Application of SurveyCTO mobile data collection technology in household surveys: The case of an impact evaluation of the Community Based Integrated Water Resource Management Project in Niger

Interest in enhanced data quality at reduced cost continues to grow globally. While evaluators previously relied on paper-based surveys, with the attendant challenges of poor data quality and increased cost and time of data collection and entry, there is a shift toward the use of digital surveying. While many tools with varying mobile data collection functionality exist, finding the most suitable one mindful of data security, cost, ability to work offline and ease of use is key. One such software is SurveyCTO – a product that gathers high-quality data using Android phones/tablets or via the web. This article examines the use of SurveyCTO in an impact evaluation of a community based integrated water resource management project in Niger. It highlights the pros and cons of SurveyCTO in comparison to a paper-based survey. It also highlights how SurveyCTO can find application in development organizations and contexts including that of the AfDB.
Application of SurveyCTO mobile data collection technology in household surveys: The case of an impact evaluation of the Community Based Integrated Water Resource Management Project in Niger

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Key Messages

- SurveyCTO is a reliable, secure, and scalable mobile data collection platform for researchers and professionals working in offline settings.
- Use of SurveyCTO reduces the cost and time of data collection and increases the quality of data.
- SurveyCTO allows data collection teams to disseminate preliminary findings to stakeholders immediately after data collection is completed.

Introduction

In conducting household or individual surveys for evaluations, the traditional approach has involved using paper questionnaires filled in manually by enumerators during interviews. Then each evening, survey supervisors and coordinators check the quality and consistency of the responses reported in the questionnaires. Once all the interviews are conducted, and fieldwork is concluded, data-entry clerks transcribe the information from the paper questionnaires into a digital format. This process, however, is problematic (Lombardini et al. 2018). First, the quality of the data—there are several opportunities for the introduction of errors during the data-collection and data-entry processes; and second, the time lag between the data collection and when the data is ready for analysis can prevent or significantly delay the feedback to communities and utility of the data.

Minimizing errors is critical in the case of impact evaluations with a limited sample size. As Caeyers et al. (2012) suggest, errors tend not to be randomly distributed across a sample, but are correlated with household characteristics, which can potentially introduce bias in analysis if observations need to be dropped. Using digital data collection methods can mitigate some of the problems inherent in the use of paper-based surveys. This is particularly key where data collection involves household surveys that assess the performance of development interventions. This was the case with the impact evaluation of the community based integrated water resource management (CBIWRM) project where SurveyCTO was utilized. The intervention was implemented by Oxfam in Banibangou and Soumatt communities of Niger, jointly with Karkara, a local partner, and the Department of Agriculture, Niger.

The CBIWRM Project

The project, which commenced in April 2013, was completed in March 2015, and evaluated a year after closure. Central to the project’s overall objective was a focus on increasing agricultural production and farmers’ income – particularly women. Crops targeted for enhanced production included cabbages, tomatoes, onions, carrots, potatoes and sweet peppers. The choice of these crops was based on specific problems experienced by farmers in the two villages—very low levels of rainfall, local farmers’ low capacity to produce crops, and a lack of necessary inputs.
Karkara played a vital role in addressing these issues – notably by developing irrigation systems. With funding from Oxfam, wells and boreholes were dug, while water tanks with solar pumps were installed. Pipelines were linked to water basins in order to improve irrigation in the community, and farmers were given seeds and agricultural tools to boost crop production. Karkara then partnered with the Department of Agriculture to train farmers on improved agronomic practices, organized field exchange visits, and encouraged farmers to establish groups to enhance their bargaining power at local markets. Oxfam funded the project’s implementation and coordinated project activities, routinely monitoring activities via site visits to ensure smooth implementation (Oxfam 2019).

The Survey and Sampling Design: The primary goal of the project evaluation was to determine the impact of the intervention on beneficiaries’ household income. Evaluators used a quasi-experimental impact evaluation design, which involved comparing households that had been supported by the project with households in neighboring communities that had not been supported, but who had similar livelihood characteristics prior to the project being implemented. The evaluation covered four villages (two project and two control villages). Households involved in the project were randomly selected and interviewed. For control purposes, interviews were carried out with households from two villages that had not participated in the project, but who had been eligible and had expressed an interest in doing so. The control villages were selected purposively because they were deemed to have had similar characteristics to the implementation villages at baseline (prior to onset of project). In total, 300 project participants and 404 non-participants were interviewed.

Statistical tools of propensity score matching (PSM) and multivariate regression were used to control for demographic and baseline differences between the households in the project and control villages, in order to increase statistical confidence when making estimates of the project’s impact (see Caliendo & Kopeinig 2008). Table 1 below lists the villages and the number of households/farmers interviewed in the intervention and control villages.

SurveyCTO Software and its features: The evaluation team selected the SurveyCTO software for several reasons. Firstly, a unique feature of this software is its ability to use many languages, including non-Latin characters. Also, the tool can be used entirely offline, from building the survey to data analysis – making it ideal for areas with limited connectivity such as Niger. Third, the tool has an advanced

<table>
<thead>
<tr>
<th>Commune</th>
<th>Villages/ farmer associations randomly selected from intervention communities</th>
<th>Project participants</th>
<th>Sample comparison group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Households/ farmers participating in the project</td>
<td>Households/ farmers interviewed</td>
<td>Commune</td>
</tr>
<tr>
<td>Banibangou</td>
<td>Banibangou 320</td>
<td>147</td>
<td>Banibangou</td>
</tr>
<tr>
<td>Soumatt</td>
<td>392</td>
<td>153</td>
<td>Gossou</td>
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<tr>
<td>Total</td>
<td>712</td>
<td>300</td>
<td>404</td>
</tr>
</tbody>
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design functionality to accommodate
the structure of long and complex survey
questionnaires and an inbuilt functionality
to run frequencies when the survey is
completed. This enables fast feedback to
the community surveyed. Finally, its robust
encryption features make it invaluable to
data collectors for whom data security
is paramount. There are eight keys
prerequisite steps to using SurveyCTO,
with guidelines and standardized tools to
support the process (Tomkys et al. 2015).

Potential Applicability in
Evaluations and Associated Benefits

This section highlights how the
application of SurveyCTO and other
digital platforms can contribute to
enhance evaluation within the African
evaluation community, including the
AfDB. The analysis focuses on five broad
areas: a) cost, quality and time of data
collection; b) data security; c) ethics;
d) community/client engagement; and
e) versatility of use. To ensure balance,
the section also highlights potential
challenges of SurveyCTO and similar
tech platforms.

Cost, quality and time of data
collection: The average cost of a
paper-based questionnaire in data
collection is estimated to be almost
1.5 times more as compared to
employing SurveyCTO. In the Niger
study, data collection took 8 days as
compared to 2 weeks for a paper-based
survey of the same sample size. Also,
the SurveyCTO data quality was better
due to inbuilt checks and the ability of
the survey team to provide immediate
feedback to the community. Further,
SurveyCTO has the potential to
improve data quality by monitoring
incoming data in real time while
data collection is still underway. This
allows for a quick identification of
survey flaws; enumerators who need
additional supervision; and data
errors and discrepancies that need
correcting. For African evaluators, this
tools will be beneficial in household
surveys, particularly for impact
evaluations, where sample sizes are
key. The cost reduction realized by
using SurveyCTO can translate into
more evaluations being done and more
evaluative knowledge being generated.

Data security: Concerns over data
privacy and cybersecurity have led
to growing trends of in-country
or on-premise data hosting. Data
privacy and cybersecurity concerns
continue to grow, exacerbated by
the occurrence of large-scale data
breaches, such as the Capital One
data breach that compromised the
private data of over 100 million
consumers (FBI 2019). SurveyCTO
approaches the challenge of web
vulnerability by providing its users
the highest levels of data security
through end-to-end encryption. End
users generate and fully control
the public-private key pair used for
encrypting and decrypting data.
In this way, if one’s data is stolen
or otherwise breached, it remains
safe provided the encryption key
is not also stolen or compromised.
This feature can be utilized by
evaluators especially in evaluations
of non-sovereign or private
sector operations, where utmost
confidentiality of data is required.

Principle of respect and
ethics: Consent is an ethical and
legal requirement in evaluation. To
this end, all evaluations should be
designed and executed in compliance
with the rights, values and physical
integrity of stakeholders and their
communities. Evaluators should
respect the dignity and the human
values of all persons/groups involved
in the evaluation such that no one
feels coerced, threatened, or harmed
physiologically, or due to their
religious belief. Evaluation findings should also be owned by stakeholders and the limits of the methodologies employed should be precise. Privacy should be maintained during the evaluation process to minimize any undue influences on evaluators—hence why consent should always be sought prior to the onset of an interview. A unique feature of SurveyCTO is its ability to be programmed such that it prevents enumerators from proceeding with an interview unless the consent field is signed. This ‘trigger’ ensures that ethical guidelines are strictly observed.

Increased community engagement through timely feedback: Ethics dictate that when respondents dedicate time to participate in household surveys, to close this loop, evaluators in turn need to share the results/findings with the individuals who provided the data. This is not standard practice and where it does happen, it is often done well after the survey. Using technology to gather data enables the processing of survey data in real time. This facilitates the sharing of survey data with communities almost immediately, even while fieldwork is still ongoing, and has the potential to increase engagement and participation with surveyed communities. Again, it aids knowledge-sharing and the prioritization of community needs.

Survey in multilingual setting: SurveyCTO allows for the crafting of surveys in multiple languages, including question text, answer options, hints, and even any media, such as images, audio clips, and video clips. There’s no limit to the number of languages that can be programmed, and respondents can switch between languages as needed. This feature has promise for international institutions such as the AfDB, which conduct evaluations in multi-lingual and complex ethno-cultural settings, but also for evaluators who survey participants in local languages. This flexibility to design language specific and culturally nuanced surveys can boost participation and increase the validity and reliability of responses.

Challenges with SurveyCTO

Like all things technology, glitches can prevent or disrupt the quality and feasibility of the data-collection process using SurveyCTO. First, the challenge with varying levels of technological literacy. If enumerators are not familiar with use of mobile devices/tablets, this can impact the quality of data gathered. Second, weather conditions (e.g., dust and moisture) can also adversely impact the functioning of devices.

In the case of Niger, the project negotiated these challenges by training enumerators to properly navigate the devices. Guidelines and troubleshooting tips to aid the enumerators and supervisors were also provided. Regarding the weather, zip lock bags were utilized to minimize dust and rain damage. However, the temperatures in Niger made the devices hot and uncomfortable to hold for long periods. Another challenge faced was the theft of devices. This, if not addressed, can result in valuable data losses, and delays as enumerators are compelled to re-survey respondents.

Conclusion

The impact evaluation in Niger shows how ICT and particularly SurveyCTO can add value and play a key role in an evaluation. There were considerable improvements gained in data security, accountability, accuracy, timing and cost. Where technology is readily available, organizations should use digital surveys if feasible. Platforms such as SurveyCTO allow various evaluators to streamline...
organize and assess their field data collection in real time. Evaluators can seamlessly submit their forms remotely for an immediate review/fact-checking, thus enhancing productivity and minimizing turnaround time. This positively impacts the validity of the study, and reduces the time and resources spent on data cleaning, which can instead be channeled to tasks such as feeding results back to the communities. SurveyCTO also offers robust dashboards and automated reports, further enhancing confidentiality, data security, and efficiency. Surveys can be completed offline, with data being auto-sent once connectivity is restored, minimizing field stress associated with working in remote areas or with limited connectivity.

For African evaluators, such a tool holds much promise especially considering the restrictions that have been imposed on many due to the COVID-19 pandemic.

Endnotes

1. SurveyCTO, is a software that gathers high-quality data via Android phones/tablets, or the web, by way of personal interviews (i.e., Computer Assisted Personal Interviews) or phone (Computer Assisted Telephone Interviews (CATI)).

2. For more on the eight steps, see Tomkys et al. (2015).

3. The data security landscape changed dramatically with the adoption of the General Data Protection Regulation (GDPR) in 2018, which introduced strict standards for processing sensitive personal data and steep fines for violators.

References


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