Harnessing the Crowd to Improve Accountability for the Delivery of Public Services

Phase II: Implementation Plan and Pre-Analysis Plan

Authors: Mark Buntaine, Colleen Devlin, Jacob Skaggs
Project Leadership: Mark Buntaine, Colleen Devlin, Daniel Nielson, Jacob Skaggs

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Overview

This study aims to generate reliable evidence about the provision, quality, and impact of citizen monitoring of public services via mobile phones. International development organizations fund projects around the world aimed at improving public services. Governments are building platforms to collect mobile information from citizens. Unfortunately, existing research has provided little guidance about whether mobile phones can facilitate regular, high quality, and useful feedback about the quality of public services. In close partnership with the Kampala Capital City Authority's Waste Management and Information and Communications Technology teams, we are conducting an experimental study on citizen monitoring of solid waste services that is uniquely suited to answer foundational questions about spatial citizen-reported data. Because solid waste services are visible, we can verify the quality and timeliness of reports. We can also assess how citizen monitoring affects service delivery. We are specifically interested in the following questions:

- Question 1: Under what conditions will citizens voluntarily report information about public services?
- Question 2: Under what conditions will information reported by citizens be timely, accurate, and frequent?
- Question 3: Under what conditions will public services improve in response to citizen monitoring?

KCCA's Waste Management and Information and Communications Technology teams are eager to launch a successful SMS-based citizen monitoring program that collects timely and accurate information about waste management from Kampala citizens. Reliable evidence on how to best recruit, incent and motivate citizen monitors to provide useful information would be valuable in helping KCCA launch a successful citizen monitoring program used to improve the delivery of public services to citizens in Kampala, Uganda.

Timeline

This study will be carried out over several phases, with each subsequent phase building on previous findings. This document covers our plans for the implementation of Phase II of this

experiment and should be considered an addendum to the Phase I pre-analysis plan —
*Harnessing the Crowd to Improve Accountability for the Delivery of Public Services:
Pre-Analysis Plan for a Field Experiment in Kampala, Uganda* (EGAP registered design
20151103AA) — that contains a more complete description of the theoretical goals and
background information about the study setting. We pre-register this plan for implementation
and analysis prior to collecting any data in the zones assigned to treatment or implementing any
of the treatments.

Phase I of this field experiment was implemented in October and November 2015. Initial results
from Phase I are documented in the report, *Harnessing the Crowd to Monitor Solid Waste
Management in Kampala, Uganda: A Preliminary Report on a Randomized Field Experiment*
and are being developed into a research manuscript at the time of this registration. In summary,
the results from Phase I taught us that subjects who were nominated by other community
members to be citizen monitors did not provide reports that were significantly more frequent or
timely than citizen monitors that were randomly selected. This is good news from a policy
perspective, as it indicates that higher-cost efforts to bring carefully selected reporters into a
reporting system will not necessarily lead to more reporting. However, we did find that both
nominated reporters and randomly-recruited reporters provided information that did not
corroborate data on solid waste conditions from random household surveys and independent
audits. These results highlight the need to test additional recruitment methods in an effort to
boost the quantity and quality of reporting by citizen monitors.

In Phase II of the project, we continue exploring how to best recruit citizen monitors by
increasing the level of social expectation experienced by reporters to send regular and accurate
information about conditions in their zone. We will also explore how a responsiveness by the
KCCA to citizen reports might boost the timeliness, frequency and quality of reporting.
Subsequent phases of this study will involve an impact evaluation of citizen reporting on solid
waste management, using as the monitoring treatment the most effective recruiting method to
generate high-quality and frequent reporting, based on evidence from the previous phase and
this Phase II experiment.

Overview of Results from Phase I
In Phase 1 of the study, our goal was to generate evidence about the importance of carefully
selecting and screening reporters when developing platforms to monitor public services and
development projects. To this end, we recruited approximately 12 citizen reporters from 90
randomly selected zones in our experimental sample for a total of 1040 reporters. With the zone
as the unit of randomization, half of the zones were assigned to a *nomination recruitment*
method. In the zones assigned for the nomination treatment, randomly selected residents were
asked to nominate "responsible and reliable" individuals to become reporters on behalf of the
zone and make a personal introduction to the nominee. The other half of the zones were
assigned to the *random recruitment* method. In these zones, adult residents were recruited as
part of a random walk pattern in the zone. Following the recruitment effort, all 1040 reporters
received a total of 18 prompts for information about waste pick-up schedules, waste burning

practices in their zone, and the locations of waste piles that needed special attention by the KCCA or its contractors over a 7-week period.

In Phase I, we found very similar reporting behavior between randomly recruited and nominated reporters. This result indicates that higher-cost efforts to bring carefully selected reporters into a reporting system will not necessarily lead to more reporting. In total, we received 825 SMS reports, with a similar number of reports from the Random Citizen reporters as compared to the Nominated Citizen reporters. Secondly, when we restrict our attention to the question of whether the reporters ever sent in a solid waste report, we find nearly identical rates of ever reporting between treatment conditions, at approximately 20 percent. Finally, we examined whether reporters recruited under the different conditions had different distributions of reporting, probing whether nominated reporters were more likely to be highly active. Again, we find no difference in the rate of reporting at different parts of the distribution of reports per reporter. We do find, however, that reported information about solid waste services does not corroborate independent data from random household surveys and independent audits, which calls into question both types of recruitment conditions. Below is a summary of other findings from Phase I, which are documented in more detail in the preliminary report:

- We do not find any significant difference in the amount of reporting by citizen reporters recruited under the different conditions.
- When we restrict our attention to the question of whether the reporters ever sent in a solid waste report, we find nearly identical rates of ever-reporting between treatment conditions, at approximately 20 percent.
- Reporting quantity is not a function of resident satisfaction.
- Reporting about the frequency of pickups not related to pickup frequency revealed in household surveys.

Experimental Design and Treatments for Phase II

Over the past year, waste management services managed by the KCCA have been in transition. Waste collection and transport services provided to residential and commercial properties are being contracted to private companies. Under this arrangement, KCCA has divided Kampala District into seven service zones. In each service zone, a private company will be awarded a contract to manage waste collection and transport throughout the zone. Even then, KCCA is still mandated to ensure the successful delivery of waste management services provided by its contractors.

The transition to private management of waste services is being carried out gradually. Currently five of the seven service zones have been completely passed on to contractors. In these zones, waste collection and transportation is being carried out by private companies. In the remaining two service zones, the majority of waste management services have been handed over to private companies. The implementation of waste management services in several villages in these two zones are still being transitioned from KCCA to contractors. Phase II of this study will focus on all seven service zones. This phase will largely focus on collecting data from citizen

monitors that helps KCCA both monitor the quality of waste management services provided by its contractors, and improve the waste management practices of contractors.

We plan to recruit subjects from 96 randomly selected administrative zones (LC 1) within the seven service zones. With the zone as the unit of randomization, each zone will be assigned one of eight different treatment methods based on a three-factor experimental design. Two factors are recruitment conditions in this Phase II experiment, while the third factor is a feedback condition, where reporters receive confirmation from the KCCA that their information is being passed onto the contractors to improve waste management services during the 8-week treatment stage of this phase. All reporters within a zone will be recruited using the experimental recruitment method assigned to the zone. In each zone, 20 reporters will be recruited. Each zone will be divided into four cells of roughly similar geographic size and five individuals will be recruited from each cell. Reporters must be an adult (over the age of 18) resident of the zone and be the primary user of their own cell phone.

In Phase I of the study we found very similar reporting behavior between randomly recruited and nominated reporters. In other words, the nomination treatment was not strong enough to improve the timeliness or quality of citizen reports. Building on these findings, for Phase II, the two factors involved in the recruitment stage will attempt to strengthen the level of social expectation experienced by reporters.

Treatment 1. Recruitment by LC1: For the first experimental recruitment factor, reporters in zones assigned to treatment will be recruited by the local council chairperson (LC1) or another delegated zone-level authority figure.[1] For this treatment we chose LC1s to select citizen monitors because they provide oversight and hold authority at the zone level, which may heighten the desirability of providing frequent and high-quality information about waste services. Further, LC1s are typically well known throughout their zones and likely know the community members well enough to select citizen monitors that will represent their zone well. LC1s will recommend reporters by introducing them to the recruitment team. In zones not assigned to treatment, reporters will be randomly recruited by the implementation team following a random walk pattern, using exactly the random recruitment method in Phase I.

Treatment 2. Announcement of Reporters by LC1: For the second experimental recruitment factor, reporters in zones assigned to treatment will be informed that the LC1 will announce the citizen monitoring program and those selected to be reporters at an upcoming zone-wide meeting. After all 20 reporters have been recruited in a zone, a list of the names of selected citizen monitors and information on the program will be left with the LC1. The implementation team will contact LC1s by phone one week following the completion of the recruitment activity to

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[1] If the LC1 is unavailable, the recruitment responsibilities can be delegated to another local authority figure such as the Vice-Chairperson, Secretary of Defence, or member of the Local Council Committee. If the recruitment responsibility is delegated, the LC1 will be contacted that day to inform him/her about the program, the recruitment task and to whom it was delegated, and any other additional responsibilities they have relating to the citizen monitoring program such as the announcement treatment.

remind the LC1s to make the announcement at a community meeting. In zones not assigned to treatment on this factor, LC1s will not be asked to make an announcement about the citizen monitoring program or reporters at an upcoming community meeting.

Treatment 3. Responsiveness from the KCCA: The third experimental factor will be implemented during the 8-week treatment period while the citizen monitoring platform is in operation. In half of all the experimental zones, reporters will receive weekly personalized text messages thanking them for information, listing the number of responses sent by the reporter that week, and offering to answer any questions. Any questions will be promptly answered by phone. The personalized messages will also include information on the total number of messages received from the subject's zone. During phone calls with subjects, program representative will reemphasize the objectives and purpose of the citizen monitoring platform outlined in subject consent form. Subjects will also be informed that their responses to prompts are sent to KCCA contractors to help improve waste management services in their zones. As part of the responsiveness treatment, subjects will be contacted by phone one month following the start of the treatment period. The program representative will thank the citizen monitor for their participation, discuss the quantity of the subject's responses, remind them of objectives and expected results of the program, explain how the subjects' reports are being used to improve waste management in their zones, and ask if they have observed any improvements in waste management in their zone. Both active and non-active participants of the responsiveness treatment will receive the weekly messages and phone call offer to answer questions.

Below is a table that breaks down the 2x2x2 treatment assignments for this full-factorial design:

	No KCCA Responsiveness		KCCA Responsiveness Treatment	
	No LC1 Announcement	LC1 Announcement	No LC1 Announcement	LC1 Announcement
Random Recruitment	n = 12	n = 12	n = 12	n = 12
LC1 Recruitment	n = 12	n = 12	n = 12	n = 12

Recruitment Plan
Recruitment activities will take place in sixteen zones each day over 6 working days between June 8 and June 15, 2016. The recruitment staff will include 12 separate teams, each team comprising a team leader and a research assistant.

Zones selected for either LC1 recruitment and/or LC1 announcement treatments will follow the aforementioned recruitment guidelines that are documented in more detail in the recruitment

protocol. For zones that are assigned for random recruitment, the enumeration team will follow a random walk pattern to select subjects. The recruitment team will find their way to the center of one of the four cells in a zone, then follow the random walk pattern below for three minutes using a timer on a phone or tablet. Once the timer reaches three minutes, the recruitment team will attempt to recruit the nearest eligible reporter. If the adult is ineligible or refuses to participate, the recruitment team will start the random walk pattern again for three minutes to select the next potential subject to attempt recruitment. The same process will be followed until five subjects have been selected in each cell.

How to generate a random walk pattern:

1) Each team asks a local resident to describe the boundaries of the zone and how to get to all of the boundaries.
2) Divide the zone up into roughly four cells. The team will be responsible for recruiting four subjects - following the treatment methods - in each of the cells in the zone. This way all cells in one zone are enumerated.
3) Find an intersection in each of assigned cells. An intersection is the crossing of any road, path, or alley that leads to the entrance of residential dwellings. The starting intersection should be located by walking several minutes into the assigned cell.
4) Assign each direction leading from the intersection a number. Roll the dice and move in the direction selected randomly.
5) Any time you reach another intersection, assign each direction that moves forward from your walk path a number and roll the dice, moving in the direction selected randomly. You should only turn around if you reach a dead end or the edge of the assigned cell.
6) The only reason that the randomly chosen direction should not be an option is if you have already been down a path and you know that it leads to a dead end.

Audits of Solid Waste Services

Audits of solid waste will be conducted in all four cells of each zone. Below is the solid waste audit protocol:

a) Set a timer on a cell phone or tablet for 15 minutes and start a random walk pattern in the cell.
b) As you proceed along the random walk, conduct an audit of all piles of waste visible from the walk path that are at least 1m in width or length using the *KCCA_Phase2_RubbishPileAudit* survey on KoboCollect.
c) Stop the timer while you are auditing rubbish piles so that the time spent performing the audit and entering information into Kobocollect is excluded from the 15-minute walk time.
d) When taking a picture of the rubbish pile, place a measuring tape stretched out to 1 meter on the ground in front of the rubbish pile.
e) Waste piles may vary significantly in shape and density. It is important that each is measured accurately and according to consistent guidelines.

f) All measurement are taken by laying a tape measure next to the pile. Do not enter or touch the waste pile.

g) Take the measurement of width of the waste pile at the widest point from edge to edge. Enter this information on the tablet as survey indicates.

h) The "edge" will be defined as: the outermost point at which the ground underneath the waste pile is not visible. While there may be trash scattered about around the waste pile, it is not included in the pile if ground can be seen between that trash and the greater waste pile. As soon as dirt or foliage is clearly seen, that is the edge of the pile.

i) Take the measurement of the length of the waste pile at the longest point from edge to edge (as defined above.) Enter the length on the tablet as before.

j) Continue the random walk while taking photographs until you have taken 10 photographs or used 15 minutes of time, whichever comes first.

Implementation of Citizen Monitoring Platform

Following the recruitment stage of Phase II, we will send text messages to subjects over a period of 8 weeks prompting them to report on issues relating to waste management in their neighborhoods. Reporters will receive 2-3 prompts per week, and all reporters will receive the same 14-20 text messages. SMSOne's text message platform will be used to test the toll-free and auto-response features, which are both potential upgrades to KCCA's internal SMS platform, which might be adopted for the Phase III impact evaluation.

Below are a examples of the types of questions we might ask. Questions marked with a (*) might be sent multiple times over the 8-week period when the citizen monitoring platform is running. Answers to question about objective conditions will be compared to independent audits of solid waste conditions in each zone.

General waste management
1. Does a rubbish truck come to your neighborhood? 1) no 2) yes 3) don't know

2. *When did the rubbish truck last collect your rubbish? 1) never 2) more than two weeks ago 3) last week 4) this week

3. What is the most common way for your neighbors to dispose of their rubbish? 1) burn rubbish 2) throw in a rubbish pile 3) throw in a ditch 4) use a rubbish truck 5) don't know

4. *How happy are you with rubbish collection services? 1) very unhappy 2) unhappy 3) neither happy nor unhappy, 4) happy 5) very happy

5. How often do you see rubbish spilling from rubbish trucks? 1) never 2) rarely 3) two times a month 4) once a week 5) many times a week

6. How much waste is there on the ground in your neighborhood? (1) none (2) some small piles (3) a few larger piles (4) waste in many places

7. On the path you walk in and out of your zone, how many waste piles would you see? [Respond with a number]

8. In a typical week, how many times would you see burning rubbish if you walked in the zone for fifteen minutes per day?

Timeliness

9. *How often does the rubbish truck collect rubbish on the chosen day of the week? 1) never 2) not often 3) often 4) very often

Frequency

10. *How happy are you with how often your rubbish is collected? 1) very unhappy 2) unhappy 3) neither happy or unhappy 4) happy 5) very happy

Proximity

11. How happy are you with the distance from your home to the rubbish truck? 1) very unhappy 2) unhappy 3) neither happy or unhappy 4) happy 5) very happy

Customer service

12. How well do rubbish collectors treat you? 1) very bad 2) bad 3) neither bad nor good 4) good 5) very good

Open-ended questions

13. What is the biggest problem with your rubbish collection service? _____

14. Are there any other rubbish or sanitation services that you would like? _____

15.Please describe how to reach the largest rubbish pile near your home. _____

To incent subjects to respond to text messages prompts, all subjects that respond to at least one weekly prompt with an appropriate response will be enrolled in a weekly lottery for a chance to win 30,000 UGX in airtime. Each week the winner's first name and village will be announced by text message to all reporters recruited for this phase.

Gathering and processing information for the response treatment
Each week reports from citizen monitors assigned to the response treatment will analyzed by a processing agent who will be a member of the research team. Reports will be sorted by the

quality of response and organized into a form that can be shared with KCCA. To keep our reporters' identities confidential, only the citizen reports and villages where the messages were sent from will be shared with KCCA. The responses will be divided by service zone and organized in a way that is simple and (to the greatest extent) actionable for KCCA's contractors. KCCA will be responsible for sending the information to the appropriate subcontractor according to a prearranged schedule.

Inclusion of Phase I reporters
In order to test whether responsiveness can generate timely and accurate reporting over longer periods of time, we plan to send the same questions to all Phase I reporters. As with Phase II reporters, we will randomly assign half of all reporters to the responsiveness treatment. Tracking the more long-term responses of Phase I reporters will allow us to understand how responsiveness can maintain high reporting rates necessary for longer-term investment in a citizen-monitoring platform.

Outcomes of Interest for Phase II
In Phase II, data for analysis will come from citizen monitoring reports received through the SMS-based citizen monitoring platform. Generally, reports will be analyzed based on their timeliness, frequency and quality.

The main outcomes we expect from Phase II include the following:

● We expect to learn how the LC1 recruitment and LC1 announcement treatments might influence the timeliness, frequency and quality of reports from citizen monitors. More practically, the findings of Phase II may help KCCA identify better ways of recruiting citizen monitors in a way that improves the usefulness of reports.

● We expect to learn how the response treatment and KCCA's efforts to work with its contractors to improve service delivery might influence the timeliness and frequency of citizen monitoring reports. These findings might inform KCCA of the importance of responding to citizen monitoring requests and making sure reporters feel like their participation is appreciated and their input is operationalized.

● We also expect that reports from Phase II might start informing KCCA about the quality of waste management services currently provided by its contractors and aspects of waste management that might be improved.

All of these outcomes have been identified as valuable by KCCA's Waste Management and Information and Communication Technology teams.

Relationship with Phase III

Results from Phase II of this study will be used to inform the design of subsequent city-wide impact evaluation of citizen monitoring on solid waste services. In the next phase, we plan to use what we have learned about effective recruiting to launch with the KCCA a broader program of citizen monitoring of solid waste services. The main goal of Phase III will be to test whether a citizen monitoring platform, as informed by the results of Phases I and II, can improve the management of solid waste services in Kampala.

We may explore other areas in Phase III that are not explored in the first two phases of this study. We will register such plans in advance of launching Phase III.

- How various recruitment methods influence the accuracy of citizen reports
- How various incentives influence the quality of citizen reports
- Investigate other issues relating to public services that citizen monitors might be better positioned to report on, e.g., missing or broken street lights, major potholes, areas of flooding during heavy rains, etc.
- Explore using a citizen monitoring platform to gather information on waste management services still carried out by KCCA itself, such as waste collection from markets, schools, hospitals, government offices, etc.
- How subjects not enrolled in waste management services might be included in KCCA's citizen monitoring program
- Expand the testing of a citizen monitoring program to all 7 service zones once KCCA has passed
- Start providing KCCA the opportunity to build capacity processing, analyzing citizen reports and converting them into actionable data for their subcontractors

Outcome measures and hypotheses

Provision of reporting

H1a: More reporters assigned to the LC1 recruitment treatment will respond to at least one prompt than randomly recruited reporters.

H1b: More reporters assigned to the LC1 announcement treatment will respond to at least one prompt than reporters in the announcement control condition.

H1c: More reporters assigned to the responsiveness treatment will respond to at least one prompt than reporters in the responsiveness control condition.

H2a: Reporters assigned to the LC1 recruitment treatment will respond to more prompts than randomly recruited reporters, measured as a count both over the entire 8-week experiment and within individual weeks.

H2b: Reporters assigned to the LC1 announcement treatment will respond to more prompts than reporters in the announcement control condition, measured as a count both over the entire 8-week experiment and within individual weeks.

H2c: Reporters assigned to the responsiveness treatment will respond to more prompts than reporters in the responsiveness control condition, measured as a count both over the entire 8-week experiment and within individual weeks.

H3a: Reporters assigned to the LC1 recruitment treatment will respond to more open-ended prompts than randomly recruited reporters, measured as a count both over the entire 8-week experiment, within individual weeks (to measure changes in participation over time), and for the final two weeks (to measure attrition).

H3b: Reporters assigned to the LC1 announcement treatment will respond to more open-ended prompts than reporters in the announcement control condition, measured as a count both over the entire 8-week experiment, within individual weeks (to measure changes in participation over time), and for the final two weeks (to measure attrition).

H3c: Reporters assigned to the responsiveness treatment will respond to more open-ended prompts than reporters in the responsiveness control condition, measured as a count both over the entire 8-week experiment, within individual weeks (to measure changes in participation over time), and for the final two weeks (to measure attrition).

Quality of reporting

H5a (Accuracy): Conditional on reporting, reporters assigned to the LC1 recruitment treatment will provide information that is closer to independent measures of the severity of solid waste problems than randomly recruited reporters.

H5b (Accuracy): Conditional on reporting, reporters assigned to the LC1 announcement treatment will provide information that is closer to independent measures of the severity of solid waste problems than reporters in the announcement control condition.

H5c (Accuracy): Conditional on reporting, reporters assigned to the responsiveness treatment will provide information that is closer to independent measures of the severity of solid waste problems than reporters in the responsiveness control condition.

Estimation

Provision of reporting. Differences in means for the measures of reporting for H1-H3 will be estimated using randomization inference under the sharp null hypothesis assumption and an exact replication of our randomization procedure.

Quality of reporting. If a group of people reports the same objective conditions accurately, we will observe low variance of reported outcomes for the same objective conditions. We exploit this implication to estimate the accuracy of reporting through the KCCA platform. For each reporting outcome, we will divide the reporters according to their recruitment method. We will assess accuracy using two methods.

We will then run a nonparametric polynomial regression with automatically chosen bandwidths to model the reporting outcome as a function of the objective outcomes measured during the baseline household surveys and audits. We will compare the mean squared error of the reporters recruited under different conditions. We will then form a sampling distribution of difference in mean squared errors using randomization inference by repeatedly fitting such nonparametric models while exactly replicating our randomization procedure.