

# Examining the Use of Mobile Technologies in Providing School Library Services in Zanzibar

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## **Abstract**

*This paper aims at examining the use of mobile technologies in the provision of school library services in Zanzibar. The paper seeks to address the following questions: to what extent are the teachers, students and library staff familiar with mobile technologies that support teaching, learning and library services? What are the common mobile technology services offered by libraries? How do these technologies help libraries to enhance services? and What are the challenges facing libraries in providing mobile technology-based services? The study was conducted in Zanzibar whereby 22 innovation hubs and 22 surrounding schools were involved. The study used a cross-sectional study design and a mixed-method approach was used to collect and analyse data. A purposive sampling technique was used to select 88 library staff. At the same time, a simple random technique was used to select 110 students and 88 teachers for this study. Data were collected through semi-structured questionnaires and face-to-face interviews. The results indicate that few libraries used WhatsApp groups to interact and share information with users while remarkable personal access to learning materials through educational mobile applications was found to have a positive impact among respondents. However, mobile-based library services were not provided by the hubs as well as the school libraries due to various reasons including the shortage of funds for purchasing mobile gadgets and bundles and inadequate skills for navigating mobile applications. The study recommends that school libraries need to adequately utilise emerging mobile technologies and take them as positive and useful in improving the standards of library services.*

**Keywords:** Mobile technologies, mobile applications, innovation hubs, school library, library service, Zanzibar, Tanzania

## **Introduction**

Recent developments in mobile technologies have heightened the need for education stakeholders including libraries to adapt and implement them for enhancing educational services. With this respect, Dei (2020) affirmed that in recent years, mobile technologies have been embraced by academics including libraries as a medium that can offer convenient library services to users. Mobile technology has also become the key to the journey of moving from traditional to modern services for all types of libraries.

Mobile technologies have made communication and information access very convenient and timely to users from the comfort of their own homes and from wherever they are while on the move with their smartphones. Today, many people use smartphones as their primary interface for surfing the Web, listening to music, watching videos, reading books and communicating with friends. Similarly, Nowlan (2013) observed that educational mobile apps play a crucial role in teaching and learning and can add a great deal of value to supplement traditional school library services in a modern way.

According to Saravani and Haddow (2017), the increasing availability and affordability of internet-enabled handheld devices have affected people's mode of searching, receiving and interacting with information. Similarly, in the wake of these developments, Dukic, Chiu and Lo (2015) argue that library users have also resorted to the use of mobile devices to access the internet and forcing many libraries to introduce mobile communication technologies into their services. This confirms the assertion that any move by libraries to enhance the quality of their services and closely connect with patrons cannot be completed without considering the use of mobile technologies (Kumar, 2014).

Kumbhar and Pawar (2014) assert that mobile technologies have introduced the 'Libraries in hand' trend and they suggested that since libraries are currently creating digital content accessible on computers, such digital collections could be also made available on mobile platforms. The consideration of how to make library services available on mobile platforms has gained recognition both in literature and in practice by virtue of its benefits. The mobile-based library services initiative is said to bring with it interactive capabilities, easy access to information, time-saving, personalised services, user participation as well as limitless access (Pope *et al.*, 2011).

As far as this study is concerned, the concept of mobile-based library services as suggested by Paterson and Low (2011) are services that make use of smartphones and other mobile devices to present novelty and opportunities for libraries and information centers to provide digital services for their remote users. These services, according to Walsh (2012) and El-Namour (2018), include SMS alert service, instant messaging for reference service, the possibility of suggesting a purchase, library instructions and virtual tours, OPAC on mobile phones, in-house search, research consultation and instruction, journal finder applications, news and events, reference service, new title preview and institutional repositories. These services can be expanded with the additional use of such social media tools as Twitter, WhatsApp, Instagram, Tiktok and QR codes to promote the library services.

Globally, mobile technology has opened countless new opportunities for students, teachers and librarians and has brought a very open approach to learning where students are no longer depending on their instructors' notes or textbooks as their only sources of information. Mobile technology, according to Clyde (1995) Todd (1997) and Sekyere (2011), has several benefits as it allows cost-effectiveness in accessing and using both teaching and learning information resources. Moreover, with mobile technology in trend, mobile technology widens the horizon of students further than their local boundaries in terms of information searching. Students are not anymore limited to what is physically available in their libraries or may not wait for borrowing and returning of library information resources. As a result, these opportunities, according to Olatokun (2008), promote reading habit and improves understanding as well as reading skills, which in turn supports students' academic performance.

Current literature in the field of librarianship shows that many libraries in developed countries have adopted and integrated mobile technologies to provide innovative services to users. Chang (2013) and Zha, Zhang and Yang (2016) mentioned North Carolina State University library, Amsterdam University Library and Cambridge University Library, as some examples of libraries providing a variety of mobile technology-based services to users. The services range from an online catalog to access to unlimited electronic information resources.

In the African context, few studies have been conducted on mobile technology applications in libraries. A good example are the studies by Paul and Mavuso (2012) as well as Chaputula and Mutula (2018) which noted the adoption of mobile technologies in some African universities. They include the University of Pretoria, University of Swaziland, Kwazulu-Natal and the University of Free State. There is also a positive story as noted by Dulle, Minish-Majanja and Cloete (2010) and Mgonzo and Yonah (2014) about the use of OPACs, institutional repositories, adoption of e-learning and access to electronic resources through mobile devices among academic library users in Tanzania. Mtebe and Raisomo (2014) and Shemahonge and Mtebe (2018) mentioned the University of Dar es Salaam, Mzumbe University and The Open University of Tanzania that have been offering online undergraduate and postgraduate programmes.

The increased rate of internet penetration and mobile technology has been noted by GSMA (2022) that mobile connections in Tanzania were equivalent to 86.2 per cent of the total population in January 2022. Data show that there were 53.81 million cellular mobile connections in Tanzania at the start of the year 2022. Probably, this is because some make use of more than one mobile connection. Further, GSMA data indicated that apart from voice calls and short message services, mobile phones in Tanzania are primarily used for internet surfing and mobile money services, provided by telecom operators like Airtel, Tigo, Halotel, Vodacom and Zantel.

However, as in many African countries including Tanzania, internet penetration and the use of mobile technology by teachers, librarians and secondary school students are hampered by numerous factors. Some of them as noted by Sife (2013) include limited library support from the government, inadequate ICTs infrastructure in secondary schools, inadequate budget for the adoption of technologies in secondary schools and limited knowledge of mobile technology use among library staff. Similarly, Asongwa and Ezema (2012) observed that many East African countries, especially in rural areas do not have power supply which, as a result, makes it difficult for secondary schools in those areas to have a sustainable or encouraging technological atmosphere appropriate for mobile services provision.

Despite the availability of cheap internet services provided by telecommunication companies and the growing usage of mobile devices among library users, many libraries in Tanzania are yet to fully exploit the available opportunity through

mobile technologies. Moreover, the reviewed literature shows that most studies on the topic of mobile technology have focused much on the use of mobile services in academic libraries. Hence there is, however, the lack of remarkable research that has ascertained how mobile technology-based library services can be adopted and enhance school library services in Tanzania. This fact provides room for a more and in-depth investigation to fill this knowledge gap, particularly in Zanzibar.

### **Objectives of the Study**

The general objective of the study was to investigate the use of mobile technologies in the provision of school library services in Zanzibar. In specific terms the study intended:

- i. To examine the awareness of teachers, students and library staff on the available mobile applications that support teaching, learning and library services
- ii. To find out the common mobile-based services offered by school libraries
- iii. To evaluate the impact of using mobile applications in enhancing school libraries services
- iv. To examine the challenges facing school libraries in providing mobile-based services

### **Research Questions**

The paper seeks to address the following questions:

- i. To what extent do teachers, students and library staff familiar with the available mobile applications that support teaching, learning and library services?
- ii. What are the common mobile-based services offered by school libraries?
- iii. What is the impact of using mobile applications in enhancing school library services?
- iv. What are the challenges facing school libraries in providing mobile-based services?

The study findings may provide some important insights to policymakers and education officers on the need for enhancing the capacity of school library services by introducing regulations and guidelines for the effective use of mobile-based library services. The Ministry of Education Zanzibar in collaboration with the Zanzibar Library Services Board and other professional organisations may use this study to review or introduce the school library guideline by considering the

provision of mobile-based library services. In addition to that, this study will provide an exciting opportunity to advance our knowledge and raise awareness of the need for serious utilisation of mobile-based library services in Tanzania and Zanzibar in particular.

### ***Profile of the Zanzibar innovation hubs***

The establishment of Innovation hubs is a sub-project under the Zanzibar Improving Students' Prospects (ZISP) Project funded by the World Bank to improve the quality of instruction and learning environment of the Zanzibar education system. According to the Zanzibar Ministry of Education (2015), the project involved the construction of 22 innovation hubs and equipping them with adequate and modern facilities including ICT labs, science laboratories, language labs and libraries. The construction of learning facilities was planned for 22 existing secondary schools located in 11 districts of Zanzibar with each site expected to serve as a hub for neighbouring schools.

The project is structured into the following three main components: first is to support activities to enhance teaching and motivate teachers; the second is to equip schools with autonomy, resources and incentives to improve the quality of instruction and student support by improving the overall learning environment of the school; and the third component is to support the provision of learning facilities/resources for improved Math, Science and English achievement. The implementation of this component involves building and equipping 159 additional rooms and learning spaces in existing schools to reduce overcrowding, improve learning conditions and promote Math, Science and English learning (MoE, 2020).

## **Literature Review**

### ***The concept of mobile technology***

Hamad, Farajat and Hamarsha (2018) define mobile technology as handheld information devices, that can fit in a pocket and that encompass hardware, software and communication which help us to be connected at all times. Examples of some popular mobile devices include smartphones, tablets, e-readers, mp3 players, smart watches, voice recorders, portable digital assistants and integrated wireless solutions. The term can also be defined as technology that uses the radio frequency spectrum in any band to facilitate the transmission of text data, voice, videos, or multimedia services to mobile devices with freedom of time and location limitations (Kim, Mims, & Holmes, 2006).

Mobile technologies extend the way people access, receive and interact with information and they provide new channels for collaboration and communication (Hamat, Farajat, & Hamarsha, 2018). To Hamat *et al.* (2018), these new technological advancements provide faster access to an increasing volume and variety of information. Sabah (2016) opined that mobile technology (specifically cell phones and tablets) has already proven effective in all aspects of daily life. Users are increasingly relying on mobile devices as the most important means of performing many daily activities such as web navigation, e-mail access, reading books and social media engagement with friends.

Mobile technologies provide easy-to-use technologies and immediate access to vital information. It is considered a contemporary technology with enormous benefits to individuals, educational institutions, corporate organisations and government agencies. Mobile devices provide a transportable way to access data across borders, areas and institutions (Singh & Mahajan, 2014). To Saxena and Dubey (2014) mobile technologies provide a mobility central interface for individuals to access and share information anywhere anytime.

### ***Mobile technology-based library services***

Several studies, for example, West, Hafner and Faust (2006) and Lippincott, *et. al.* (2010) has found that libraries have extensively embraced the concept of mobile device applications. Libraries have done so to provide numerous innovative services to meet the needs of their users. According to Paterson and Low (2011), mobile-based library services are the use of smartphones and other mobile devices to present a novelty and opportunities for libraries and information centers to provide digital services for their remote users. Today, with mobile library technologies, patrons can search for a library's catalog, view upcoming events, make a reservation for library facilities, text for reference inquiries and renew borrowed materials.

In the views of Choy and Goh (2016), mobile technology-based library services include mobile online public access catalogs, mobile e-journals, mobile databases, short messaging services (SMS) for reference services, mobile collections (e-books and audio materials), mobile digitised thesis and mobile library tour/instruction. Mansouri and Soleymani (2019) provided some additional library mobile services such as integrated mobile library management databases and mobile reference services or as known as 'ask a librarian'.

As far as this study is concerned, mobile technology refers to mobile applications which have been created to support educational activities including library services. It is apparent that there is a good number of domestic and international educational mobile applications developed for teachers and learners. In Tanzania, several mobile applications have been created for different purposes to help teachers and students and facilitate the teaching and learning process. The apps were created to provide different services ranging from scholarship information, educational tips and discussion platforms to access teaching and learning materials including texts, audios and videos and e-learning platform. Some examples of these domestic made applications according to the Citizen (2019) are the shule direct app, maktaba tetea, mtabe app, soma app, tesa app, myelimu app, Tzshule app, the learning hub, tHL app, Elimutube, TZ past papers app, akili app, ubongo app, etc.

Literature in Africa concerning the use of mobile-based library services in all types of libraries does not provide a satisfactory report. It was observed by Asongwa and Ezema (2012) that many libraries in Africa are not utilising the benefits of this technology in their information delivery. However, there is somewhat a positive story in Tanzania's academic libraries where some of them are embracing digital access to professional and academic articles and full-text e-journal articles, e-books and e-thesis (Mgonzo & Yonah, 2014; Nunda & Elia, 2019). Yet, school libraries have been reported to be very slow to respond to the pressure for mobile technology adoption in their programmes (Dulle, 2010).

### ***Access and use of mobile technology in the academic environment***

Mobile technology is one of the many sources students and teachers may use in searching for online information. With the rapid change in technologies, many people are now using their mobile phones to access the internet rather than using computers. No individual can now argue that it is a luxury to possess a smartphone as it is a prerequisite as these devices are now used not only for communication but also to access the internet and other applications.

Several previous studies have found that students and teachers are the majority of regular users of the internet through smartphones. Findings from studies by Mtega *et al.* (2014) and Dei (2020) showed that the majority of teachers and students who were using mobile services used them for accessing teaching and learning materials and assignment preparations. Their studies also indicated that most students felt that the use of mobile services was suitable and far much better

than their school libraries. Further, students established that mobile services as a source of general knowledge since they assisted them in their reading habits as well as improving their academic performances.

It has been noted by Chambo *et al.* (2013) that mobile technology in Tanzania has been intensively made much cheaper for everyone even students. In line with that, in trying to encourage students to use mobile technology, Tanzanian mobile phone service providers have been competing by offering university and secondary school students cheaper internet bundles with more Gigabytes for them to enjoy mobile services. As a result, the utilisation of mobile technology services in the education sector is used as an alternative way to fill the gap of inadequate physical resources in traditional school libraries.

Apart from using mobile services for academic purposes, the study by Sife (2013) and Mtega *et. al.* (2014) pointed out that many young students use mobile services to assist in social communication such as e-mail, interacting with social media and chatting. In the case of entertainment, youth use mobile services in providing platforms for downloading and listening to music, film watching as well as posting and viewing photos and videos.

### **Methodology**

The study was carried out in Zanzibar and involved 22 innovation hub libraries and 22 surrounding secondary schools. These hubs and their surrounding schools were selected since they were under the pilot study of the World Bank project; hence the hubs were fairly equipped with modern library facilities. Therefore, the study intended to examine the provision of library services using mobile technologies. Schools were selected since they were nearby the hubs and they were expected to be benefited from the hubs' facilities and services. Five (5) form three and form four students were randomly selected from each school hence making a total sample size of 110 respondents. Simple random sampling was used to select 88 language and science subject teachers. Among them, four (4) teachers were from each school. A purposive sampling technique was used to select 88 library staff, two (2) from each library. This made a total of 286 sample sizes. Teachers were chosen for this study as they were expected to be good users of mobile technology-based library services and encourage their students to practice similar things. Students were chosen as they were expected to use mobile technology library services for their studies. Besides, librarians were chosen mainly because they were the providers of information services.

A cross-sectional research design was used and a mixed method approach was applied for data collection. In these ways, both a questionnaire-based survey and semi-structured interview schedules were used to language and science subject teachers, students and school library staff. A self-administered questionnaire was distributed to all respondents which were selected through the purposive total population sampling technique. Qualitative data were collected through an in-depth interview held with 6 library staff, 11 teachers and 22 students. The response was obtained from 30 innovation hub libraries, 20 school library staff, 70 subject teachers and 100 students. The total number of all questionnaire respondents was, therefore, 220 with an overall response rate of 76.92% as Table 1 illustrates.

After collection, the data were edited by means of checking and adjusting errors to ensure completeness and consistency before entering them into the database for analysis. As mentioned before, data in this study came from two sources: questionnaire data and interview notes. Interview responses were noted and data coding for the survey instrument was done via the online software tool and captured in a Microsoft Excel file. The researchers employed such descriptive statistics, as frequencies and percentages in data analysis.

**Table 1: A response rate of the distributed questionnaire**

Study area	Study population			Total
	Library staff	Teachers	Students	
Innovation hubs	44	0	0	44
School libraries	44	88	110	242
Total	88	88	110	286
	Response rate			
Innovation hubs	30	0	0	
School libraries	20	70	100	
Total	50	70	100	220
%	56.8	79.5	83.3	74.3

**Source: Research data (2022)**

## **Results**

### ***Respondent's awareness of the available educational mobile applications***

The researchers first sought to find out whether respondents were aware of the available mobile applications. The applications were the ones which could be used to supplement traditional library services and/or facilitate access to teaching and learning material. The result shows that 98 (44.5%) out of the 220 respondents

were aware, followed by 55 (25%) who were somewhat aware. The number was decreased to respondents who were very familiar with educational mobile applications; they were only 40 (18.2%). Conversely, a small number of respondents 27 (12.3%) were not familiar. Table 2 summarises the data.

**Table 2: Respondents’ awareness of the available educational mobile applications**

Response	Library staff		Teachers		Students		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Not familiar	2	2.27	9	6.3	16	16	27	12.27
Somehow familiar	9	10.22	19	12	27	27	55	25
Familiar	28	31.81	27	18.9	40	40	98	44.54
Very familiar	11	12.5	15	10.5	17	17	40	18.18
<b>Total</b>	<b>50</b>		<b>70</b>		<b>100</b>		<b>220</b>	<b>100</b>

**Source: Research data (2022)**

In this subsection, apart from awareness, the researchers were also interested in finding out whether or not respondents were using educational mobile applications. The results indicated that two-thirds 162 (73.6%) of respondents were reported to use mobile applications, followed by 34 (15.4%) respondents who did not use the applications. On the other hand, 24 (10.9%) respondents claimed to be not sure whether they were using the applications or not. These data provide evidence that the majority of respondents were using educational mobile applications for one reason or another.

Furthermore, as regards the use of mobile applications, respondents were asked to indicate how often they accessed educational mobile applications Majority that is 94 (42.7%) respondents said that they only used them whenever they needed to do so, followed by a quarter 55 (25%) respondents who used once a week while only 30 (13.6%) indicated daily use. What is surprising from these data is that 41 (18.6%) respondents pointed out that they had never used educational mobile applications. Table 3 summarises statistical data.

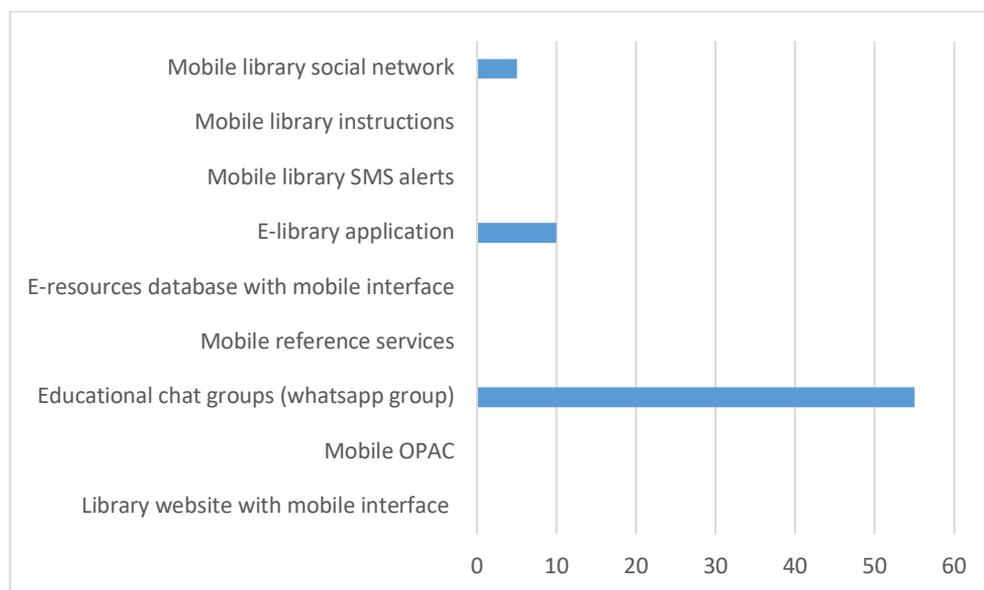
**Table 3: Frequency of using mobile applications among respondents**

Response	Library staff		Teachers		Students		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Daily	6	6.81	12	8.4	12	12	30	13.63
Once a week	10	11.36	15	12	30	30	55	25
Whenever needed	24	27.27	30	21	40	40	94	42.72
Never used	10	11.36	13	9.1	18	18	41	18.63
Total	50		70		100		220	100

**Source: Research data (2022)**

***Mobile application services offered by hubs and school library***

One of the objectives of this study was to identify library services offered through mobile technology platforms at the selected libraries. With choices of Mobile OPAC, library website with a mobile interface, educational chat groups, mobile e-books collections, mobile library text SMS alerts, mobile e-resources databases, e-books application, mobile reference services, library social networking services and mobile library instructions, respondents were asked to indicate the mobile-based services offer by their libraries. Selection of multiple responses was allowed. Figure 1 summarises the data.



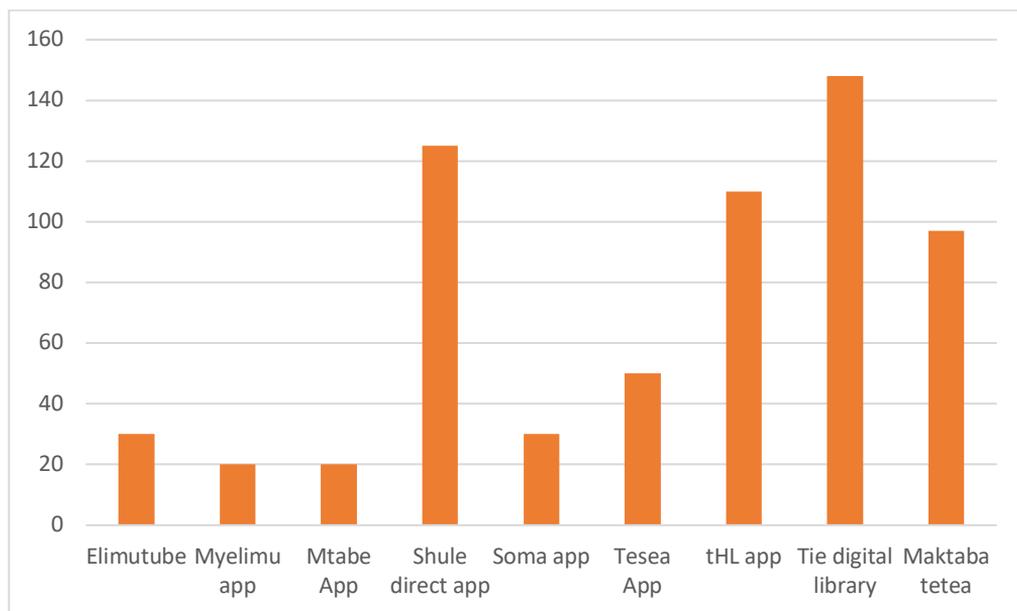
**Figure 1: Mobile services offered by hubs and school libraries**

**Source: Research data (2022)**

Data in Figure 1 indicate that the overall response to this question was poor and the majority that is 55 (25%) of those who responded to this item selected educational chat groups through the WhatsApp mobile application, followed by the mobile e-library application, recorded by 10 (4.5%), while only 5 (2.2%) indicated mobile library social network. This result is rather disappointing and it provides evidence that the libraries under this study were likely to not offer mobile services.

### ***The educational mobile application used by respondents***

In the current study, respondents were asked to indicate the educational mobile applications they were using to access teaching and learning material. A list of domestic educational applications was provided and respondents were asked to choose their answers from the list. Multiple responses were collected as summarised in Figure 2.



**Figure 2: Educational mobile applications used by respondents**

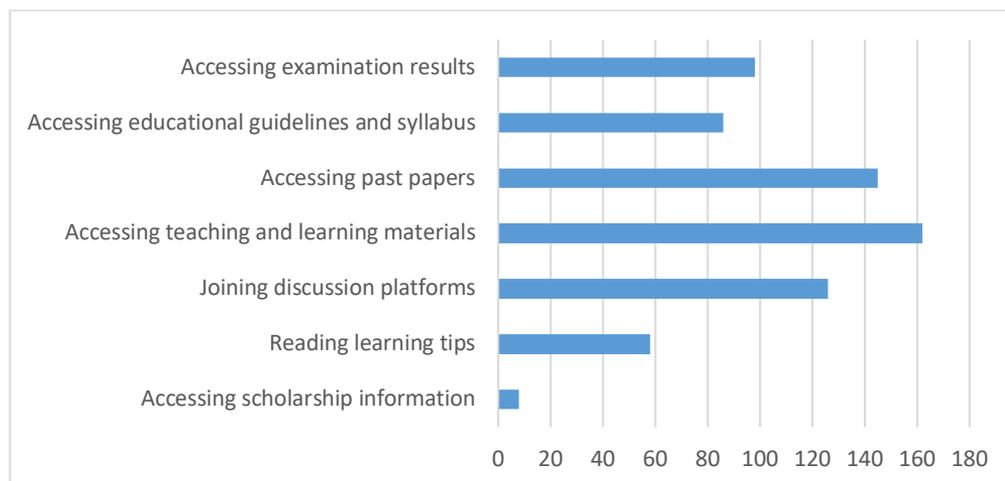
**Source: Research data (2022)**

Data in Figure 2 indicate that the majority of respondents, 148 (67.2%) were using the Tie digital library, followed by 125 (56.8%) respondents who used the shule direct application, followed by half of the respondents that is 110 (50%) who recorded to use tHL application. Furthermore, 97 (44%) respondents recorded

using the maktaba tetea application, followed by tesea and elimutube which were recorded to be used by 30 (13.6%) respondents, while the Mtabe app and myelimu app were recorded to be used by minority that is 20 (9%).

### ***Reasons for using the educational mobile application***

Respondents were asked to indicate the reasons why they used educational mobile applications. Multiple answers were provided and respondents were asked to choose from them. Findings are summarised in Figure 3 below.



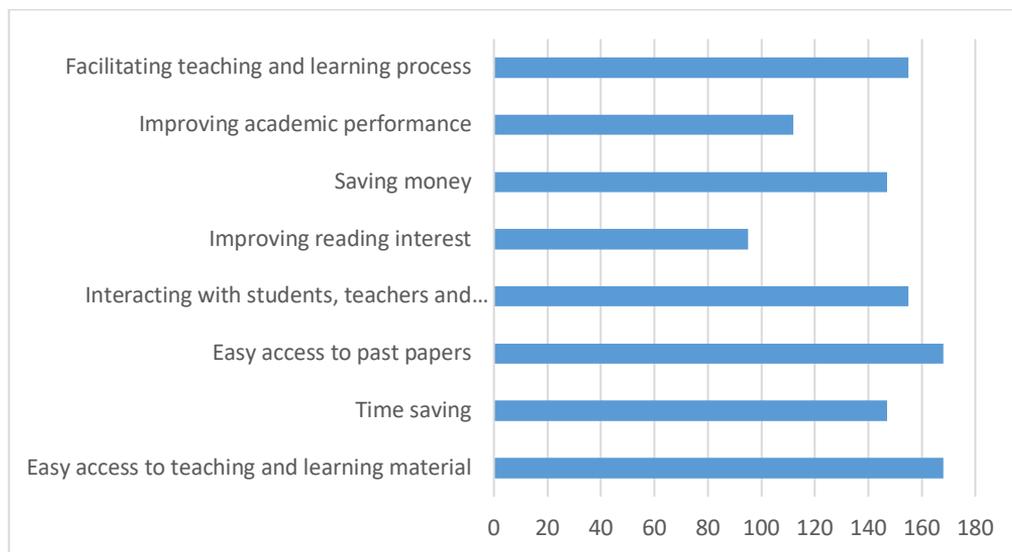
**Figure 3: Reasons for using the educational mobile application**

**Source: Research data (2022)**

The results in Figure 3 showed that a good number of respondents that is 162 (73.6%) used mobile apps for accessing teaching and learning materials. This was followed by 145 (65.9%) respondents who used them for accessing past papers and 126 (57.2%) respondents for joining discussion platforms. Furthermore, 98 (44.5%) respondents recorded using mobile apps for accessing examination results, followed by 86 (39%) respondents for accessing educational guidelines and syllabus. On the other hand, less than 4%, which is equal to 8 respondents used mobile apps for accessing scholarship information.

### ***Benefits of using educational mobile applications***

Respondents were asked to indicate the advantages of using educational mobile applications. Multiple answers were provided and respondents were asked to choose from them. Findings are summarised in Figure 4 below.



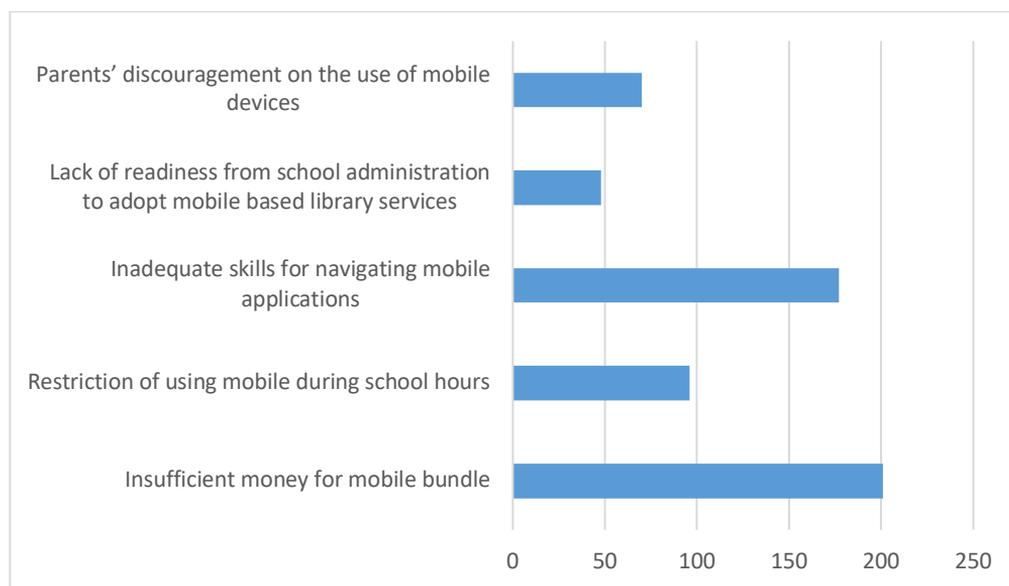
**Figure 4: Benefits of using educational mobile applications**

**Source: Research data (2022)**

Data in Figure 4 indicated that a good number of respondents that is 168 (76.3%) felt that the use of mobile applications leads to remote and easy access to teaching and learning material and past papers. This was followed by 155 (70.4%) respondents who indicated interaction with students and teachers and facilitate teaching and learning process. This was followed by 147 (66.8%) respondents who noted the help to time and money saving. Furthermore, 112 (50.9%) respondents indicated improving academic performance while only 95 (43.1%) respondents indicated that the use of mobile applications improves the reading interest of students. Table 3 provides summary statistics of these data.

#### ***Challenges that hinder the use of educational mobile applications***

Finally, the study sought to identify potential challenges that may impede the use of mobile apps in innovation hubs and school libraries in Zanzibar. Respondents were asked to state if they were being faced with any problems in accessing their information needs through mobile apps. Figure 5 summarises the data.



**Figure 5: Challenges that hinder the use of educational mobile applications**

**Source: Research data (2022)**

Data in Figure 5 indicated that, out of the 220 respondents, 201 (91.3%) stated that they had insufficient money for purchasing mobile bundles, 177 (80.4%) experienced inadequate skills for navigating mobile applications, 96 (43.6%) noted restrictions of using smartphones during school hours and 70 (31.8%) recorded to face parents' discouragement on the use of mobile devices. Conversely only 48 (21.8%) respondents mentioned the lack of readiness of school administration to adopt mobile-based library services.

### **Discussion**

The present study was designed to examine the use of mobile technologies in the provision of school library services. The first question in this study sought to determine the awareness of respondents of the available educational mobile applications. The current study found that the majority of respondents that is 98 (44.5%) were familiar while 40 (18.2%) were very familiar with educational mobile applications. This can be used to supplement library services as well as to facilitate access to teaching and learning material. It can be said that having an understanding of these mobile applications is one step forward toward their use and an implication of this result is the possibility that respondents were using the applications. These results are in line with the findings of Washburn (2011) and Hamad *et al.* (2018) who reported a high level of awareness among library staff

and users regarding the use of the mobile application to support library services, teaching and learning.

With regard to the time spent by respondents in accessing educational mobile applications, it was found in Table 3 that despite mobile services in Tanzania being fairly cheaper for everyone even secondary school students as they can acquire megabits bundles for as cheap as 500 TZS per day, surprisingly, the results indicate that many respondents were spending very little time on accessing educational mobile applications and some of them did not even use them. When they were asked about ownership of a smartphone, interview data revealed that the majority of respondents that is 15 (68%) did not possess their own phones. However, they tended to borrow phones from their classmates who owned phones or from their parents.

With respect to the provision of mobile-based library services, the result of the current study is rather unsatisfactory, since, despite the existence of cheap and easy-to-use mobile technologies, the majority of libraries under this study were not offering mobile-based services. However, the use of WhatsApp chat groups was reported by just a quarter that is 55 (25%) of respondents. It is interesting to note that the use of social networks can be perceived as a step forward toward the full implementation of mobile-based library services.

The benefits of using WhatsApp in an academic environment have been articulated by many scholars. Arahony (2015) and Bitso (2018), for example, noted that WhatsApp features of document sharing, groups creation, video and voice call make it a very powerful application in digital transformation for library and information services. Further, previous literature (e.g., Aharony & Gizat, 2016; Bitso, 2018; Anwar & Zhewei, 2020) provide evidence that WhatsApp has become another means of communication with librarians; showing that '*WhatsApp a Librarian*' has become quite common in reference services particularly in many academic, school and research libraries. Similarly, Ahad and Lim (2014) indicated that with the ease of use and affordability provided by WhatsApp, students benefit in terms of discussing and sharing information related to study matters and also from everyday communication with their teachers, librarians and fellow students.

The probing question was asked through the interviews to examine the interest of respondents in the use of mobile applications to access library services. Data from the interviews indicated that respondents were interested in using their

smartphones to access mobile-based services if they would be provided by their libraries. These results are supported by the studies by Lippincott (2009), Smith et al. (2010) and Goh (2011) who opined that mobile reference services were extensively known to most students and they preferred to use the services to get reference assistance from the librarians. These results are a wake-up call for hubs and other school libraries in Zanzibar to redesign their services to meet the users' demands and expectations.

Turning now to educational mobile applications used by respondents, the findings of the current study indicate that a majority of respondents that is 148 (67.27%) were using the TIE digital library (<https://www.onlineschoolbase.com/2021/12/tanzania-institute-of-education-tie.html>). This platform was designed by the Tanzania Institute of Education (TIE) to provide online access to learning materials of all levels, especially for those who have no access to physical school libraries. The most interesting finding was that although mobile-based school library services were noted to be poorly offered, the majority of respondents were recorded to use several educational mobile applications such as the shule direct app, tHL app and maktaba tetea. All of these applications were designed to facilitate access to teaching and learning materials including recommended textbooks and past papers. This finding is in line with Mtega *et al.* (2014) who pointed out that smartphones have the potential of facilitating and improving the teaching and learning processes as the devices are affordable to many people including students compared to other computer-related devices.

Regarding the reasons for using educational mobile applications, it is clear from the results that the majority of the respondents that is 162 (73.63%) were using educational mobile apps mainly to access teaching and materials, especially the recommended textbooks. The findings of the current study confirm the study results by Pu *et al.* (2009) that teachers and students have a positive desire and prefer to use mobile apps for accessing teaching and learning resources as they are cheap, user-friendly and can be accessed anywhere anytime.

When library staff respondents were asked through interviews to comment on the advantages of the provision of library services through a mobile platform, they commented that mobile apps may help to facilitate interaction with library users, supplement the library collection and help to save the time of users. This result implies that the majority of respondents agreed that using mobile

technology had several benefits chiefly being easy and remote access to teaching and learning materials. The present findings seem to be consistent with the studies by Clyde (1995) and Todd (1997) which found that mobile technology allowed flexible, easy and cost-effective access to teaching and learning information resources. Similarly, Olatokun (2008) had the view that access to mobile technology helped to promote reading habits and improved reading skills which in turn supported students' academic performance.

Finally, the study sought to find out the challenges facing respondents when using educational mobile applications. The current study found that the majority of the respondents that is 201 (91.36%) had a challenge of insufficient money for subscribing to a mobile bundle. This result is consistent with those by Mtega *et al.* (2014), Kira and Mahumbwe (2015), Tarimo and Kavishe (2017) who noted the problem of the shortage of funds for purchasing mobile gadgets and bundles. In addition, the problem of inadequate skills for navigating mobile applications was noted by a good number of respondents, that is 177 (80.45%). A possible explanation for this result might be the lack of information literacy skills among respondents.

Furthermore, it is interesting to note that student respondents claimed that they were restricted to use mobile devices during school hours. These data must be interpreted with caution because the order of not using smartphones on school premises was issued by the Ministry of Education and of course there are some important reasons including the aim of controlling and preventing students from the misuse of internet. The ministry's assumptions might be true if students may misuse the internet as it has been noted by previous literature.

However, mobile applications can sometimes be used without internet connectivity. One significant issue which can be considered here is the safety and control of smartphone use by secondary school students to ensure that the technology is used for good. Such a challenge might likely be connected with another challenge of parents' discouragement of the use of mobile applications as noted by students' respondents. One of the issues that emerge from these findings is the need of educating parents on the importance of using mobile applications by students since they play a crucial role in facilitating access to learning materials. Furthermore, parents' engagement with mobile phones should be empowered with additional technical skills to monitor and guide their children on the proper use of technology. Additionally, there is a need of imparting

information literacy skills to secondary school students especially the skills on the ethical use of online information.

### **Conclusions**

This research sought to ascertain the use of mobile technology in the provision of school library services in Zanzibar. The findings of the study established that there was a strong awareness of the availability of educational mobile applications and the majority of respondents reported using them regularly. Furthermore, the findings of the current study observed that some hub and school libraries offered mobile-based library services by using the WhatsApp application and social networks. However, the general use of mobile technology-based library services was reported to be very low. Concerning educational services that were offered by domestic mobile platforms, the majority of respondents were using the TIE digital library, shule direct app and tHL app to access teaching and learning materials. Through the use of these applications, respondents were reported to improve the teaching and learning process and hence improved students' performance. This study has also led to the uncovering of the potential challenges of the use of mobile application-based library services in innovation hubs and school academic libraries. If the challenges identified in the findings are properly addressed, they may be used as the foundation for the successful use of the educational mobile application as well as the implementation of mobile-based library services in innovation hubs and school libraries in Zanzibar.

### **Limitations**

Although the present study successfully demonstrated that library staff, teachers and students in Zanzibar reported using mobile applications to access teaching and learning materials, the study had some limitations that need to be noted. First, it is unfortunate that the study did not include universal mobile applications that can be used for educational purposes. Second, the current study was conducted in Zanzibar which is just a small part of Tanzania. Thus, these results may not be generalised to the whole of Tanzania school libraries. Finally, the study did not focus on the safety, control and ethical use of mobile technology among secondary school students which is a significant aspect to be considered in future research.

### **Recommendations**

Based on the findings of the current study, the following recommendations are put forward by the researchers for the successful adoption and implementation of mobile-based library services in hubs and school libraries in Zanzibar:

- i. The Zanzibar education authority should develop a policy framework and guidelines for the adoption and implementation of mobile technology-based in innovation hubs and school libraries.
- ii. The education authority in cooperation with Zanzibar Library Services Board (ZLSB) should provide training to school library staff on the effective use of mobile applications in the provision of library services.
- iii. The hub and school libraries on another part should also train library users on the role played by mobile applications and the benefits of using them.
- iv. The management of innovation hubs and secondary schools should allocate sufficient funds to support the integration and full realisation of the mobile technology deployment in their libraries.
- v. COTUL should think of subscribing to e-resources that will support the teaching and learning process at the primary and secondary school levels.
- vi. The Ministry of Education should think of embedding information literacy skills in secondary schools' curricula. This will help students to be equipped with information search skills as well as the ethical use of online information.

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