# A library-based model for explaining information exchange on Coronavirus disease in Nigeria

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## Abstract

**Background**: Misinformation about COVID-19 is one of the challenges that health experts need to overcome if they must effectively create awareness about the virus. Available literature point to the fact that libraries have a significant role to play in the dissemination of health messages. Additionally, recent evidence on the nexus between mobile technology devices and libraries show that such devices have promising potentials to assist modern libraries in their service delivery. Nonetheless, researchers have paid less attention in suggesting models that explain how modern libraries can contribute in information dissemination during public health emergencies in general and COVID-19 in particular.

**Objective:** This study sought to develop a library-based model that will explain how libraries can make use of mobile technology devices to deliver information to their patrons regarding COVID-19.

**Methodology:** An online descriptive survey was used for the study. The questionnaire served as the instrument for data collection. A total of 470 participants took part in the study. The respondents were sampled through respondent-driven sampling (RDS) chain referrals. The multiple regression analysis was used to analyze data for the study.

**Results:** Mobile technology devices such as cell phone, smartphones, smartwatches, laptops, netbook, etc can be used to effectively deliver information on COVID-19 to library users in Nigeria. Additionally, facilitating conditions such as access to Internet connectivity, ownership of mobile technology device, ability to operate mobile technology devices, as well as capacity to make provision for alternative Internet access determine the utilization of mobile technology for receiving information on COVID-19 through libraries among users in Nigeria. Finally, performance expectancy and effort expectancy significantly predict behaviour intention regarding the use of mobile library features for information reception on COVID-19 in Nigeria.

**Unique contribution:** The study has developed a library-based model that explains how to use mobile technology devices to effectively disseminate information on COVID-19 to library users in Nigeria.

**Conclusion:** Libraries have a critical role to play regarding information dissemination during public health emergencies such as COVID-19.

**Key recommendation:** Libraries should deploy mobile technology devices to effectively deliver services to their patrons.

**Keywords**: COVID-19; information sharing; library-based; model; misinformation.

## Introduction

Information exchange is a key component for effectively combating public health emergencies. During public health emergencies, people need information on causes, prevention, symptoms, cure, and other information that may be useful to them. As a key component of health promotion, information guides the general public regarding unfolding happenings on a public health emergency. Baker et *al*., (2020) in making a case for the important role that information plays during public health emergency note that part of preparation to comprehensively address a public issue is to make arrangement regarding communication and information sharing. They add that the challenge which COVID-19 poses makes a strong case for the general public to be guided so that they can make the needed adjustments. Apart from educating the general public, information is needed during public health emergency to avoid panic among the general public. Marshall *et al.*, (2007) corroborate that health education experts often make efforts to ensure that the general public are not unnecessarily anxious during emergencies. Unfortunately, misinformation about COVID-19 has continued to pose a threat towards effectively educating the general public about the virus. Social media platforms have particularly served as fertile grounds for misinformation during the pandemic. This makes a case on the need to develop models that will provide guide on how to share accurate and timely information regarding the virus.

Although information related to COVID-19 can be communicated through different channels like radio, TV, newspaper, magazine, social media, etc, in the current study, attention was paid to libraries. Researchers (Baker *et al*., 1998; Kwon & Kim, 2009; Zickuhr *et al*., 2013) acknowledged that libraries play essential roles in health information dissemination. For example, Kwon and Kim particularly note that 6% of adult people in America consider public libraries as essential sources of health information. Zickuhr *et al.,* note that majority of Americans rely on library resources for their health information needs. Within the context of library and health information, a user is called a *consumer*. (Medical Library Association and the Consumer and Patient Health Information Section, 2003). Just like in commercial marketing where the consumer is the king, in health information sharing, the receiver of health messages is the king; and health messages, no matter how beautifully crafted, if the message is not communicated to the target receivers, the objective of such health messages will not be achieved. With this in mind, a study of a library-based model that will explain how to effectively share information on COVID-19 to consumers becomes relevant.

## Objective and significance

The objective of this study was to develop a library-based model that will explain how to effectively share information on COVID-19 to health information consumers in Nigeria. It is expected that this study will be useful to academics, library professionals, and health experts. Regarding academics, the result of this study has extended literature on health communication and health information exchange by highlighting the important roles that libraries can play during pandemics. Additionally, the study has suggested a model that explains how libraries can be used to share information on COVID-19 in particular and health issues in general. The current study also has implications on library practice by

revealing the link between library and public health emergencies. The current study has implications on health promotion by revealing the need for both library professionals and health educators to form a synergy with a view to ensuring that the general public has access to information that will guide them in times of global public health emergencies. Finally, this study has implications in advancing theories of health promotion because its results could be useful for other researchers that may be willing to suggest theories of health information sharing.

**Literature review**
The outbreak of Coronavirus disease (COVID-19) was first recorded in December, 2019 in Wuhan, a city, the Republic of China. As at that time, the virus was widely regarded as a local outbreak that may not even spread to other parts of China, but that was not the case as the virus spread to other parts of China with casualty in its trail. Even when the virus began to spread to other parts of China, it appears the world was yet to come to terms with the magnitude of the problem. Gradually, the virus began to spread to other parts of the world. The international community was not prepared for such a pandemic because there was insufficient warning signal. Gever and Ezeah (2020) in a study found that the media in Nigeria did not provide sufficient warning messages on COVID-19. According to Gever and Ezeah, before the outbreak of the virus, there were fewer stories about it in the media, but as soon there was a confirmed case in Nigeria, stories on the virus suddenly increased. The study of Gever and Ezeah is an evidence of how less prepared the world was before the virus began to spread.

COVID-19 cases have been on the increase globally with casualties recorded. According to the World Health Organization (2020), a total of 29,356,292 confirmed cases of COVID-19 have been recorded globally as at 16 September, 2020. The world health body notes further that a total of 930,260 deaths have been recorded globally due to the virus. In Nigeria, WHO notes that from February 28 to September 16, a total of 56,388 cases have been confirmed with 1,083 deaths. The virus has had a significant impact on human activities. Economic activities have been brought to a standstill; people have lost their sources of livelihood while human beings have been compelled to modify their behaviour to suit the realities of the moment. There is currently no cure for COVID-19 nor is there an approved vaccine for it. Wu *et al*., (2020) say that COVID-19 pandemic has a low to moderate (estimated 2%-5%) mortality rate. Sun *et al*., (2020) affirm that at the moment, there is no vaccine for COVID-19; instead, what is used as treatment is mainly symptomatic treatments. During times of emergency like COVID-19, information sharing is key to awareness creation and public enlightenment. Ezeah *et al.,* (2020) in a study found that information is important for educating people about COVID-19 and influencing their behaviour. Libraries as repositories of information have a critical role to play in disseminating relevant information on the virus.

Modern day libraries can particularly play essential roles in circulating information to the general public on COVID-19 with the aid of mobile technologies. Kari (2019) says that mobile technologies are now considered as important tools for delivering library services to users. Kari further defines mobile technologies hardware and software features of communication technologies. Such technologies are viewed as mobile as a result of the fact that they can be carried along from one place to another. According to Aharony (2014), the features of mobile technologies are: smallness of size and

portability. Aharony further gave examples of mobile devices to include: tablets, smartphones, and netbooks. In the views of Aharony, such mobile technologies have completely changed the communication landscape. Speight (2009) says that the growing use and acceptance of mobile devices in different aspects of life is propelling libraries to contemplate adapting these new technologies. Bridges *et al*., (2010) aver that the time is due for libraries to fully make use of the opportunities inherent in mobile technologies. Hahn (2008) was thinking along this direction by noting that mobile technologies can be beneficial for libraries to deliver efficient, effective, and timely services to their users in the current technology-driven world. Based on the above literature, it was hypothesized:
**H1:** Mobile technology devices will significantly enhance library information reception on COVID-19.

**Theoretical framework and study model**
To enable the researcher to achieve the objective of this study, the Uses and Gratification Theory (U&G) and the Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical framework. Venkatesh,*et al*., suggested the theory in 2003 by harmonizing other theories on use of new technologies. Some of the theories that were harmonized together with empirical evidence to suggest UTAUT were: theory of planned behaviour, technology acceptance model, theory of reasoned action, and the combined TAM-TPB. UTAUT has a total of six fundamental constructs that are combined to explain behaviour intentions. These are namely: performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), behavioural intention (BI) to use the system, and usage behaviour. The UTAUT theory has four critical predictors and four moderators. Consequently, the four predictors of BI (Behaviour intention) and usage behaviour are: performance expectancy, efforts expectancy, social influence, and facilitating condition (Venkatesh *et al*., 2003). The theory adds further that moderators of this relationship include: gender, age, experience, and willingness to use technology. In the view of Venkatesh *et al*., (2003), effort expectancy is the extent of ease related with the utilization of new technologies. On the other hand, performance expectancy is defined as the extent to which a person is convinced that new technologies will be useful in task execution. Behaviour intention is defined as the extent to which a person has put in place, plans regarding if to carry a certain future behaviour or not. Venkatesh *et al*., (2003) reported that performance expectancy is the strongest determinant of a user's BI to adopt a technology. Evidence in literature (Šumak & Šorgo, 2016; Khalilzadeh *et al*., 2017; Šumak *et al*., 2017) has it that performance expectancy and effort expectancy are direct determinants of behaviour intention. The new technologies argued about in this study are mobile technologies that can be deployed to deliver information on COVID-19 to the general public. Kari (2019) conducted a study on the use of mobile technologies in libraries and reported that both library professionals and patrons are aware of mobile technologies that can be deployed in delivering library services to users. Consequently, the researcher hypothesized:
**H2**: Facilitating conditions will significantly predict the effectiveness of utilizing mobile technology library services for receiving information on COVID-19 among users in Nigeria.

***H3****:* Performance expectancy and effort expectancy will significantly predict behaviour intention regarding the use of mobile library features for information reception on COVID-19 in Nigeria.

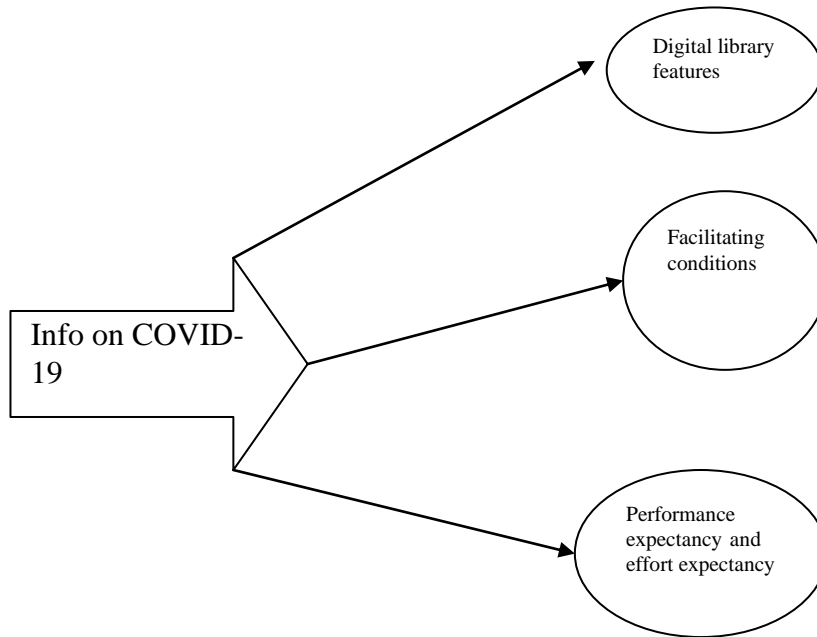Based on the above hypotheses, the researcher illustrated the model below:



**Figure 1: Study Model**

information to its patrons on COVID-19. According to the model, information on the virus can be made available to users using mobile technology devices.

**Materials and methods**

The researcher made use of descriptive survey research design to carry out this study. Usually, the choice of a research design is done based on the objective of a study. Therefore, it was the conviction of the current study that descriptive survey was best suited for this study. This is because descriptive survey typically allows a researcher to examine an issue in detail. The sample for the study was made up of 470 library users in Nigeria. The researcher reasoned that library users were best suited for the study so that they could provide relevant data on how to share health information on COVID-19 to them. The researcher selected the sample after conducting a priori power analysis. The researcher utilized the G*power programme (Faul *et al*., 2007) and then checked the parameters with power $(1 - \beta)$ at 0.90, 0.30 effect size f, and $\alpha = .05$. The outcome suggested that a sample size of 470 was adequate to detect effect at 0.05 level of significance. To sample the respondents for the study, the researcher made use of respondent-driven sampling (RDS) chain referrals (Johnston *et al*., 2008) to recruit the study participants. Usually, RDS begins by recruiting initial respondents normally known

as "seeds." These 'seeds' are expected to have the characteristics which a researcher is looking for. In this study, the seeds were library users. The researcher recruited the seeds through social media advertisements that were pasted on the Facebook handle of the researcher. The initial seeds were required to forward the research participation link to other potential participants. This process continued until the desired number of participants were recruited. Onuora *et al.,* (2020) in a recent study applied the RDS technique and the outcome showed that it is an effective sampling approach. The instrument for data collection in this study was the questionnaire. The questionnaire has the capacity to generate large volume of data that could be used for quantitative analysis. The questionnaire contained an introductory question that sought to ascertain if respondents were library users or not. Respondents who clicked 'no option' got an automatic response-"thank you for your time," but those who clicked yes proceeded to respond to the survey. The response format for the questionnaire was multiple options. Overall, the questionnaire instrument had 20 items. The researcher collected data for this study over a time frame of three weeks. A total of three experts from library and information science, University of Nigeria, Nsukka validated the questionnaire. The experts made comments on the relevance and adequacy of the items. Their comments and views were found useful for the study. The reliability of the instrument was determined with the use of test re-test strategy using two weeks interval. The exercise yielded correlation coefficient of .87, meaning that the instrument was reliable. The researcher made use of multiple regression and multiple hierarchical regression to analyze data for the study. The Statistical Package for Social Sciences version 22 was used to analyze data for the study. The assumptions in the study were tested at 0.05 level of significance. All the results were presented in tables.

**Results**

A total of 470 copies of the questionnaire were filled and returned to the online platform. The sample was 64% male and 36% female. Also, the mean age of the respondents was 26 years. Most (96%) of the respondents had tertiary education. The result of the hypotheses testing is presented in the tables below:
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*Table 1: Regression analysis of mobile technology devices that will enhance library information reception on COVID-19*

| Devices | *Constant* | β *value* | *R square* | *F. value* | *P. value* |
|---|---|---|---|---|---|
| Tablet | 4.014 | .305 | .510 | 11.401 | .001 |
| Smartphones | | .797 | | | .003 |
| Netbooks | | .405 | | | .001 |
| Laptop computers | | . 564 | | | .003 |
| Cell phones | | | | | .002 |

| Smart watches | | | | | .001 |
|---|---|---|---|---|---|

The objective of the table above was to determine mobile technology devices that can be utilized to enhance library information reception on COVID-19. The result of the analysis showed that all the variables significantly predict library information reception among users in Nigeria. The result of the beta value showed that smartphones (β=.797) had the highest beta value. This means that smartphone is the most effective mobile technology device that can be used to enhance library information reception on COVID-19. Based on the outcome of this study, the first assumption was supported and the researcher concludes with 95% confidence that mobile technology devices will significantly enhance  library information reception on COVID-19.

**Table 2: Regression analysis of facilitating conditions that will significantly predict the effectiveness of utilizing mobile technology library services for receiving information on COVID-19 among users in Nigeria**

| Items | Constant | β value | R square | F. value | P. value |
|---|---|---|---|---|---|
| Ownership of mobile devices | 4.911 | .305 | .516 | 10.422 | .001 |
| Access to Internet connection | | .897 | | | .001 |
| Ability to make arrangement for personal Internet access | | .702 | | | .002 |
| Ability to operate mobile devices | | . 461 | | | .001 |

The researcher computed table two to determine the facilitating conditions that will make it possible for mobile technology devices to be used to receive library information on COVID-19. It was found that all the four items are predictors of facilitating conditions that will determine the reception of library information on COVID-19 through mobile technology devices. Further examination of the table showed that access to Internet connection had the highest beta value (β=.797). This point to the fact access to Internet connection is the most facilitating condition that determines the use of mobile technologies for reception of library information on COVID-19. The result of the study supports the second assumption and the researcher concluded with 95% confidence that facilitating conditions play an essential role in determining the utilization of mobile technologies to receive library information on COVID-19.

*Table 3: Regression analysis of performance expectancy and effort expectancy as predictors of behaviour intention towards the use of mobile library features for information reception on COVID-19 in Nigeria*

| Items | *Constant* | β *value* | *R square* | *F. value* | *P. value* |
|---|---|---|---|---|---|
| Performance expectancy | 4.015 | .318 | .504 | 12.120 | .001 |
| Effort expectancy | | .801 | | | .001 |

Table three above was computed to test if performance expectancy and effort expectancy significantly predict actual use of mobile technology devices for receiving library information on COVID-19. The analysis showed that both items had p-values of less than 0.05, an indication that they significantly predict use of mobile technology devices for receiving library information on COVID-19. On a comparative note, effort expectancy (β=.801) had higher predictive ability. Based on this result, our third assumption was supported.

**Discussion of findings**
The aim of this study was to develop a model that will be used to share information about COVID-19 from the library and information science perspective. In doing so, the researcher recognized the changing dynamics in library service delivery as a result of improvement in technology. Specifically, the researcher made use of variables from the Unified Theory of Acceptance and Use of Technology (UTAUT) theory to suggest a model that will serve as a guide on how health promoters can form a synergy with libraries to deliver health care information on COVID-19. It was found that mobile technology devices such as cell phone, smartphone, netbook, laptops, and tablets can effectively be used to deliver health care information to library users in Nigeria. This result has extended previous studies such as the study of Kari (2019) who have examined the important role of mobile technology devices in health care information delivery without paying attention to how libraries can make use of these devices in times of public health emergency to reach the general public.

Additionally, the result of the current study showed that the utilization of these mobile devices for health information reception related to COVID-19 is determined by facilitating conditions. These facilitating conditions include ownership of such mobile devices, ability to operate, availability of Internet facilities, and ability to make provision for alternative internet connections. Additionally, the researcher found that other variables such as expectancy performance and effort expectancy significantly determine actual use of mobile devices for library information reception about COVID-19. These aspects (facilitating conditions, performance expectancy, and effort expectancy) of our results confirmed the theoretical postulations of Unified Theory of Acceptance and Use of Technology (UTAUT) as a theoretical framework as expressed by Venkatesh *et al*., (2013). Also, the result of the current study has extended the study of Šumak and Šorgo (2016); Marshall *et al*., (2007) and Khalilzadeh *et al*., (2017) who examined the relevance of UTAUT in studies related to use of new technologies without paying

attention to how libraries can utilize mobile technology devices for information delivery on public health emergencies in general and COVID-19 in particular. The current study has equally extended literature (Ezeah *et al*., 2020; Gever & Ezeah, 2020; Sun *et al*., 2020; Wu *et al*., 2020) on COVID-19 by including the role of libraries in information dissemination on the virus. It is the expectation of the researcher that the current study will widen debates on the role of information and communication technologies in library service delivery on one hand, and the role of library to the society on another.

## Conclusion/ recommendations
In the light of the result of this study, it is the conclusion of the researcher that libraries have a critical role to play in information dissemination during public health emergencies. In this era of growing acceptance of mobile technology devices, libraries can utilize them to effectively deliver services to their patrons. Although this study has succeeded in developing a model that serves as a guide regarding the roles of libraries in public health emergency periods, it has its limitations. The first limitation is that the study was conducted from the perspective of library users. It will be beneficial to equally understand the issue from the perspective of library professionals. In the second place, the sampling was done through online platform; thus, this denied the researcher the opportunity of interacting with the respondents. Further studies are recommended to take care of these limitations. Additionally, the researcher recommends that health promotion experts and library professionals should form a synergy to effectively deliver health care service messages to the general public. Finally, it is the recommendation of this study that libraries should deploy mobile technology devices to effectively deliver services to their patrons.

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