WEB-BASED AND SMART MOBILE APP FOR DATA COLLECTION: KOBO TOOLBOX / KOBO COLLECT

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Rapid technological advances have led to the smarter data collection being easier to access, less expensive and more efficient.Researchers and organisations in many fields have successfully developed and deployed various Mobile applications (apps) for data collection. In the present era the data collection phase plays a vital role in a survey research. It is a process of gathering and measuring of research data. It turns out to be a tredious process to collect research data through traditional methods.This paper explains the application and usage of Mobile data collection, features of kobo toolbox and 'kobo collect', an open source suite for data collection. Kobo Toolbox/Collect is a precise, handy and remote data collection tool. It helps researcher to collect the data by using 'one click method' and can compile the data based on the predefined criteria of the research. There are several web based and Mobile applications which are trending as data collection tools such as Google forms, LimeSurvey, SurveyMonkey, KwikSurveys, eSurv, and Kobo Toolbox.

Keywords: Data collection tool, Kobo toolbox, Kobo collect, Open source, Mobile data collection.

INTRODUCTION

Data collection plays a critical role at the survey phase, which highly affects the quality of data of the research work. In disciplines like Humanities & Social Sciences, Biological Sciences, Earth & Environmental Sciences, data can be collected through human-mediated fieldwork. Several field research disciplines compromises the integrity of research results due to the lack of transparency and reproducibility. Survey data is generally collected using a printed copy, data fragments in various formats, and customized databases. Datasets, furthermore, are often trapped in hard-copy archives and local storage making it difficult to get a line and limiting reinterpretation and reuse. Digital datasets are often highly variable, of poor quality, and incompatible. Deficiencies like these inhibit the reuse of primary data and the aggregation of datasets from multiple studies for large scale research (Ballsun-Stanton et al., 2018).

In the mid of 80s, gathering research data through phones and mail had become the standard over surveying the clients' door to door. Due to the tremendous growth in Information Technology, there have been several options that have come into existence for data collection along with a variety of software, mobile applications, online and cloud-based data collection tools. In addition to these, the concept of open-source software is wide spread. It allows users to modify the source code according to their requirement and feel free to share content with others. Different methodologies can be used for data collection and analysis. Data collection applications allow gathering a wide variety of information. In fact, a large number of organizations and companies are involved in the design of applications. Some of them designed to collect their own functional data and some designs are open to all. Today, a bundle of open-source mobile applications are available in the market for data collection, mainly Kobo Collect, ODK, Open Foris Collect Mobile. These applications are designed to let users own, visualize, and share data without the difficulties of setting up and maintaining servers. The tools are easy to use, deploy, and scale up. These are based on open source standards and supported by a larger community("mtab.com", n.d).

MOBILE DATA COLLECTION

Mobile Data Collection is a technique used for compiling qualitative and quantitative information with the help of devices like mobile phones, tablets etc. This method helps to increase speed and accuracy while collecting research data. Instead of capturing information using paper and pen, which is then manually entered into a computer or database, research data is directly entered into a device that is capable of exporting data into a connected database (Satterlee et al., n.d.) . The connected database in turn can be used for retrieval also.

Mobile data collection can be deployed in several ways. These methods include Computer-Based Telephone Interviews(CBTI), Interactive Voice Response (IVR), Short Message Service (SMS), Unstructured Supplementary Service Data (USSD), Wireless Application Protocol (WAP), Web Surveys using smart phone browsers and data collection applications downloaded onto android phones or through conversational bots (Robertson & Jeoffreys-Leach, 2017).

BENEFITS OF MOBILE DATA COLLECTION

1. *Speed and Efficiency* – By using mobile devices in data collection, data can be prepared for analysis in a significantly shorter duration of time. This method helps to eliminate a separate data entry process, especially in longer and more complex surveys.
2. *Reduced cost* - Mobile data collection helps researchers in benefitting monetarily by saving the expense of data entry, travelling cost, and avoiding the use of pen and paper. This helps the environment also.
3. *Quality data* - While creating data sets, certain customizations will be followed and various quality checking tools will be used. *Filter Logic* can be adopted, which clear

confusions on questionnaire constructions.

4. *Control and flexibility of fieldwork* - It is possible to fix small issues in questionnaire design such typo errors, badly phrased queries, or filter logic. To a certain extent, further questions can even be added to investigate inserted findings.*User friendly* - This method enhances the credibility of the data collection. While collecting data with the help of mobile devices, there is no need to carry a large number of survey materials. This reduces the hassle and burden of traditional pen and paper methods (Trucano, 2014).

LIMITATIONS

1. *Difficult to use*- Using mobile devices will be extremely difficult, for those unfamiliar with its usage. Without proper training, one will not be able to use them for interviews. Lack of literacy among using mobile techniques is another hurdle faced by users.
2. *Electronic devices are unreliable* - Devices operate on batteries that run out. Almost all devices are breakable, if fallen on ground. Hanging of software also causes disruption of data collection.
3. *Too expensive* - To provide evident based result, there is a dire need to develop appropriate tools. Equipments are too expensive but these can be used for multi rounds of data collection.

REVIEW OF LITERATURE

In the context of emerging technologies used for data collection Mehmood et.al., (2019) have discussed importance of rapid growth in mobile technologies and its application in contemporary world and faster escalation in the digital network coverage have the potential to transform data collection in every corner of the world. So that Digital data collection is faster and quickly adaptable mechanism. Park (2015) mentioned the mobile collection system and use of mobile technologies has increased the demand for mobile-based data-collection solutions to bridge the information gap in Small and Mediu-size Enterprises (SMEs). As a part of data collection, a web based authoring tool developed, that allows non-programmers to build mobile applications to collect data. Brewer and Guiterman (2016) used a new digital data collection tool i.e. ODK (Open Data Kit) to provide a customizable and intuitive method for dendrochronological field data collection. ODK is an Open source and ecosystem of tools designed to enable data collection through using Smart Phones. Lefever et al., (2007) evidenced the online data collection has been replaced the paper-and-pen survey in academic research. The present study discussed on the advantage and disadvantages of online and web based data collection tool used in LearnICT project among upper secondary school Students and teachers in IceLand.

Ahmed et al., (2020) developed a tool to bridge the data collection gap between the onset of a Covid-19 outbreak and start of data collection. The study conducted in WHO African region and used *Go.Data* as data collection tool for summarization and visualization. Go.Data is a flexible for data collection and provides functionality for Covid-19 case investigation,

contact tracing, and visualization of transmission chain. It has been developed primarily to improve contact tracing activities to break disease transmission as well as it works to choose the right interventions to stop the disease from spreading. Minnaar and Heystek (2016) expressed opinion, by using online survey in academic research should get international recognition as convenient and cost-effective. The study conducted on school governance and leadership and its clearly proven conventional data collection methods and instruments were inappropriate for researchers those who intended conducting large-scale research in any sector.

Laitenberger and Dreyer (1998) adopted the web-based measurement instrument to collect questionnaire on 'better understanding of people's attitudes and behavior'. The instrument is Davis's Technology Acceptance Model and its goal is to provide an explanation of the determinations of technology acceptance. This study clearly defined it is a model of usefulness, ease to use and self-predicted future usage. De Vries et al, (2013) experimented the emerging data collection strategy is that using smart phones as recording tool for Speech data collection to analyze under-resourced languages. Due to increasingly available and decreasing cost of smart phones, it has become a significant tool for data collection on Automatic Speech Recognition. 'Woefzela' was used in this study; it helps to collect the data without using internet and allows data for multiple sessions in parallel. It was demonstrated as part of a South African data collection Project. It also simplifies the process and maximizes the opportunities in recording. Tomlinson et al., (2009) used mobile phones for household survey in South Africa region. This method helped to investigate the feasibility and executed in a simple manner. Along with using Mobile phones for data collection, web based application was also developed to allow online filled questionnaires and real-time supervision.

DEVELOPING MOBILE APPS FOR DATA COLLECTIONS

Smart technology is taking over the world. We are in an age where most people use smart tech devices regularly for various purposes. In another form, mobile app developers come across diverse users requirement, they come up with creative and innovative mobile app solutions that include more than one emerging technology, such as Android phones and "Apps", which allows to set up any research in a different manner. In fact, Smart Mobile devices have become an integral part of billions of lives. In the 21st century, lots of web and mobile based apps are being developed for data collection making them convenient to various fields. It is rapidly spreading to the field of research. Due to this, thousands of researchers involved in collecting research data use web forms and mobile apps.

WEB BASED AND ANDRIOD MOBILE APPS FOR DATA COLLECTIONS

Kobo Toolbox / Kobo Collect

By concentrating on the limitations of mobile data collection, Harvard Humanitarian Initiative in association with Brigham and Women's Hospital, USAID have designed an open source data collection tool for a challenging environment i.e. Kobo toolbox. It provides an

integrated suite of applications for data collection. Kobo toolbox plays a vital role in terms of accuracy, speed, data quality, analysis and cost effectiveness (¨kobotoolbox.com", n.d). A researcher can build a questionnaire choosing various patterns in the Kobo Toolbox website. The prepared questionnaire or form will be uploaded to the server where the sections are pasted and defined into a tabular format. The platform provides an online form editor which may be more intuitive to many users. Once the questionnaire is organized, the survey can run through the android application *'Kobo collect'* for data collection by downloading it without any expenditure.

Kobo collect is a data collection app is linked to Kobo toolbox. Usage of this tool requires the following steps:

1. Building a form/questionnaire.
2. Downloading the app using mobile device.
3. Authenticate & synchronize form to mobile app.
4. Data collection.
5. Analyzing and managing the data (Le Bel et al., 2016)

Data can be collected through both the online and offline mode. While collecting data through online mode, the data directly is saved in the researcher's account as cloud storage, whereas in the offline mode, at the time of data collection the data will be saved in the device temporarily. This data will be sent to the server once the device is connected to the internet. Kobo collect is a quick but less consuming tool for data collection and analysis. Currently Kobo toolbox and Kobo collect has been widely used during humanitarian crisis like natural disasters, natural calamities, manmade disasters etc.

FEATURES OF KOBO TOOLBOX

1. **Form builder:** The integrated form builder aims to provide a simple click and drag interface, which needs a few technical skills to manage. It is completely flexible with XLS forms, allowing to design a form in a simple manner. It allows to share the working project to others.
2. **Question library:** It enables the questions to be re-used and managed by the users. It helps in identifying the prepared questions quickly, can be modified and re-inserted in a form that it is designed.
3. **Data Collection via Android or Browser:** Data can be collected not only via recognised app but it is also compatible with a browser form, which is accessible on any device like computer, laptop, or any mobile device. Data collection is possible in dual mode which entirely supports both online and offline modes .
4. **Submit, manage, download and analysis of the data: (a)**When collecting data via the offline mode, it is stored locally on both the browser and the android app, and whenever there is an internet connection available, the data will be submitted to the server directly. **(b)** To manage the data, Kobo Toolbox has incorporated *formhub technology* feature, which allows editing, aggregation, annotation and mapping GPS location for the data. **(c)** A

variety of formats are available for downloading the collected data such as *pdf, doc, excel, csv* etc. **(d)** Data can downloaded in *excel format* which provides fully featured tables and powerful charts**.**

5. **Access control**: Users can create and manage separate accounts and make their built forms inaccessible to others ("Features". n.d.).

Strengths

i. *Smart and paperless work* - Since it requires only an android phone and minimal skills to collect the data, the process is very fascinating and there is no need to carry a large baggage of printed questionnaires.

ii. *Time consuming* All the collected data will be stored directly in the server as cloud data.

iii. *Easy to prepare, manage, modify* the form as per the convenience of researcher's/user's requirement.

iv. *GPS enabled* – Helps to map the location of the respondent, where the researcher collected the data.

Weaknesses

i. *Expansive than printed form* - This process would require the availability of android phones or tablets which could be more expensive than the printed version of questionnaires.

ii. *It requires technical assistance to make the questionnaire in the application.*

iii. *It requires proper training to handle the gadgets for entering the data, correctly into the application.*

CONCLUSION

It is very important to understand and adapt the latest technology in the research field. Many researchers face many difficulties while gathering data due to unfamiliarity with latest developments and smart technologies. To solve these types of problems in research, plenty of open source softwares and android applications were developed which also helps in data collection and analysis. Among those applications 'Kobo Toolbox/Kobo Collect' is one of the effective tools. It is very easy to create a form and convenient to manage with minimal technical skills. This application could be helpful for any type of research to collect data especially in a survey based research.

REFERENCES

1. Ahmed, K., Bukhari, M. A., Mlanda, T., Kimenyi, J. P., Wallace, P., Lukoya, C. O., Hamblion, E. L., & Impouma, B. (2020). Novel approach to support rapid data collection, management, and visualization during the COVID-19 outbreak response in the world health organization African region: Development of a data summarization and visualization tool. *JMIR Public Health and Surveillance, 6*(4). https://doi.org/10.2196/20355

2. Ballsun-Stanton, B., Ross, S. A., Sobotkova, A., & Crook, P. (2018). FAIMS Mobile: Flexible, open-source software for field research. *SoftwareX, 7*, 47–52. https://doi.org/10.1016/j.softx.2017.12.006

3. Brewer, P. W., & Guiterman, C. H. (2016). A new digital field data collection system for

dendrochronology. *Dendrochronologia*, *38*, 131–135. https://doi.org/10.1016/j.dendro.2016.04.005

4. De Vries, N. J., Davel, M. H., Badenhorst, J., Basson, W. D., De Wet, F., Barnard, E., & De Waal, A. (2014). A smartphone-based ASR data collection tool for under-resourced languages. *Speech Communication*, *56*(1), 119–131. https://doi.org/10.1016/j.specom.2013.07.001

5. *Features / Humanitarian Response*. (n.d.). Retrieved January 6, 2021, from https://www.humanitarianresponse.info/en/applications/kobotoolbox/features

6. Laitenberger, O., & Dreyer, H. M. (1998). Evaluating the usefulness and the ease of use of a web-based inspection data collection tool. *International Software Metrics Symposium, Proceedings*, 122–131. https://doi.org/10.1109/metric.1998.731237

7. Le Bel, S., Chavernac, D., & Stansfield, F. (2016). Promoting a Mobile Data Collection System to Improve HWC Incident Recording: A Simple and Handy Solution for Controlling Problem Animals in Southern Africa. In F. M. Angelici (Ed.), *Problematic Wildlife: A Cross-Disciplinary Approach* (pp. 395–410). Springer International Publishing. https://doi.org/10.1007/978-3-319-22246-2

8. Lefever, S., Dal, M., & Matthíasdóttir, Á. (2007). Online data collection in academic research: Advantages and limitations. *British Journal of Educational Technology*, *38*(4), 574–582. https://doi.org/10.1111/j.1467-8535.2006.00638.x

9. Mehmood, A., Taber, N., Bachani, A. M., Gupta, S., Paichadze, N., & Hyder, A. A. (2019). Paper versus digital data collection for road safety risk factors: Reliability comparative analysis from three cities in low-And middle-income countries. *Journal of Medical Internet Research, 21*(5). https://doi.org/10.2196/13222

10. Minnaar, L., & Heystek, J. (2016). Online Surveys as Data Collection Instruments in Education Research: A Feasible Option? *South African Journal of Higher Education*, *27*(1), 162–183. https://doi.org/10.20853/27-1-233

11. Park, J. (2015). Evaluating a mobile data-collection system for production information in SMEs. *Computers in Industry, 68*, 53–64. https://doi.org/10.1016/j.compind.2014.12.006

12. Robertson, G., & Jeoffreys-Leach, S. (2017). *Sustainable data collection: Mobile Modes About insight2impact*. *October*.www.i2ifacility.org.

13. Satterlee, E., Mccullough, L., Dawson, M., & Cheung, K. (n.d.). *Paper-To-Mobile Data Collection: A Manual*.

14. *Simple, Robust and Powerful tools for Data Collection* (n.d). Retrieved June 26, 2020 from https://www.humanitarianresponse.info/en/applications/ kobotoolbox

15. *Technology's Impact on Data Collection in Market Research* (n.d). mTab.com. Retrieved June 28, 2020 from https://www.mtab.com/technologys-impact-on-data-collection-in-market-research/.

16. Tomlinson, M., Solomon, W., Singh, Y., Doherty, T., Chopra, M., Ijumba, P., Tsai, A. C., & Jackson, D. (2009). The use of mobile phones as a data collection tool: A report from a household survey in South Africa. *BMC Medical Informatics and Decision Making*, *9*(1), 1–8. https://doi.org/10.1186/1472-6947-9-51

17. Trucano, M. (2014). *Using mobile phones in data collection: Opportunities, issues and challenges*. https://blogs.worldbank. org/edutech/using-mobile-phones-data-collection-opportunities-issues-and-challenges

18. UN-OCHA. (2017). *Kobo Toolbox / Humanitarian Response*. Retrieved June 26, 2020, from https://www.humanitarianresponse. info/en/applications/kobotoolbox.

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