educational digital services. Secondly, it studied 302 online reviews by users of seven (7) digital platforms for secondary and primary education contents in Tanzania. In the first set of results facilitating conditions such as ownership of smartphones, computers, Televisions, and access to the Internet still contribute to the digital divide among users of secondary and primary education platforms. In the second set of reviews, the study observed the following nature of reviews submitted by users to studied online platforms. The first category had a positive view of digital platforms. This is a positive view submitted to the platform on its usefulness. In all platforms, users were of the view that the platforms were useful. Another category was that of poor technical quality. This view reflects the perception of viewers that the quality of the accessed platform was poor. In this category, users were more uncomfortable with the inability of the platform to launch appropriately. The third category was about the quality of the contents. In all platforms, users suggested that the contents were inadequate. With the guidance of policies, all stakeholders need to engage together in addressing observed issues of the digital divide.

Keywords: Digital divide, educational platforms, facilitating conditions, low technical quality, low content quality
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Introduction

Soon after her independence, Tanganyika declared war against three enemies – poverty, diseases, and ignorance. This position received emphasis in different periods of the first presidential regime, including after the birth of the United Republic of Tanzania. For example, the first principle of the Arusha declaration stated that all human beings are equal (Mpangala, 2012). This equality transcends to the right to education, from the primary education. This position in Tanzania is supported by different institutions across the globe. For example, the United Nations (UN) commits to promote sustainability through education; access to education is among the 10 basic principles of academic impact principles (United Nations, 2022). Also, it is among the UN 17 Sustainable Development Goals. The emphasis is to ensure inclusive and equitable quality education and promote lifelong learning (United Nations, 2022).

Currently, the quest of Tanzania for equality in education is echoed in the vision statement of the Ministry in charge, where the government strives to educate every Tanzanian with the requisite knowledge, skills, ability and positive attitude that add value to National development (Ministry of Education, Science and Technology, 2022). Though challenging, equality in education for all is a very important element of building a stable society (Salisbury, Omolewu, & Smith, 2018); therefore, it must be embraced.

In ensuring equality, planning is one thing, while the achievement of the plan is the other. Evidence shows that the government of Tanzania, through the Ministry of Education puts in place structures and procedures, to enable equity in access to education among its citizens (Ministry of Education, Science and Technology, 2022). This includes the building of infrastructure, provision of teaching staff and guiding policies as supported by Mmari and Kovács (2022). Unfortunately, existing population dynamics affect such needs. This is the reason why demands for quality classes, teachers and associated teaching tools are ever there. Apparently, the use of Information and Communication Technologies could ease some of the demands (Malekani, 2018; Mpangala, 2012). One of the aspects that could be addressed is the inadequate number of teachers. Nevertheless, this objective is only achievable in the presence of reliable Information Systems.

In general, reliable access to Information Systems and associated infrastructure remains a problem in most African countries, including Tanzania. The study by Kihoza, *et al.,* 2016) suggested the absence of policies needed to support different interventions by stakeholders as the main challenge. In addition, the study by Salisbury, Omolewu and Smith (2018) considers limited funding to affect the progress in ICT implementation. Other factors such as the absence of relevant contents, and user skills are equally acknowledged (Kihoza, *et al.,* 2016). Collectively, these factors together with others, affect the access and use of Information and Communication Technologies within Africa. In Tanzania, there are efforts invested by the government, civil societies, business corporations as well as individuals toward minimising the access gap in Information and Communication Field. Such effort includes building infrastructure, educating users, managing the access price, sensitisation and many others (Kihoza, *et al.,* 2016). Nonetheless, the access and use of information and communication remain low as reported by Malekani (2018), and Kihoza, *et al.,* (2016). In the current study, the interest is in understanding the digital divide gap between secondary and primary education potential users of online contents. The current study responds to the following questions: -

i.) What is the current contribution of the facilitating conditions in the current status of the digital divide among secondary and primary education platforms in Tanzania?

ii.) How does the quality of existing primary and secondary education digital platforms define the current status of the digital divide?

iii.) What steps can stakeholders of education take in addressing the digital divide gap in Tanzania?

Methodology

This study is qualitative. As recommended by Omona (2013), qualitative studies are more suitable in a smaller sampler, when compared to quantitative studies. Also, it is good for generating new patterns of knowledge, especially when the study area is new (Ngulube, 2013). First, it established three questions that needed response. The two questions are presented in the previous section. The first question needed to know the status of facilitating conditions in the current status of the digital divide among secondary and primary education platforms in Tanzania. The second question needed to know how the quality of existing primary and secondary education digital platforms defines the status of digital devices, and

the third addresses steps for addressing the digital divide. In addition, the study collects its data from review comments submitted by users on education platforms and the literature.

Sampling

The population of the study is made up of two key categories. First, it is made of mobile applications providing educational digital contents in Tanzania. The study confined its focus to mobile applications with at least 10,000 downloads. This is because they are likely to be more experienced than others. To obtain the sample, the study used the phrase, "Education in Tanzania", to search for mobile applications linked to lower level education, within Tanzania. The study used the following applications in its sample: Shule Direct, Tzshule, Learning Hub Tanzania, Elimutube, NECTA, THL, Elimutube, and Past Papers.

To respond to the third research question, the study used government reports and academic papers about the subject. In particular, statistical information by the Tanzania Communication Regulatory Authority published in 2021, was used to set the basis for discussion.

Data Collection

To understand the status of the digital divide in education, the focus of data collection was on two aspects: positive and negative aspects of reviews submitted by users. Data included the review submitted by users of mobile phone applications for primary and secondary education purposes. Review comments were between 2020 and 2022, for the following mobile applications: Shule Direct, Tzshule, Learning Hub Tanzania, Elimutube, NECTA past papers, schoolpvh, and THL. The selection criteria were for the application to have at least 10,000 downloads, and any number of reviews submitted by users. Also, the study ignored the first five reviews for each application, to avoid the Influence of the owner in the process. In total 302 reviews were accessed, from all the applications by January 2023.

This approach is best suited for this study because reviews were submitted based on users' experience. It is equally supported by Moen, Havro and Bjering (2017) and Alzate, Arce-Urriza, and Cebollada (2020) who suggested that it is the most suitable approach for capturing user feelings.

Data Analysis

In order to analyse data, the study examined every single user review submitted to a mobile application, and identified its category. The study categorised common reviews together, and regardless of their number, they accounted for one vote. Each vote represented a perspective of reviewers about the mobile application. After the observation of reviews submitted, and allowing a vote for every category represented, all votes were accounted for to determine the perception of users of secondary and primary education mobile applications. This was followed by the interpretation of the results. This sequence of analysis is in accordance with the recommendation by Akinyode and Khan (2018), in analysing qualitative data.

The second perspective was used in the analysis of the third research question. The question was based on statistical information provided by government authorities. The statistical information was interpreted and discussed to understand the current situation of digital education facilitating conditions. The facilitating conditions include access to facilities, access to the internet, internet affordability, and access to Television. These are critical in evaluating the digital knowledge divide Lubua and Pretorius (2019).

Quality Issues

The research process focused on text analysis. The study ensured statistical information included is from reputable sources. Also, it ensured that a large part of the study is based on users' reviews which were submitted voluntarily, without the influence or meeting with the researcher. The submission of reviews without the influence of the researcher represented the true feelings of users. Data obtained without pressuring the source are valid and reliable, as supported by Golafshani (2003) and Leung (2015).

Results and Discussion

This section presents results on the status of the digital divide in Tanzania based on two key elements. First, it focuses on user facilitating conditions; these are access to mobile phones or computers, access to the internet, internet affordability and access to Television. The other part of the presentation focused on the quality of digital platforms available in Tanzania. The focus was on mobile phone applications dedicated to secondary and primary education. The last part of the section provides information on how to address the gap.

Facilitating Conditions and Digital Divide in Tanzania

In order to access the learning material from digital platforms, you need the infrastructure and user facilitating conditions. In the context of using Information and Communication Technologies in Tanzania, for primary and secondary education, the current study makes its analysis based on the following facilitating conditions: access to mobile phones or computers, access to the Internet, internet affordability, and access to radio and television. The next part makes the discussion.

Access to Mobile Phones or Computers

According to statistical data provided by the Tanzania Communication Regulatory Authority in 2022, the number of mobile cellular connected subscribers is 54,044,384 (Tanzania Communication Regulatory Authority, 2021). The current population in Tanzania is 59,441, 988, and within it 50.1% have the age between Zero and 17 years old (National Bureau of Statistics, 2021). If this number of subscribers is to be taken literary, it represents 91% of all, including the underage. This is a high access level, but statistically questionable. First, most subscribers have multiple subscriptions (Walwa, 2019). Secondly, the presented total population represents all age groups, from zero years old. Also, although the number of mobile phone subscribers is higher than before, not all families have access to smartphones or computers (Walwa, 2019). Moreover, even with families with such access, children are limited. Therefore, this category still manifests the digital divide.

Access to the Internet

The report by the Tanzania Communication Regulatory Authority of 2021 suggests that there are 29,858,759 internet subscribers (Tanzania Communication Regulatory Authority, 2021). These are both fixed and mobile broadband subscribers. In total, this is about 50.23% of citizens have an internet connection. Unfortunately, these figures lack a proper analytical reflection, since they include fixed lines, which are mostly accessible through offices. Also, they include people with multiple simcards as observed by Walwa (2019). Also, they include people in areas where signals are very low; for example, 86% of people in rural lack connectivity (O'Grady, 2021). Therefore, in a real sense, fewer people have access to the internet. The smaller the number, the larger the impact on level students, who would benefit through their parents

Internet Affordability

Network coverage and the ability to use the service are two different things. Network coverage simply provides connectivity to suitable devices. Nevertheless, this connectivity does not assure access to network services. This is because access can only be acquired through payments. Currently, the cost of 1 GB of data is TZS 2,700/- per day, therefore, it is obvious that most families are connected without access (Tanzania Communication Regulatory Authority, 2021). This is because according to the World Bank report of 2020, the Gross National Income of Tanzania is TZS 1080 (World Bank, 2021). This is less than half of the cost of 1 GB of internet in Tanzania. With this analysis, a reliance on family level support for internet access affects most students. It equally widens the digital divide.

Access to Television

Digital access includes Television as suggested by Jack (2008), however, not all Television and digital. In the context of this study, Television ownership is a good indicator of the ability to have access to mobile phones or computers within the Tanzanian population. It is very unlikely for someone to own a smartphone or computer without a Radio or Television. According to the study by World Vision Tanzania (2021), 15% owned Television. In a report by the Tanzania Communication Regulatory Authority of 2020, a total of 24% of households are the ones with a Television. Given this figure, it is obvious that access to these digital facilities is low, especially among rural communities. In addition, parents are in control of these devices. This limits access by school children, where digital access was to come through Televisions. Also, digital Televisions are modern, therefore, fewer people are likely to own them.

The Quality of Digital Platforms for Lower Level Education

The quality of education digital platforms is another factor defining the digital gap. The quality is in terms of the reliability of the platform, and the availability of relevant contents. Even if the access to the Internet is high, and the coverage is 100%, without the right platform and contents, the digital success will remain low (Lubua & Pretorius, 2018).

Currently, different stakeholders of education use opportunities presented to them through Information Systems to develop educational contents relevant to lower level students. For example, mobile applications such as Shule Direct, Tzshule, Learning Hub Tanzania, Elimutube, NECTA past papers, schoolpvh, and THL have over 10,000 downloads each. This is a good effort by stakeholders toward building a digital community for all Tanzanians. The platforms provide notes and review questions.

Together with these efforts, the quality of these platforms is of great importance. This is the reason why this study evaluated the quality of education platforms based in Tanzania. The study used user reviews to understand the perception of users on the quality of these platforms. It categorised review comments by users based on their nature to understand the negativity and positivity of user views on the quality of such platforms. Overall, the study reviewed 302 comments provided by users between 2020 and June 2022, across above mentioned platforms. Table 1 simply represents the occurrence of a comment; a single occurrence was enough to inform the research decision. No repetition is per platform.

Table 1: Review aspects of the quality of education platforms in Tanzania

Review aspects	Frequency
Positive comments	
Useful	7
Good user interface	2
Organised contents	1
Negative technical comments	
Fails to download	2
Fails to launch or work appropriately	6
Incorrect configurations lead to wrong Answers and people pay but fail to access	3
Poor user support	1
Difficult to use	4
Not compatible with some devices	1
Slow	3
Negative comments on contents	
Inadequate contents	7
Not suitable for students with vision problems	1
Inappropriate contents	3
Lack of frequent content updates	5
Need for offline contents	2

According to Table 1, the review found three key perspectives of review comments from users. Positive comments, negative technical comments, and negative content based review comments. Each frequency represented the number of digital platforms where a review comment occurred. In total, the study included a review of seven (7) platforms. The next part provides the analysis of each category presented.

Positive Comments

There are three positive comments repeated in different mobile applications for lower level education. Indicatively, most users are parents or students at senior levels. According to the results presented in Table 1, users of all mobile applications are positive about the usefulness of mobile applications in supporting lower level education. In each of the seven (7) mobile applications, there is a positive comment about the usefulness of the platform in modern education at lower education levels. In essence, the applications provide review notes and even act as the gateway for review questions. Notes and review questions make part of essential resources for learners in low level education.

Moreover, there were two (2) positive comments about the suitability of the use interface mobile applications platforms. This is equivalent to 28.6% of all reviewed mobile applications. A good platform makes navigation and access to contents easy, as suggested (Lubua & Pretorius, 2018). The last positive review comment suggests that the work organisation is good. This comment is featured in one mobile application, which makes up 14.3% of all. The study by Kihoza, *et al.,* (2016) suggested that a good organisation of contents promotes ease of use.

Negative Technical Comments

In reference to Table 1, the study observed seven (7) categories of negative reviews about the quality of technical aspects of mobile applications dedicated to lower level education. The aspects are the application failing to download, failing to launch appropriately, incorrect configurations, poor user support, the difficulty of using, lack of compatibility with devices, and being slow. The presented frequency shows that two categories are highly reported. They include more than half of the mobile applications under study. First, 85.7% suggested

that applications do not launch appropriately. Some simply crushed while launching or prompted an error message. This affects the use. This percentage of representation requires urgent attention from owners and stakeholders as well to eliminate the undesired behaviour.

Another category of negative technical reviews reported in more than 50% of all mobile applications is the difficulty of use. This is reported by 57.1% of studied applications. While users acknowledge that the contents are useful, they equally admit that the process of using is difficult. The study by Moen, Havro and Bjering (2017) commented on the importance of ease of use in technology adoption. The system which is difficult to use gets dropped by users easily as reported (Lubua & Semlambo, 2017).

Two other categories received 42.8% of reporting. The categories are incorrect configurations and slow systems. With incorrect configurations, users complained that they received wrong answers or multiple suggested correct answers. These brought confusion in the learning process. Moreover, the challenge of configuration was found in matching the user with payment accounts. There were cases where the system denied eligible users access, even though they paid for service. In addition, the lowliness of the system affects efficiency and effectiveness. The lowliness may be caused by factors such as the large size of an application, poor codes, wrong configurations, and even the presence of adds (Salisbury, Omolewu, & Smith, 2018). Adds are highly undesired especially when people pay for services because they consume user's limited resources (Walwa, 2019).

Other categories that represent negative technical reviews with their percentage include failure to download (28.6%), poor user support (14.3%), and difficulty of use (14.3%). They all require the attention of the technical team to develop suitable mobile applications for lower level education.

Negative Comments on Contents

In this aspect, two categories reported counts more than 50%. These are inadequate contents and the lack of frequent content updates. The issue of inadequate contents reported a count for each mobile application reviewed. The study observed users complain of not getting notes for certain subjects or topics. Also, they complained of not getting certain review questions and answers for such questions. It is unarguable that inadequate contents reduce the usefulness of the platform to users as suggested by (Dhingra & Mudgal, 2019). This could be addressed by ensuring a frequent update of contents, as desired by users (Newa & Mwantimwa, 2019). In the current study, it is unfortunate that the lack of frequent updates of contents was reported by 71.4% of all reviewed mobile applications.

In addition, the lack of appropriate contents was the next highly reported factor within the category of negative comments on contents. The sum of 42.8% of reviewed mobile applications reported this challenge. Users need appropriate contents for applications to be relevant. Other aspects of negative comments on contents with their respective percent include the need for offline contents, and the need to accommodate students with low vision. Offline contents will lower the cost of accessing contents, while tools for people with low vision will address special needs. Collectively, they will add value to the mobile applications for lower level education.

So What is the Status of the Digital Divide?

Although the current study cannot quantify the acuteness of the gap of the digital divide, there is an obvious existence of the digital gap in the lower level of education. Except for three positive categories of mobile application reviews, the rest are negative. Although users consider digital platforms for facilitating primary and secondary education as useful, to most

platforms, they seem to be more hopeful than realistic. This is because the presence of negative factors affects the use and, therefore, creates the digital gap.

According to the presentation in the previous section, the limited accessibility to facilities such as Radio and Television, are indicatively suggesting the existence of the gap among users. Since some is a policy to provide some national TV channels for free, ownership by many would ease the pressure on those without the internet (O'Grady, 2021). Nonetheless, they would equally miss downloadable contents. Access to mobile phones (or computers) and the internet are critical facilitating conditions. Not all primary and secondary schools have assured access to these facilities. This is the reason why the study by Dhingra and Mudgal (2019) recommends the building of community centres for equal access. Another facilitating condition is the affordability of the internet; many families cannot have access to the Internet.

Apart from facilitating conditions, the poor technical quality of platforms and poor contents widen the digital gap, among those with access to facilities and the Internet. In summary, poor technical quality of the platform makes the use of the digital platform difficult or even impossible. This argument is supported by Lubua and Semlambo (2017), who had similar observations in their technology use experiments. On the other hand, the poor quality of anticipated contents lowers system usefulness as supported by Malekani (2018).

Given the presence of poor facilitating conditions and poor quality of most platforms, it is obvious that the digital divide among primary and secondary students of Tanzania still exists. This requires stakeholders to come together to address the problem. Nonetheless, the government is the key actor in facilitating accessibility through mobilising other stakeholders.

Fortunately, the government demonstrated its will to address the question of the digital divide in Tanzania. Since the early 2000s, policy instruments such as the first ICT policy (2003), the first policy for ICT in education (2007), and the National ICT Policy of the year 2016 advocated for improving digital contents (Ministry of Works, Transport and Communication, 2016). Together with these policy documents, it is important to remind ourselves that we still have the gap to close to create a better environment for secondary and primary students.

Addressing the Digital Divide Gap

So far, two types of digital divide are presented: access divide and use divide. In short, there are those who struggle with access, while there are those with access but struggle with the use because of different reasons. Regarding access divide, this paper focuses on how to address the challenges presented in Table 1. The challenges are technical and content based.

Addressing Technical Based Negative Factors

The failure to download and set up the access platform, failure to launch after the setup process and poor configurations are part of the technical challenges highlighted. To a large extent, these technical problems are caused by the limited skills processed by local developers. This is because system users submitted these complaints in the form of reviews, on platforms where they expected to access learning materials. The key solution is to advance the knowledge of pioneers of digital knowledge in terms of their technical capacity. This will equip them and enhance their ability to develop much more improved systems.

To improve the technical skills of developers, the government can intentionally, coordinate learning activities, through its ICT incubators. The intention is for the government to manage the learning process of pioneers, in the development of educational digital contents in an objective manner. As part of the program, the government will have to carry the funding responsibility, and manage the learning process. Another group that needs to support the learning process of technical skills is that of None-Governmental Organisations. They need to advocate and support skills development in the area of programs development. This

will enable them to take their advocacy into practice. Top technological companies are another group of stakeholders, who must support the process through their corporate social responsibility initiatives. They have skills and funds. The two ingredients are important in technological development (Kihoza, *et al.*, 2016).

Addressing Content Based Factors

Content development is critical in closing the digital gap. Currently, digital systems have the challenge of inadequate contents, inappropriate contents, and the presence of useless information. All these are part of the reasons for the existing digital gap, as shown in Table 1. To a large extent, the responsibility of developing the right content rests on the owner of the digital platform. Unfortunately, they lack the capacity to develop such contents because they are owned by other stakeholders. Examples of such owners include book authors, the National Examination Council, teachers and so on. Only the government has the authority to mobilise all of these stakeholders and argue them to make their contents available for sharing, under given conditions.

Also, having inappropriate contents is a problem. Since this may be caused by the negligence of the technical team. It is a good idea, for quality reasons, to set quality procedures for approving authentic content providers. This will assist users to avoid consuming garbage in the learning process.

Conclusion and Recommendations

This study concludes that the gap in access to online contents among secondary and primary school students still exists in Tanzania, and it is indicatively wide. Factors such as the lack of ownership of relevant devices, poor access to the Internet, system technical factors, and poor contents increase the digital divide gap. In an effort to close the gap, this study recommends the following: -

- The government and other education stakeholders should establish strategic access points within wards, which will bring access closer to users, especially in rural areas.
- The government and other education stakeholders would Collaboratively advance the software development skills of analysts, developers, and programmers who own secondary and primary education-based mobile phone applications. This will address challenges emerging due to the lack of the required level of competency. The government, businesses, and NGOs can work together to equip technical teams.
- The government should establish a framework for obtaining and approving contents for applauded for consumption. This addresses the inadequacy of contents and the lack of relevance. This is easily done under the custodian of the government.

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