LEAP Final Deliverable(s)

Project Host:

CFK Africa

Fellows:

Francis Bizoza Bigirimana, Social Entrepreneur Fellow

Lindsay Kincaid, Social Entrepreneur Fellow

Catherine Lebel, Research Fellow

Sho Tsuji, Research Fellow

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Executive Summary

Introduction

Schools in informal settlements in Kenya provide access to crucial education for many young students, yet rates of finishing primary school are low. CFK Africa is working to improve attendance via a variety of methods, and this LEAP project was designed to provide guidance on how to implement, measure, and eventually scale specific interventions to improve school attendance in informal settlements in Kenya.

Organization's role & strength

In Kenya, millions of people live in informal settlements. In these communities, residents lack access to quality health care, proper nutrition, and adequate sanitation, leaving them susceptible to preventable diseases. Limited access to quality education and economic advancement opportunities, high levels of unemployment, and gender inequity further impede individual and community progress. Though residents are talented, resilient, and entrepreneurial, many lack the opportunities needed to break cycles of poverty. CFK Africa is working to change that narrative.

CFK Africa's Best Schools Initiative (BSI) works with students ages 5 to 12 and collects data from 64 primary schools in Kibera. This initiative targets equitable and sustainable education development at multiple levels; building capacity at the school level, assisting school leaders in implementing transformative policies, and helping guide the greater educational community in leading similar research.

Need summary

Schools in informal settlements are critical for providing accessible education for many students, but it can be difficult to keep attendance rates high. CFK Africa, through their Best Schools Initiative, worked closely with stakeholders to identify 12 factors (for example, providing school lunches, teacher training) that could potentially improve school attendance in informal settlements. They are now implementing these practices in partnership with schools, but had questions about data collection and levels of evidence required to evaluate the practices. The focus of this LEAP project was therefore to provide advice and strategies for collecting data to evaluate these practices and providing a framework in which to do so.

Solution summary & next steps

We worked to provide value to CFK Africa and for the wider field through four deliverables.

First, we used CFK Africa's existing data (collected from schools in 2020, prior to any interventions) to glean insights to guide current and future data collection, and to provide preliminary evidence to guide future interventions.

Second, we created an overview of different research design methods to measure intervention effectiveness and infer causality, and we discuss the advantages and disadvantages of each in the context of CFK Africa's Best Schools Initiative.

Third, we provide advice on the best data collection platform and methods to measure school attendance and other relevant data.

Finally, we provide advice on how to pursue potential funding and partnership avenues to sustain effective programs, as well as potential venues for sharing this important work with others.

Deliverable 1: Insights from collected baseline survey data

Introduction

CFK Africa is planning to assess the effect of different candidate practices on improving school attendance (Best Schools Initiative [BSI]). As part of planned practice implementation and testing in 2019, CFK Africa collected baseline surveys from 43 schools. Unfortunately, the implementation was interrupted due to the Covid-19 pandemic. This deliverable takes an in-depth look at that data to gain three types of insight for future data collection:

1. Baseline variability of schools on characteristics potentially important for school attendance.
2. The relationship between attendance and school characteristics.
3. Recommendations for future data collection strategies.

Deliverable 1

Overview of collected data

The baseline surveys are paper-based (manually transferred into excel for analysis) with 111-134 items, and were completed by two coders in each school. The survey items addressed teacher characteristics (e.g., number of teachers, salary), parent characteristics (e.g., attendance of workshops), student characteristics (e.g., class size, extracurriculars), facilities (e.g., space, toilets), and management (e.g., number of board members). The survey also assessed student enrollment and attendance. As such, the survey covered a range of factors that can potentially influence a school's success in retaining students.

To understand how reliable the data are, we first assessed inter-coder-agreement (i.e., how often the two coders gave the same response). Average agreement was 80% (range 35% - 100%), which is high and suggests that two raters are unnecessary. Therefore, we recommend only **one coder per school** going forward (we compile all in-text recommendations from Deliverable 1 in Table 3).

We looked at how complete the survey answers were. Most coders answered most questions, but there were a few questions that often had missing information, suggesting they were hard to answer. For example, "what is the longest wait time for a toilet" was often blank, suggesting that coders did not know (see Table 1 for questions that were answered in less than 50% of cases). We **recommend removing these questions from the survey** to reduce time spent answering and analyzing data.

Table 1. Survey items answered by less than half (50%) of schools.

Question item	Description
Students per textbook ratio per class.	This item was not consistently answered for each class, and often answered in the same way for each class. Consider asking about an average per school, or removing.
Number of students attending after-school classes, extracurricular activities, or holiday programs	Many left this unanswered, suggesting either there are no such events or the number is unknown.
Longest wait time for toilet	Many left this unanswered, suggesting this is hard to measure.
Supplies fees, book fees, desk fees	Many left this unanswered, suggesting fees are unknown.

Variability of school characteristics

We investigated the variability of characteristics among schools. It is important to consider such variability when determining which schools receive which intervention. We give two examples below.
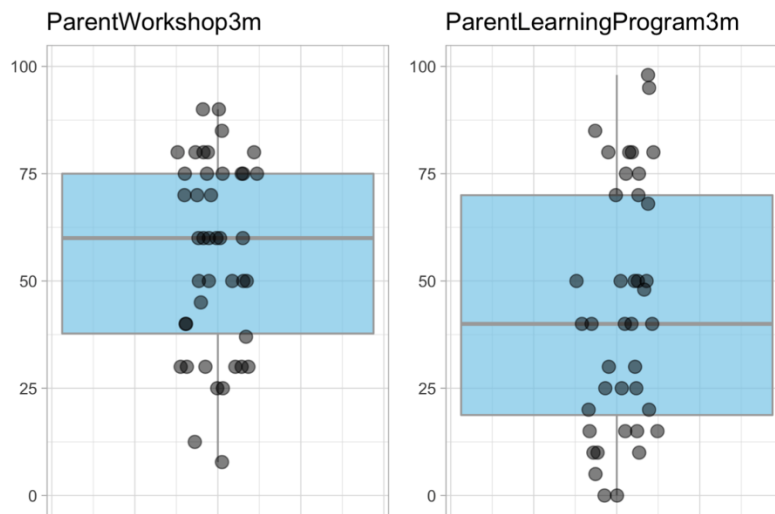

Figure 1. Variability of parent assessments. The y axis shows the percentage of parents participating in a program during the past 3 months. Each dark grey dot represents the percentage of parents reported in one school. The blue boxplots represent the distribution of values: The horizontal line in the middle of each box is the median value for this variable (thus, half of the values are above and half are below this line). The horizontal outer edges of each box represent the 1st and 3rd quartile (thus, 25% of values lie above or below this line).

Figure 1 shows the differences in parent participation in workshops or learning programs offered by school. Participation is quite variable, ranging from zero to almost 100%. Therefore, **this characteristic is important to assess in a baseline survey**. This factor is important to control (e.g., by randomization or a quasi-experimental design, see Deliverable 2) to avoid having only schools with high parent participation in one intervention group, and only schools with low participation in another. Additionally, parent participation might be a good intervention target, since there is a lot of room for improvement.

Figure 2 shows a different pattern of variability for the number of days when food was served. Most schools show similar patterns: lunch is often served, and breakfast or tea is rarely served. However, in some schools, no lunch is served at all, and in others, breakfast or tea is often served. **Because lunches are already consistently served in most schools, this might not be a useful intervention target**. With lunches already served, interventions to provide lunch will not make much difference (however, breakfast and tea are almost never served and might be a more promising target). Together with the previous example, this stresses the importance of controlling for baseline differences: While meal characteristics are similar for most schools, some schools are very different. We want to avoid accidentally grouping schools with similar characteristics all into one intervention group.
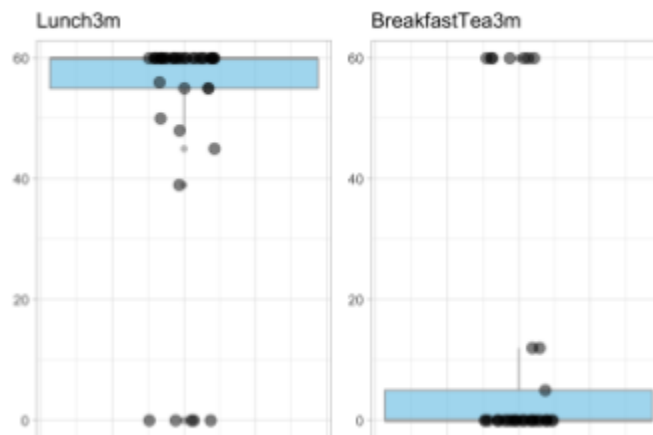

Figure 2. Variability of meal plans. The y axis shows the number of days when lunch (left) or breakfast/tea (right) were served in the past 3 months. Each dark grey dot represents the values reported in one school. The blue boxes represent the distribution of values: The horizontal line in the middle of each box is the median value (half the values are above and half are below this line). The upper and lower edges of each box represent the 1st and 3rd quartile (25% of values lie above or below this line).

We have illustrated an approach to leverage information on variability from the baseline questionnaires using two examples. We recommend using this approach to examine the baseline characteristics of all potential practices that are intervention targets. **Examining the variability in baseline characteristics can thus indicate where there is room for improvement (or not), and how important it is to control for baseline differences.**

Data analysis

Our second analysis assessed the relationship between measured *school characteristics* and *student attendance* in the baseline data. Baseline data were assessed before any interventions, so cannot tell us about the success of an intervention or uncover causal relationships. However, they can highlight school characteristics that are related to attendance normally (i.e., without special practices), and serve as one of many indicators to identify good candidates for interventions.

We ran a correlation analysis of school characteristics with student attendance. Correlation tells us whether two variables show a systematic relationship (e.g., children's height is positively correlated with weight, meaning that children who are taller are more likely to be heavier). In this context, we can test whether a school with more days of lunch served has higher attendance. We correlated school characteristics with the percentage of students attending each school per month. Table 2 lists the characteristics included in analysis; note that this list does not include all the measured school characteristics in order to restrict the number of variables entered into statistical analysis (see Callout Box 1). **We did not find any significant correlations of this measure with any school characteristic.**
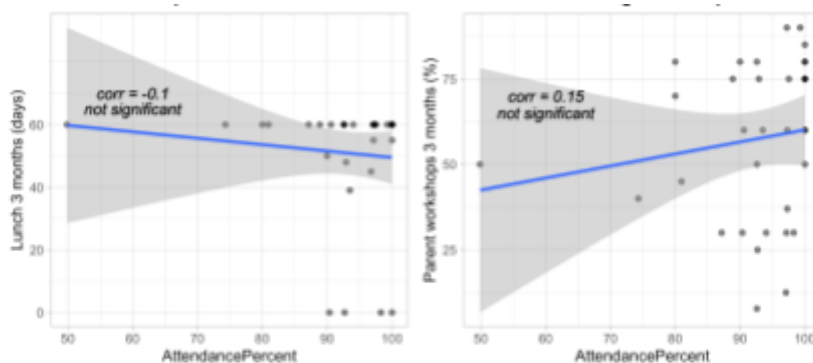

Figure 4. Correlation between school characteristics (lunches and parent workshops) and percent student attendance. Both correlations are non-significant. The blue line shows the linear correlation (confidence interval in grey). Grey dots represent individual schools.

Figure 4 shows the non-significant relationships between attendance and lunches (left) and parent workshops (right). We can again observe the difference in variability between these two characteristics discussed in the previous section. It is important to consider variability (discussed in the previous section). Factors with low variability (for example, lunches) are less likely to show correlations with attendance, because all schools are similar.

Parent workshop attendance is more variable, but still does not show a significant relationship with attendance, which means that the observed relationship could just be chance. Using this effect to calculate sample size can help guide future studies. In this case, if baseline parent workshop attendance is truly related to student attendance, we would need more than 300 schools to detect this effect.

The number of schools needed to detect an intervention effect is likely lower than 300, because intervention designs that measure pre- and post increase the power to detect differences. However, this baseline data analysis illustrates that there are no straightforward and easy ways to detect relationships between school characteristics and attendance. This is why **the design of the intervention study (see Deliverable 2) is important.**

We also note that the percent attendance calculated was high (average = 93%). Reported attendance also did not differ between grades 1-4 and 5-8: Mean attendance in grades 1-4 was 92%, and in grades 5-8 93%. This high reported attendance is a possible reason for the lack of significant relationships. Since attendance is expected to drop over the school year, this pattern may be different when observing the whole school year.

Table 2. School characteristics entered into correlation analysis with student attendance. None showed significant correlations.

School characteristics entered into correlation analysis with student attendance
Number of teachers   *New teachers in last 12 months*   *Teacher absence in last 3 months*   *Teacher Salary*   *Number of teachers following teacher training*   *Parental workshop participation in last 3 months*   *Parental learning program participation in last 3 months*   *Textbook to student ratio*   *Toilet wait time*   *Students per desk*   *Class space*   *Lunches served in last 3 months*   *Breakfast/tea served in last 3 months*   *Number of board members*   *Frequency of board meetings*

It may seem good to include as many variables as possible in a statistical model to account for any influence they could exert. However, this can cause problems. First, when multiple similar variables are included, results are unreliable, leading to incorrect conclusions. Second, the more variables included in an analysis, the less power that analysis has to detect differences, making it harder to detect true effects. Third, when many variables are included in an analysis with few data points, conclusions can not be generalized to other datasets or situations. For these reasons, our analysis excluded variables that were redundant or incomplete.

Recommendations for future data collection

Future surveys should be designed and implemented to maximize the potential insight from their data. We now go through lessons we learned from our in-depth analysis of the CFK Africa baseline survey, including recommendations on survey design, implementation, and digitisation. Since CFK Africa is still transitioning from paper to digital surveys, we give recommendations on both where applicable. Shorter versions of these recommendations are summarized in Table 3 along with other recommendations from Deliverable 1.

Standardize question format

CFK Africa's survey often inquires about a very specific number - e.g., attendance per day or per month, fees paid per month or per year. However, the way this information is requested varies across items and questions, which makes it hard for respondents.

Example 1: Ask only one thing per question
In the question on student attendance, coders are required to provide three pieces of information in one answer cell, in a specific order *("Class Size: Total Enrolled/Avg. Attendance Last Month/Total Attendance Today in that order").* If all three pieces of information are really required (see also "Asking as few questions as possible" below), they should be separated into three questions. This will make it easier to answer, since keeping track of three different tasks at once is hard. It will also reduce errors (e.g., wrong order) and inconsistencies (e.g., different coder decisions if they do not have an answer to the middle item).

Example 2: Clearly separate different kinds of questions and answers
Switching between different kinds of information in one section can be hard for coders. For instance, baseline survey questions about students were sometimes asked by class and sometimes about a total number of students. Thus, coders may confuse the two types of information requested. For example, both *"Total Number of students enrolled beginning of the term still attending (attended any time in last 2 weeks)"* and *"Number of students enrolled Feb 1 that have missed 10 days in a row at any time this year"* intended to ask about total number of students in a school, but both questions were answered by-class rather than by-school. This could be avoided by keeping the types of information requested similar across questions.

Example 3: Define questions with precision
Survey items on fees (*"What is the Total cost of All Fees? Tuition___ food___ Exams___ Supplies___ Desk___ Texts/Exercises___ other fees___ "*) did not specify whether answers should be amounts per day, month, term, or year. The actual answers have huge variation, suggesting that respondents were not sure either. Another example is the question "*Number of parents volunteering at least 3 hours per month at school during last 3 months*". Here, some coders answered "3" or "5", which is exactly what was requested. However, these numbers are not informative, since they need to be interpreted in the context of the total number of parents. Others answered with ratios like "10/265" or "2/50", which is much more informative, but not what was actually requested.

In sum, **we recommend simple questions with a standard format across the survey, with each question asking information about only one item.** This is easier with a digital tool, where you can copy formats across survey items, and predefine possible response values.

Restrict response options

In many cases, the range of possible answers for a survey item can be predicted. Thus, we recommended restricting the type and range of answers, to reduce errors and minimize effort completing and analyzing the survey. Below, we go through different types of items CFK Africa included in their baseline surveys and give recommendations on question design.

<u>Give numerical values a predefined range</u>
Questions on numbers of students/teachers, as well as percentages, ratio, sizes, and amounts, all have a set range of possible answers (e.g., 0-100%, 1-50 teachers). For paper surveys, we recommend clearly putting the possible range in the question (e.g., "What percentage of parents volunteer for at least 3 hours (0-100%)?"). For digital surveys, we recommend only allowing numbers within a set range (e.g., the tool would flag answers outside the range as errors).

MealSize
normal space
1/4 plate
normal portion
not enough retion
not much
small amount
enough to sustain them
not enough (only to sustain them)

Figure 5. Examples of actual answers to question on meal size in baseline survey

<u>Multiple predefined response options</u>
Some questions have a predictable selection of likely responses (e.g., which kinds of payment are accepted by the school: "Bank" or "Cash"). For paper or digital surveys, we recommend pre-defining the most likely options and making them each an option. By leaving one line with an "Other" option, respondents have the opportunity to provide other answers.

<u>Open response</u>
Some questions require an open response (e.g. "Please describe what the reward program entails"), although we recommend avoiding this if possible. Questions with open response options are great for qualitative information, or if you are not sure about the possible response options, but are difficult to answer quantitatively. An example of a challenging question from the baseline survey was a question about meal sizes (see Fig. 5). What is a "normal" portion? Is a "small amount" similar to "enough to sustain them"? A similar pattern can be seen in answers to other questions like available playground space. We recommend avoiding questions that can only be answered subjectively.

In sum, **we recommend making response options as clear, comparable, and objectively evaluable as possible**.

Asking as few questions as possible

CFK Africa's baseline survey was extensive, which can be good in the pilot phase. However, moving forward we recommend having as few questions as possible. This will reduce the time commitment and increase accuracy of responses for coders. A short list of questions also helps data analysis and interpretation. Non-essential variables can make it hard to achieve sufficient statistical power (see Callout Box 1), and pose challenges for interpretation.

Based on the response patterns in this baseline survey, we recommend two ways to shorten the survey. First, remove questions answered by less than half of schools (Table 1). Second, remove redundant questions. For example, student extracurricular activities were surveyed as after-school classes, extracurricular classes, holiday classes that teach the standard curriculum, and non curriculum holiday programs. The response rate to these items was low, and likely one item on extracurricular activities would be sufficient. Another example is the availability of toilets, which had three questions (toilets-per-student ratio, wait time per toilet, and the number in line). We thus recommend **removing survey items to which a majority of schools did not respond, as well as redundant survey items.**

Keep survey items consistent across schools

Based on the available data, total survey items varied by school: 12 schools had 111 response items, 14 schools had 127, 1 school had 128, 11 schools had 130, and 5 schools had 134 response items. Perhaps some questions were amended or added later based on experience. However, doing so in the middle of a program makes data analysis challenging. For instance, only 5 schools were surveyed with all 134 items, so the extra items cannot be included in analysis. Therefore, we recommend **keeping survey items fixed during the intervention phase**.

Train coders to complete surveys

People who conduct the surveys should be trained to complete the items. Even with a well-designed survey (including the recommendations above), people may interpret questions differently. For example, "*How many Total Days have teachers been absent During last 3 months of school? (Count each day each teacher has been absent)*" was asked clearly, but coders answered in very different ways (Fig 6): many answered in days, some in weeks, one counted the number of teachers. Some differences can be corrected later (e.g., convert weeks into days), but this is labour-intensive and requires assumptions (does a "week" refer to a 5 day work week or a 7 day calendar week?). Other differences cannot be corrected (e.g., it is impossible to compare the number of teachers and days/weeks). These inconsistencies can be prevented by training the coders.

TeacherAbsence3m	
10–12	0
1 teacher	7
1 week	10–12
22 days	15 days
10 days	0
0	21 days (1 teacher 1 days,
0	14 days
5 days	none
0	10 days
1 week	15
1 week	10 days
10–12	12 days
5	21

Figure 6. Examples of actual answers to question on days of teacher absence during the last 3 months in baseline survey.

The recommendations above (see "Standardize question format" and "Restrict response options") can help make questions clearer. **It can also help to put a concrete example below the question** (e.g., for the question on teacher absence: "For example, if one teacher was absent for 7 days and another teacher was absent for 10 days during the last 3 months, please put "17"). Finally, if possible, we recommend **conducting a coder training** before they complete the survey.

Setting up spreadsheets (Excel files) for data analysis

Figure 7. Examples of variable names, with not ideal (left) and suggested improvements (right).

After the survey has been conducted, the data needs to be analyzed. With paper surveys, this means entering written data into a spreadsheet; with a digital survey, this means downloading data in digital format. Ideally, unique and unambiguous variable names were set up when the survey was designed. But this should be double checked before analysis. Figure 7 shows an example of variable naming from the baseline survey. The variable "Class 1" occurs three times in the orange column. A human reader can see that "Class 1" refers to "Teachers", "Textbook to student ratio", or "Total Enrolled", but analysis software cannot distinguish these. Even a human reader might have problems if the rows are reordered. In the green column, we renamed variables so they are unique (e.g., "Teachers_Class_1"). Note that we also wrote "Class_1" rather than "Class 1" because some analysis software cannot handle spaces. **We recommend giving each variable a non-redundant name, with no spaces**.

If paper surveys are used, data needs to be typed into a digital spreadsheet for analysis, and this needs to be done consistently. For instance, Figure 6 shows that the spreadsheet data sometimes says "10 days", and sometimes says "10". This will cause analysis problems (e.g., you cannot use "Sum" function), but can be avoided by **training people how to complete spreadsheets consistently, using examples**.

Standardization could sometimes lead to loss of information. For instance, one of the rows in Figure 6 has a bracket with additional information ("21 days (1 teacher 1 days,...")), and one reports a range ("10-12"). Such information loss is likely not problematic, since any piece of information would only be useful if it was available for the majority of schools. However, there are ways to preserve this kind of data, using an "AdditionalInformation" column (Figure 8).

TeacherAbsence3m	TeacherAbsence3mNEW	AdditionalInformation
21 days (1 teacher 1 days,1	21	TeacherAbsence3m: (1 teacher 1 days,1
10-12	11	TeacherAbsence3m: range 10-12

Figure 8. Suggestions for standardizing the digitization of survey responses. Original (left), suggestion for more standardized entry (middle and right).

Table 3. Summary of recommendations based on insight from CFK Africa baseline data.

Recommendation	Description	Example/Elaboration
Survey design		
Reduce number of survey items	Questions answered by less than half (50%) of respondents and redundant questions should be removed from the questionnaire. A focus on relevant, answerable questions will increase response motivation, precision, and statistical power.	Questions with few answers were hard to answer (e.g. longest toilet wait time), or were not asked in all schools. Redundant questions capture similar concepts in different ways (e.g. attendance per day, month, in a specific month).
Standardize question format	Asking questions in a precise, consistent way helps respondents understand what exactly is asked for.	Asking multiple items at once or not specifying the unit of inquiry is hard for coders
Restrict response options	Predefine the range of possible responses to facilitate data management and analyses.	If numbers in a specific range (1-100) or specific responses (e.g., cash or bank) are expected, predefine these options rather than allowing open responses.
Keep response options consistent across schools	All schools within one round of intervention should be asked the same list of questions.	Changing aspects of an intervention when it is ongoing is rarely beneficial.

Survey implementation		
One coder per school	Agreement between coders was high, so you can use just one coder per school moving forward.	Average inter-coder agreement in the baseline survey was 80%.
Train coders to complete surveys	Even with precise instructions, coders might interpret survey items differently. Providing training and examples will help ensure correct and standardized responses.	When asked about teacher absence, coders answered inconsistently, some responding in days, some in weeks, and some counting the number of teachers.
Data management		
Set up data spreadsheets	Variable names should be clear and unambiguous to reduce errors. Conventions for machine readability should also be followed, such as avoiding spaces in variable names.	If multiple variables are named "Class 1", it is hard to distinguish teacher number, student number, or other characteristics. Better to name them "Class_1_Teacher_Number", etc.
Train staff on digitizing data	When transferring paper-pencil data to digital format, data should be completed in consistent, standardized format.	Survey items with numbers should record only the number, instead of sometimes saying "10", or sometimes "10 days". Items with character responses should be consistent with letters and spelling, e.g. always writing "bank", and not sometimes "Bank" or "Bank transfer".
Data interpretation		
Variability across schools	Variability and scores in baseline school characteristics can provide insights into potential intervention targets and identify baseline differences that need to be controlled.	Lunches are served in most schools already and are therefore not an intervention target likely to change attendance.
Expected strength of effects	Correlation analyses of baseline data can indicate the strength of relationships between baseline school characteristics with attendance.	We found no strong relations, suggesting that a rigorous intervention design is important to detect effects.

Summary

Deliverable 1 reported insights from the CFK Africa baseline survey conducted in 2020. Surveys were filled in well, meaning most survey items were completed for most schools, and with high inter-coder agreement ("Overview of collected data"). Assessing the variability of baseline data as well as the correlation of school characteristics with baseline attendance can help narrow down possible target practices for intervention ("Variability of school characteristics", "Concurrent data analysis"). Finally, the examination of baseline survey data has led to recommendations for survey design, implementation and management (Table 3).

Deliverable 2: Generating and gathering evidence

Introduction

As CFK Africa and the Best Schools Initiative set out to test the effectiveness of different interventions for improving school attendance, a key question posed was:

> How can causation be reasonably inferred when the number of variables to student attendance and learning is so large?

In general, testing whether an intervention works (and using that to infer causation) is done through a research design that can separate the effects of an intervention from effects of anything else (time, baseline differences, other experiences during the intervention, etc).

Key to inferring causation from any of these designs is reducing the number of variables as much as possible, ensuring that other variables are well-balanced across groups, and then statistically controlling for the others. This deliverable discusses various possible intervention designs, as well as their advantages and disadvantages. We also make recommendations for what may be most appropriate for this setting.

Deliverable 2

There are several ways to test interventions, each with advantages and disadvantages. Regardless of the method used, it is important to ensure that the study is well-designed and the outcomes are reliable and valid. Additionally, the results should be interpreted while considering any potential confounding variables or situations that may affect the outcomes.

Randomized controlled trials

Randomized controlled trials (RCTs) are the gold standard for testing the effectiveness of an intervention. In an RCT, participants/schools are randomly assigned to either an intervention group or a control group (no intervention); see Figure 9. The intervention is performed, then outcomes (e.g., attendance) are measured and compared between the two groups. Because of the randomization, you can generally infer causality from any effects observed in the intervention group that were not observed in the control group.

RCTs are the gold standard, and would be our recommendation to most accurately infer causation when testing school interventions. For an RCT, randomization would be done without considering school preferences or characteristics. Instead, randomization is done via computer-generated random numbers or by pulling names/numbers out of a hat. Especially when examining a large number of schools, the randomization helps balance characteristics across groups so that they need not be incorporated into analysis (e.g., when randomly assigning schools to intervention/control, you are likely to get a mix of large and small schools, and of schools that had high vs low parent involvement).
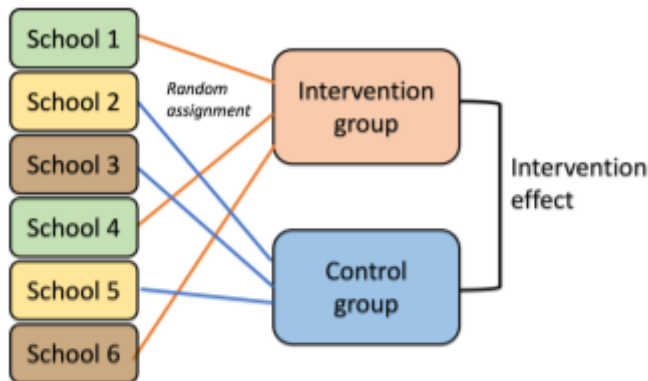

Figure 9. Randomized control study design. Schools are assigned randomly to intervention and control groups. The three different color shadings for schools indicate that they have different key characteristics (e.g., green schools have a lunch program, but the others do not). The intervention effect can be measured as the difference between intervention and control group after the practice implementation period.

However, in the context of CFK Africa, the value of an RCT may need to be balanced with participatory design, where interventions are designed and implemented in partnership with schools and according to their needs and desires. **If participatory design makes an RCT not feasible, then we recommend a quasi-experimental design** (see below).

Quasi-experimental designs

Quasi-experimental designs are like RCTs but do not involve randomization (Fig. 10). Instead, participants may be assigned to intervention and control groups based on certain characteristics, for example, by school. These designs can still provide useful information about the effectiveness of an intervention. To generate the best evidence in a quasi-experimental design, it is ideal to ensure other characteristics are well-matched between groups (for example, child age, sociodemographic factors, location).

This may be the most effective way for CFK Africa to infer causality of their interventions, while balancing participatory design and feasibility constraints. As stated above, it is critical to match schools receiving the

intervention or not as closely as possible on key characteristics. Baseline school data can help ensure schools are matched. There will be many characteristics to potentially match on, and it is unlikely to be possible to match perfectly on all characteristics. In that case, the characteristics most likely to influence outcome should be prioritized for matching (e.g., if school tuition is likely to impact success of the intervention, that should be prioritized in the matching; but if ratio of boys to girls is not likely to impact the intervention success, then you need not worry as much about matching on it).
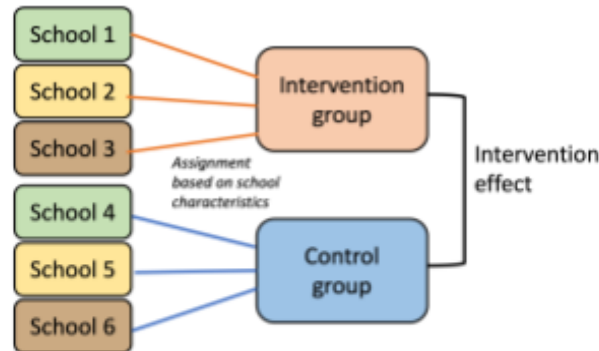

Figure 10. Quasi-experimental design. Schools are assigned to intervention and control groups based on certain criteria, here, based on key school characteristics. The intervention effect can be measured as the difference between intervention and control group after the practice implementation period.

Note that within either an RCT or quasi-experimental design, you can use **a waitlist control design**. In a waitlist control design, the participants/schools originally in the control group (i.e., those that do not receive an intervention) receive an intervention later, after outcome measures are collected. In the first phase, the intervention group will receive the intervention and the control group receives no intervention for a set period of time. After that set period of time, the control group is offered the intervention. This design is useful when it is not possible or reasonable (ethical) to deny the participants/schools the intervention.

Pre-post design

A pre-post design measures outcomes before and after an intervention (Fig. 3). The difference in outcomes between the two time points can be used to determine the effectiveness of the intervention. It can sometimes be difficult to infer causality in this design if other characteristics change pre-post (e.g., age, funding, political circumstances). Sometimes these designs are conducted with three equally spaced time points, where there is no intervention between the first two, and then an intervention between the second two, to add a sort of internal control.

This design could provide useful data on the school interventions, **but is not ideal for inferring causation**. Given the multitude of other factors that change over the course of the multi-year intervention, it will be difficult to infer that changes from pre- to post- are *because* of the intervention and not other factors. However, if a quasi-experimental design is not feasible, this will still provide some useful data.
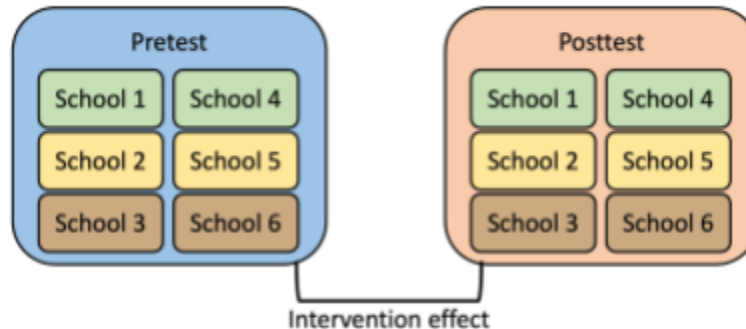
Figure 11. Pre-post design. Schools are assessed before and after the intervention. All schools undergo the intervention. The intervention effect can be measured as the difference between intervention and control group after the practice implementation period.

Observational studies

Observational studies can also be used to test the effectiveness of an intervention. These studies do not involve any manipulation of the intervention but instead observe how the intervention is implemented in real-world circumstances. These studies provide the weakest level of evidence from which to infer causality, but can still provide useful data.

> **Observational studies are unlikely to provide the level of evidence desired by funding bodies**. These can be useful for pilot data (and the observational data already collected by CFK Africa has provided useful insights – see Deliverable 1).

<u>Therefore, we would recommend an RCT or quasi-experimental design to test the desired interventions.</u>

Key considerations when designing and implementing a quasi-experimental design are:

Intervention choice

Before an intervention is implemented, there should be a reasonable expectation that it is likely to influence the outcome(s) of interest. This expectation could be based on previous data in other settings, which could be found by searching the literature (see Appendix) or reading reports. A great example is the World Bank's [Cost Effective Approaches to Improve Global Learning](#), which also contains links to other useful sources.
 or pilot data in the chosen setting.

> BSI interventions were designed in conjunction with the schools, students, and families. This is useful to get buy-in from schools and ensure the interventions are desirable for schools and families. **We encourage you to also consider the existing evidence base for these interventions** in order to have the strongest likelihood of success on your desired outcomes (attendance).
>
> It is possible to test multiple interventions in a quasi-experimental design, but it can be challenging to isolate the effects of each intervention. One approach is to test each intervention separately and in combination with the others. This allows you to use statistical analysis to separate the effects of each intervention (and their combinations) in the final outcome data, but the more interventions you test, the larger the sample required. This is why **we recommend testing a small number of interventions**, in order to better separate their effects.

How many schools / Sample size

The sample size should be large enough to ensure that the study has sufficient statistical power to detect the treatment effect. This can be determined through power analysis, which considers the expected effect size (baseline data and/or other studies can help inform this), the desired level of significance, and the data variability (baseline data can help inform this).

Finally, you need to know how *variable* the data is, so that you can determine your ability to find effects over and above normal variability. This can be done from baseline or pilot data, or from other studies in similar settings.

Significance level is typically set to alpha (or p) <0.05 by convention. This means that there is less than a 5% chance of concluding that there are real effects of an intervention, when in fact there are no true effects. More stringent alpha levels (e.g., p<0.01) require larger samples, but increase the confidence in results.

Power indicates the ability to detect an effect if it is true. Power is typically set at 0.8 or higher, which means that if an effect is real, there is an 80% chance of detecting it. Higher power means that you are more likely to detect effects if they exist, but require larger sample sizes.

Effect size can be estimated from prior studies in similar settings, from preliminary/pilot data, or based on meaningful outcomes (e.g., if funders say they're only interested in changes larger than 10%). Effect sizes are often expressed in terms of Cohens d, and are often described as small (d=0.2), medium (d=0.5), or large (d=0.8).

> For sample size calculations for BSI, we calculated variability in attendance data from the baseline survey (see Deliverable 1). We set a significance level of alpha <0.05, and set power to 0.8. Because there was no baseline data on intervention effects and there is limited data from similar settings/interventions, we estimated samples for small, medium, and large effects. We cannot know for sure without baseline data, but these may reflect attendance increases of ~5-10% (small effect), ~15-25% (medium effect), and ~30-50% (large effect).
>
> With these parameters, detecting small, medium, and large increases in attendance will require 310, 50, or 20 schools *per group*, respectively. Note that these samples are per intervention group, so if you have one intervention and one control, you **require a total of 620, 100, or 40 schools** to participate. If you have multiple interventions (e.g., if you want to test both school lunches and teacher training), you will need multiple separate intervention groups, each with the numbers identified above.

Baseline data

Collecting baseline data on participants before the intervention starts can help identify potential confounding variables, ensure that the treatment and control groups are comparable, and provide information to help guide interventions (see Deliverable 1, and sample size calculations above). Baseline data is also useful to incorporate an additional pre-post testing design within an RCT or quasi-experimental design, so you can compare school characteristics before and after the intervention.

> The baseline data already collected by CFK Africa will be helpful to select similar schools in which to implement the intervention(s). Key variables to consider matching on are school location, student sociodemographic profiles, teacher profiles, etc.

Outcomes

Outcome measures should be well-defined, reliable, and valid.

> For CFK Africa, the primary outcome measure is school attendance. It is worthwhile considering how you will define attendance and whether you are interested in any secondary outcomes as well. For example, are you measuring attendance on an individual level (e.g., percentage of school days that child

attended?), on a group level (number of students attending school each day), or in other ways?

Implementation fidelity

To appropriately infer causality, it is essential to implement the intervention(s) as consistently as possible. Monitoring how, when, and where the intervention(s) are being implemented will help ensure that data obtained is higher quality.

Statistical analysis

After data is collected, appropriate analysis should be used, taking into account the study design and potential confounding variables. See appendix for an example excel template to guide very basic data analyses between attendance values in control and intervention groups.

Summary

Deliverable 2 outlines possible research designs that would allow CFK Africa and the BSI to infer causality for their interventions. There are multiple possible research study designs to test the effects of interventions. For the most robust inferences of causality, CFK Africa and the BSI should consider a randomized control trial (RCT) as the gold standard, and a quasi-experimental design as a second-best option if an RCT is not feasible. We have outlined multiple considerations for these designs above, including minimizing the number of interventions tested at one time, ensuring an adequate sample size, balancing baseline characteristics (if using a quasi-experimental design), and appropriate implementation and analysis.

Deliverable 3: Data collection platform and implementation

Introduction

As CFK Africa and the Best Schools Initiative seek to collect multi-year student attendance and learning data in complex, rapidly changing environments like informal settlements, a crucial question emerges:

> What's the best way to gather and manage multi-year student attendance and learning data in such challenging contexts?

Understanding these unique challenges, this deliverable explores various strategies to effectively collect and manage data in environments like Kibera, considering factors such as limited resources, infrastructure constraints, and high levels of population mobility.

Deliverable 3

There are several approaches to collecting and managing data in complex environments; it is essential to carefully plan and implement data collection methods to ensure that the gathered data is reliable, valid, and representative of the population. In this section, we discuss various strategies for the Best Schools Initiative to consider in order to effectively gather and manage data in partner schools in Kibera.

Partner with local schools and organizations

Partnering with local schools can facilitate contextual understanding, trust-building, community engagement, and local capacity building, ultimately enhancing the effectiveness and impact of data-driven educational initiatives.

Contextual understanding: Local schools and organizations have a deep understanding of the community's unique cultural, social, and economic context. This knowledge helps design and implement data collection methods that are contextually appropriate and effective.

Trust-building: Local schools and organizations often have established relationships with community members. Partnering helps build trust and credibility, making it easier to collect accurate and reliable data from parents, students, and educators. WThis not only

increases the likelihood of successful data collection but also promotes a sense of shared responsibility for education and student outcomes.

Local capacity building: Partnering with local schools and organizations helps build their capacity to collect and manage data, empowering them to make evidence-based decisions and improve their educational programs.

> We recommend that BSI facilitate regular meetings, workshops, and collaborative projects among schools, parents, and community stakeholders to foster a sense of shared responsibility for education. Consider conducting community awareness campaigns to create stakeholder buy-in.

Standardize data collection systems

Develop clear protocols and guidelines for data collection, ensuring that everyone involved in the process adheres to the same methodology. This helps ensure data consistency and accuracy across different years and settings.

> It is essential for CFK Africa to develop a standardized data collection system to effectively track the progress of your initiatives. To achieve this, create comprehensive training materials and resources that clearly explain the protocols and guidelines for collecting data on student attendance, academic performance, and graduation rates. These materials should include easy-to-follow instructions, real-life examples, and best practices to ensure a thorough understanding of the methodology.

Establish teacher selection criteria

In order to ensure the success of any data collection system, it is crucial to establish a clear set of criteria for selecting the right teachers to participate. These educators will play a pivotal role in utilizing the tool to its full potential, and their skills and experiences will significantly impact the overall effectiveness of the project. With that in mind, we have identified the following key areas that teachers should excel in:

Technological proficiency: The teacher should have basic knowledge and skills in using digital devices, such as smartphones or tablets, and the internet. They should also have experience with data collection software, preferably with KoboToolbox, or be willing to learn how to use the tool.

Teaching experience: The teacher should have experience in teaching in classrooms, ideally in low-resource settings. They should be familiar with the challenges and opportunities of teaching in such environments.

Data literacy: The teacher should have a good understanding of data and its importance in education. They should be able to collect and analyze data, and use it to inform their teaching practices to improve student learning outcomes.

Communication skills: The teacher should have strong communication skills, including the ability to explain data collection processes and results to students, parents, and other stakeholders. They should also be able to collaborate with other teachers, school administrators, and community members to collect and use data effectively.

> As described in Deliverable 1, BSI should provide training for teachers involved in the data collection process. This training will build their capacity and equip them with the necessary skills to follow the established protocols and guidelines consistently. Provide regular training for all teachers and administrators on data privacy best practices, legal requirements, and the ethical handling of student data.

Offer incentives to teachers for participation

Accurate and reliable data collection is key to gathering effective data. Furthermore, fostering a sense of ownership and commitment among teachers can result in more engagement. Monetary rewards, such as bonuses or performance-based pay, can motivate teachers to prioritize data collection and strive for accuracy. Even small financial incentives can have a significant impact on teachers' motivation. Additionally, providing teachers with the necessary tools, such as digital devices, can streamline and simplify the data collection process.

Utilize mobile technology and readily-available smartphones

Leveraging mobile devices and apps can streamline data collection and transmission, as mobile phone usage is relatively high even in informal settlements. Customized digital tools can be developed for teachers, school administrators, and students to report attendance and learning data in real-time.

Establish an electronic data management system

Electronic data collection offers several advantages over manual data collection, including increased efficiency, accuracy, accessibility, scalability, and the ability to analyze data for insights and optimization. These benefits can help BSI improve their operations and achieve their goals more effectively.

Implementing a centralized, user-friendly data management system is crucial for storing, organizing, and tracking student attendance and learning data over multiple years. This system should be adaptable to accommodate changes in the educational environment and data from various sources, including paper-based records and digital inputs. Tools such as learning management systems (LMS), student information systems (SIS), and data analytics software can automate data collection, analysis, and reporting.

Recommended platform for CFK Africa: KoboToolbox

For CFK Africa's BSI program, we recommend KoboToolbox (https://www.kobotoolbox.org/) as a reliable and versatile electronic data collection solution. Kobo offers a user-friendly interface, offline data collection, robust data security measures, and a wide range of data visualization and analysis tools. It is widely used by organizations worldwide, including nonprofits, government agencies, and academic institutions, such as the United Nations High Commissioner for Refugees (UNHCR), World Health Organization (WHO), Mercy Corps, and the International Rescue Committee (IRC).
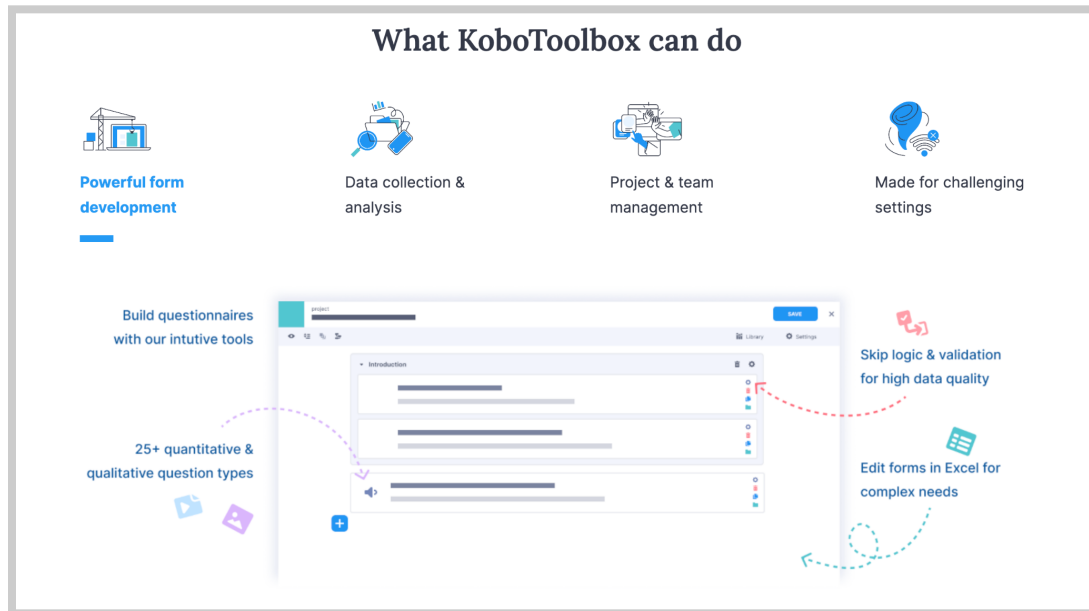
Some key features that make Kobo an ideal choice for CFK Africa's BSI program include:

Versatility: Kobo allows users to create custom data collection forms that can be tailored to their specific research or monitoring needs. The platform supports a variety of question types, including text, numeric, multiple choice, GPS location, and others.

User-friendly interface: Kobo's interface is intuitive and user-friendly, making it easy for researchers and fieldworkers to collect high-quality data without extensive training or technical expertise.

Offline data collection: Kobo supports offline data collection, which is particularly useful in areas with limited or unstable internet connectivity. This feature ensures that data can be collected even in remote or difficult-to-access locations.

Data security: Kobo has robust security measures in place to protect data privacy and ensure data security. The platform is designed to comply with industry standards for data protection and encryption, and allows users to control who has access to data.

Data visualization and analysis: Kobo provides a range of tools for data visualization and analysis, including built-in dashboards, charts, and graphs. Users can export data in a variety of formats for further analysis in external tools such as Excel or R.

For additional information about Kobo implementation, see Appendix 2.

To review other solutions explored for CFK Africa's electronic data collection, see Appendix 3.

Asses infrastructure and devices

For BSI to use Kobo effectively, there are certain infrastructure and device requirements that must be met. These requirements include internet connectivity (for setup and data download), compatible mobile devices, adequate data storage, and a backup and recovery plan to ensure a smooth data collection process.

Internet connectivity: While Kobo can collect data offline, it will require a stable internet connection for data synchronization, form creation, and data analysis.

Mobile devices: Kobo is designed to work on mobile devices such as smartphones and tablets, which can be used for data collection in the field.

Data storage: Kobo collects large amounts of data, so it is important to have a reliable data storage solution in place. This can include cloud-based storage options such as Google Drive, Dropbox, or Amazon Web Services, or local storage solutions like external hard drives or network attached storage (NAS) devices.

Backup and recovery: It is recommended to have a backup and recovery plan in place in case of data loss or device failure. This can include regular backups to external storage devices.

Protect data privacy

Before implementing Kobo, ensure that student data is stored securely and that privacy policies and procedures are in place to protect sensitive information. Restrict access to student data on a need-to-know basis, ensuring that only authorized personnel can view or handle the data. Implement role-based access controls and provide regular training to staff members on data privacy and security protocols.

> We recommend that BSI develop a clear privacy policy and obtain consent from parents and students. BSI should anonymize student data by removing personally identifiable information (PII) or replacing it with pseudonyms. This reduces the risk of unauthorized access and protects the privacy of individual students.

Regularly update data and monitor quality

Create a schedule for updating student attendance and learning data such as daily, weekly, or monthly, depending on specific needs and resources. Regular updates help maintain an accurate and up-to-date dataset for analysis and decision-making.

Continuously assess the effectiveness of data collection and management processes. Periodically review the data for accuracy, completeness, and consistency, and implement data validation and verification processes to catch errors early and ensure high-quality data. Be prepared to adapt your approach as the environment changes or as new challenges arise. Regularly monitor and audit data handling processes to ensure compliance with privacy policies and data protection regulations, and address potential risks or breaches promptly. Implement quality control measures, such as random audits and data validation checks, to ensure the accuracy and reliability of the collected data, and address any discrepancies or issues in a timely manner to maintain data quality.

> We recommend that BSI implement quality control measures, such as random audits and data validation checks, to ensure the accuracy and reliability of the collected data. Address any discrepancies or issues in a timely manner to maintain data quality.

Summary

Deliverable 3 recommends strategies for CFK Africa's Best Schools Initiative to improve data collection practices and promote stakeholder engagement. This includes raising awareness among parents, students, and community members about the importance of accurate data collection and keeping stakeholders informed about data collection practices and privacy policies. The report also recommends implementing data privacy protection measures, establishing data sharing agreements, and using incentives to encourage continuous improvement in data collection quality.

Deliverable 4: Partnership models and avenues for funding

Introduction

In relation to testing the various interventions to improve school attendance, CFK Africa asked what level of evidence is necessary for funders:

> What level of evidence is necessary (for funders) to judge which practices are most effective?

The answer to this question depends on the type of funding organization, the size of the grants, and the requirements of various programs offered by the funding organization. Below, we provide an overview of some of the various partnership models and potential funding avenues that may be relevant to CFK Africa and the BSI program.

Deliverable 4

Partnership models

Once CFK Africa's Best Schools Initiative has credible data (as outlined by LEAP's recommendations), we recommend that they seek pathways to partnerships and additional funding to ensure sustainability and accelerate scalability.

Below is a list of suggested criteria in strategically targeting external partners to advance the work of the CFK Africa's BSI:

☐	**Alignment with BSI's mission and vision**: Seek partners that share a commitment to improving education and student outcomes in informal settlements like Kibera.
☐	**Complementary expertise and resources**: Identify partners that can provide valuable skills, knowledge, or resources to enhance BSI's efforts, such as data analysis, technology, or teacher training.
☐	**Track record of success**: Target organizations with proven success in similar initiatives, ensuring they have the experience and capacity to contribute effectively to BSI's goals.
☐	**Financial stability**: Look for partners with a stable financial background that can commit to long-term support and collaboration, ensuring the sustainability of the partnership.
☐	**Reputation and credibility**: Partner with organizations that have a positive reputation and strong credibility in the education sector, which can help attract additional support and resources.

	Network and connections: Seek partners with extensive networks and connections in the education sector, as they can facilitate collaboration, knowledge sharing, and access to additional resources.
☐	

	Geographic reach: Consider partners with experience working in Kibera or similar informal settlements, ensuring they understand the unique challenges and context of the target communities.
☐	

	Long-term commitment: Focus on partners that are willing to commit to a long-term relationship, fostering a collaborative and supportive environment for achieving BSI's objectives.
☐	

	Flexibility and adaptability: Choose partners that demonstrate the ability to adapt to changing circumstances and work collaboratively to address emerging challenges and opportunities.
☐	

Avenues for funding

CFK Africa's Best Schools Initiative is rooted in private, low-cost, informal schools that often lack government funding. To create a more sustainable and scalable impact beyond offering individual student scholarships or temporary solutions for schools, it is crucial to explore various funding avenues. Potential funding sources to consider include:

Corporate Social Responsibility (CSR) programs: Many companies, both locally and globally, have CSR programs that support education and community development initiatives, including those focused on informal settlements like Kibera.

Private foundations and philanthropic organizations: Numerous foundations and organizations fund education and development initiatives in low-income countries, with some specifically supporting informal settlements.

Government grants and funding: National and local governments in Kenya may offer funding for education and community development initiatives, particularly those targeting informal settlements.

Crowdfunding platforms: CFK Africa could utilize online crowdfunding platforms to raise funds for specific BSI initiatives in Kibera, such as continued use of the electronic data collection platform or developing teacher training programs.

Social impact investing: Attracting investments from individuals or organizations seeking both financial returns and positive social impacts could be a potential funding source for CFK Africa BSI, provided there is a viable investment opportunity aligning with their objectives.

Development finance institutions (DFIs): DFIs offer financing and technical assistance to support development initiatives in low-income countries. CFK Africa's BSI could explore partnerships with DFIs focusing on education and community development in informal settlements.

Promoting BSI's impact and building stronger connections

Sharing the impact story of BSI is essential for showcasing its value and effectiveness, fostering support and engagement, and contributing to broader learning and knowledge-sharing efforts within the field.

By highlighting BSI's positive impact on individuals and communities in informal settlements like Kibera, CFK Africa can:

- Build support and engagement: Garner the interest of various stakeholders, including donors, partners, and beneficiaries, by showcasing the program's effectiveness and value.
- Contribute to broader knowledge sharing: Help others in the field of education for informal settlements understand what works, what doesn't, and promote best practices, inspiring them to get involved and contribute to similar initiatives.

To effectively promote BSI's work, consider these best practices for outreach and networking:

- Attend relevant conferences and events: Engage with potential partners and collaborators, share experiences and knowledge, and raise awareness of BSI's work by participating in events related to education, child welfare, and community development.
- Build partnerships with local and international organizations: Collaborate with organizations in education, child welfare, and community development to access valuable resources, expertise, and support. Forming both local and international partnerships can help expand BSI's reach and impact.
- Follow up and maintain relationships: After establishing initial connections or partnerships, ensure regular communication and updates to keep partners engaged and interested in BSI's work.
- Leverage social media: Utilize platforms like Instagram and LinkedIn to maintain an active social media presence, reaching a wide audience of potential partners, supporters, and donors. Share updates about BSI's work, connect with other organizations and individuals, and participate in conversations related to education and community development.

Collaborating with key education partners

CFK Africa's BSI should identify and collaborate with leading partners (financial or thought partners) working globally and locally in informal settlements or similar contexts. Establishing meaningful partnerships with organizations that share common goals and values can enhance the impact of BSI's initiatives, provide access to additional resources, and facilitate knowledge sharing. By connecting with experienced partners, BSI can leverage their expertise and networks to drive the program's success and sustainability.

For a list of global organizations to consider, see Table 4.

For a list of Kenyan organizations to consider, see Table 5.

Pursuing grant opportunities

Exploring various grant options can help BSI expand its reach, develop new projects, and sustain ongoing efforts. By targeting grants that support education and community development in informal settlements, BSI can ensure that funds are allocated effectively and in line with the program's objectives.

For a list of grant-making organizations to consider, see Table 6.

Engaging in conferences and events

Taking part in relevant conferences and events allows BSI to share their work, become more visible, and improve chances for funding and partnerships. Networking at these events helps CFK Africa's BSI connect with similar organizations, show off program successes, and learn from others working in related areas. Connecting with a wider audience can help BSI gain support, find potential partners, and stay up-to-date with current trends and best ways of working in education in informal settlements.

For a list of conferences and events to consider, see Table 7.

Summary

Deliverable 4 focuses on strategies for CFK Africa to ensure sustainability and scale the Best Schools Initiative. The report recommends seeking partnerships and additional funding through alignment with BSI's mission, complementary expertise and resources, financial stability, and long-term commitment. Potential sources of funding include CSR programs, private foundations, government grants, crowdfunding, social impact investing, and community-based fundraising. Sharing BSI results is also essential for demonstrating its effectiveness and building support, and the report recommends attending education conferences and events.

Table 4: Global organizations

Organization	Description	Value to BSI
Mastercard Foundation	The Mastercard Foundation focuses on promoting education, financial inclusion, and employment opportunities in Africa.	Emphasis on education and capacity building in the region could make them a potential partner and funder for BSI.
UNICEF	The United Nations Children's Fund is dedicated to improving the lives of children worldwide, focusing on areas such as education, health, and child protection.	Experience in working with informal settlements globally makes them a valuable partner for CFK Africa's BSI.
Save the Children	This international non-profit organization is committed to providing education, healthcare, and support to children in need, including those living in informal settlements.	Expertise in education initiatives and child protection can significantly contribute to BSI's objectives.
EdTech Hub	EdTech Hub is a global research partnership focused on the use of technology in education, particularly in low-resource environments.	Their research, expertise, and insights on technology-driven solutions in education can be valuable for BSI's efforts in informal settlements.
Room to Read	Room to Read focuses on improving literacy and gender equality in education in low-income communities.	Experience in implementing effective and scalable programs can be a valuable asset for enhancing the BSI's impact in Kibera and other informal settlements.
World Bank	The World Bank has a long history of supporting education initiatives in developing countries, including those in informal settlements.	Technical expertise, financial resources, and global network make them a potential key partner for BSI.
Plan International	This global organization works to advance children's rights and equality for girls.	Focus on education and experience in working with vulnerable communities can offer valuable insights and support to BSI's efforts.

Global Partnership for Education (GPE)	GPE is a multi-stakeholder partnership that supports education in developing countries. They work to increase access to quality education and promote inclusive learning.	Expertise and resources can significantly contribute to BSI's objectives.
Team4Tech	Team4Tech is a nonprofit impact accelerator, bridging the digital equity gap in education to create inclusion and opportunities for under-resourced learners around the world.	A global, online community of practice and a local regional hub in Nairobi, Kenya can support growth of BSI's staff as well as build best practices and enhance teacher capacity.
Pratham	Pratham is an Indian non-governmental organization that focuses on improving the quality of education for underprivileged children.	Innovative approaches and experience in working in informal settlements could be highly relevant for BSI's work in Kibera.
BRAC	Originally established in Bangladesh, BRAC is a global development organization that works in various sectors, including education.	Experience in implementing education initiatives in informal settlements makes them a potential partner for BSI.
Teach for All	This global network aims to expand educational opportunities for all children by recruiting and training local leaders to become teachers.	Model of developing context-specific solutions can be helpful in addressing the unique challenges of Kibera and other informal settlements.
Education Cannot Wait (ECW)	ECW is a global fund dedicated to providing education in emergency and crisis contexts.	Expertise in working with vulnerable populations, including those living in informal settlements, can offer valuable support to BSI's efforts.

Table 5: Kenyan organizations

Organization	Description	Value to BSI
The Aga Khan Foundation	The Aga Khan Foundation supports education in Kenya through the establishment of schools and teacher training programs, as well as through partnerships with local organizations.	Working with teacher participants of the Aga Khan foundation programs may help BSI to understand the effectiveness of interventions. They could also assist with data collection.
Teach for Kenya	A dedicated initiative to boost education in under-resourced areas of Kenya by training and supporting inspiring educators to lead and uplift their communities.	Establishing if TFK has fellows in any of the Kibera schools where BSI is being implemented could be helpful in collecting data.
SHOFCO (Shining Hope for Communities)	A Kenyan-based organization focusing on transforming urban slums by providing essential services such as education, healthcare, and economic empowerment.	Deep understanding of informal settlements in Kenya, making them a valuable partner for BSI.
Uwezo	An initiative by Twaweza East Africa, Uwezo assesses and improves literacy and numeracy levels in Kenya, Tanzania, and Uganda.	Knowledge of the local education context and commitment to quality education can benefit BSI's efforts.
Dignitas Project	A Kenya-based organization working to improve the quality of education in marginalized communities by providing leadership and management training for educators.	Focus on capacity building and local context can benefit BSI's initiatives.
Bridge International Academies	An organization operating a network of low-cost private schools in Kenya and other countries, targeting underserved communities, including informal settlements.	Innovative education models and local presence make them a potential partner for BSI.
Kenya Community Development Foundation (KCDF)	KCDF supports community-driven development in Kenya, including education initiatives.	Grassroots approach and knowledge of local communities can provide valuable insights for BSI's work in informal settlements.

Elimu Yetu Coalition	A network of Kenyan civil society organizations, Elimu Yetu Coalition works to promote access to quality education for all children in Kenya.	Advocacy efforts and local connections make them a potential partner for BSI.
M-Shule	A Kenyan edtech company, M-Shule provides personalized learning solutions through mobile technology for primary school students in informal settlements.	Innovative approach and understanding of local education challenges can be valuable to BSI's efforts.

Table 6: Grant opportunities

Organization	Description	Value to BSI
The Global Partnership for Education (GPE) Grants: https://www.globalpartnership.org/funding/how-apply-grants	The GPE provides grants to support education programs in developing countries. These grants aim to increase access to quality education and promote inclusive learning.	Deep understanding of informal settlements in Kenya, making them a valuable partner for BSI.
The United Nations Development Programme (UNDP) Grants: https://www.undp.org/content/undp/en/home/ourwork/funding/grants.html.	The UNDP provides grants to support sustainable development initiatives, including education, in developing countries.	Knowledge of the local education context and commitment to quality education can benefit BSI's efforts.
The USAID Education Grants: https://www.usaid.gov/education/grants.	USAID provides grants to support education programs in developing countries. These grants aim to improve access to quality education and promote literacy.	Focus on capacity building and local context can benefit BSI's initiatives.
The W.K. Kellogg Foundation Grants: https://www.wkkf.org/grants/	The W.K. Kellogg Foundation provides grants to support social change initiatives, including education, in underserved communities.	Innovative education models and local presence make them a potential partner for BSI.
The Mastercard Foundation Grants: https://mastercardfdn.org/our-work/where-we-work-in-africa/kenya/	The Mastercard Foundation provides grants to support education and youth empowerment initiatives in Africa.	Grassroots approach and knowledge of local communities can provide valuable insights for BSI's work in informal settlements.
The Open Society Foundations Grants: https://www.opensocietyfoundations.org/grants	The Open Society Foundations provides grants to support social justice initiatives, including education, in developing countries.	Advocacy efforts and local connections make them a potential partner for BSI.
The Children's Investment Fund Foundation (CIFF) Grants: https://ciff.org/grants/	The CIFF provides grants to support initiatives that aim to transform the lives of children in developing countries, including education.	Innovative approach and understanding of local education challenges can be valuable to BSI's efforts.

The Ford Foundation Grants: https://www.fordfoundation.org/work/our-grants/	The Ford Foundation provides grants to support social justice initiatives, including education, in developing countries.	A commitment to social justice and education in developing countries aligns with BSI's objectives, making them a potential partner for funding and networking.
The IKEA Foundation Grants: https://www.ikeafoundation.org/grants/	The IKEA Foundation provides grants to support programs that promote the well-being of children in developing countries, including education.	Focus on children's well-being and education in developing countries is in line with BSI's mission, making them a potential source of funding and a valuable partner for BSI.
Lego Foundation: https://education.lego.com/en-gb/grants-and-funding	The Lego Foundation promotes learning through play by supporting various initiatives, partnerships, research, and policies that aim to transform education and empower children worldwide.	Emphasis on innovative, inclusive education can complement BSI's approach and provide funding opportunities as well as valuable insights for developing and implementing high-quality teacher professional development programs in Kibera.

Table 7: Conferences and events

Conference	Value to BSI
eLearning Africa (attend or present): This is the largest gathering of eLearning and ICT-supported education and training professionals in Africa. It brings together policymakers, regulators, education professionals, and ICT experts to discuss how technology can be harnessed to improve education and training outcomes. The conference features keynote speakers, workshops, and interactive sessions, providing a platform to share knowledge and experiences on the latest trends, technologies, and solutions in eLearning. (https://ela-newsportal.com/)	Attending eLearning Africa offers BSI a chance to learn from and connect with other education professionals who are leveraging technology to improve educational outcomes in Africa. By presenting their work, BSI can showcase their innovative approaches in informal settlements, fostering potential partnerships, and gaining valuable feedback from experts in the field. Additionally, this conference can help BSI stay informed about emerging trends and best practices in eLearning and ICT-supported education.
African Education Week (attend or present): A conference that brings together educators, policymakers, and other stakeholders to discuss challenges and solutions in African education. (https://www.educationweek.co.za/)	By attending African Education Week, BSI can engage in discussions about challenges and solutions in African education, which can provide valuable insights for improving their own initiatives.
Global Education & Skills Forum (GESF) (attend or present): A conference that brings together leaders from the public, private, and social sectors to discuss solutions to the world's most pressing education challenges. (https://www.educationandskillsforum.org/)	Participating in GESF allows BSI to join a global conversation on education challenges and potential solutions.
World Innovation Summit for Education (WISE) (attend or present): An international initiative that aims to transform education through innovation and collaboration. (https://www.wise-qatar.org/)	WISE offers BSI the opportunity to learn about innovative education practices and connect with like-minded organizations that are focused on transforming education.
Comparative & International Education Society (CIES) Annual Conference (attend or present): A gathering of scholars and practitioners who focus on the cross-cultural study of education. (https://cies2023.org/)	Attending the CIES Annual Conference allows BSI to engage with scholars and practitioners who specialize in cross-cultural education research. By presenting, BSI can contribute to the understanding of education in informal settlements, obtain valuable feedback from experts, and forge connections with organizations committed to improving education outcomes in diverse contexts.

Women Deliver Conference (attend or present): The Women Deliver Conference is a global gathering that brings together thousands of advocates, policymakers, and leaders from around the world to discuss the most pressing issues facing women and girls today. (https://womendeliver.org/conferences/wd2022/)	CFK Africa's BSI program could benefit from attending this conference to learn about the latest research, trends, and initiatives in women's health and empowerment, and to connect with potential partners and funders working in this space.
Education World Forum (attend virtually): A global platform for ministers of education and education leaders to share experiences and discuss emerging issues in education. (https://www.theewf.org/)	Attending the Education World Forum virtually enables BSI to learn from global education leaders and stay informed on emerging issues in education. This platform can provide insights into effective policies and practices that BSI can apply to improve their initiatives in informal settlements.
UNICEF Education Online Forum (attend virtually): An annual online event that brings together educators, policymakers, and development professionals to discuss the latest trends and best practices in education. (https://www.unicef.org/education/eof)	By attending the UNICEF Education Online Forum, BSI can gain insights into the latest trends and best practices in education, particularly those focused on improving education for vulnerable populations. The event also offers networking opportunities with development professionals and potential partners who share BSI's commitment to educational equity.
ASU + GSV Summit (attend virtually): A conference that explores innovation in education and workforce development, with a focus on the intersection of technology and education. (https://www.asugsvsummit.com/)	Attending the ASU + GSV Summit virtually can help BSI explore innovative approaches to education and workforce development, particularly those leveraging technology. These insights can inform BSI's efforts to enhance their programs and maximize their impact in Kibera's informal settlements.
Education Fast Forward (EFF) Summit (attend virtually): A virtual event that brings together global education leaders to discuss key issues and innovations in education. (https://www.effsummit.com/)	Participating in the EFF Summit allows BSI to engage with global education leaders and learn about the latest innovations in education. These insights can inform BSI's strategies to address education challenges in informal settlements and foster the adoption of innovative solutions.
Skoll World Forum (attend virtually): A gathering of social entrepreneurs, activists, and change-makers who are working to create a more equitable and sustainable world. (https://skoll.org/program/skoll-world-forum/)	Attending the Skoll World Forum virtually offers BSI the chance to connect with social entrepreneurs and change-makers who share their mission of promoting equity and sustainability. This event provides a platform for BSI to learn about innovative solutions that can help enhance their initiatives and widen their impact.

Key takeaways & recommendations

Deliverable 1

For survey/questionnaire design, we recommend:
- Keep questionnaires short / remove unnecessary questions (see Table 1)
- Standardize the question format
- Restrict response options
- Keep surveys consistent across schools

For data reporting by coders, we recommend:
- Use only one coder per school
- Train coders to complete surveys

For data management, we recommend:
- Use unique variable names
- Keep variable names consistent across analysis
- Instruct staff on how to digitize data

Deliverable 2

For study design, we recommend:
- Use baseline data to inform intervention targets (e.g., if variability is high or practice is rare, this may be a promising potential target)
- Test as few interventions as possible at one time
- Use an RCT design to test intervention(s), or a quasi-experimental design if RCT not feasible
- Sampling as many schools as possible to increase sensitivity to small changes in attendance. To detect large effects of a single intervention, you will need at least 40 schools (20 intervention; 20 control). To detect small effects, you would need 620 schools (310 intervention; 310 control).

Deliverable 3

For the data collection platform and implementation, we recommend:
- Piloting KoboToolbox as the digital data collection tool.
- Raising awareness among parents, students, and community members about accurate data collection for improving education outcomes.
- Keeping stakeholders informed and encouraging transparency and communication.
- Implementing data privacy protection measures and establish data sharing agreements with partners to monitor trends, compare performance, and identify best practices.
- Encouraging continuous improvement in data collection by using incentives and professional development opportunities.

Deliverable 4

For partnerships and additional funding, we recommend:
- CFK Africa explores partnerships and funding to ensure sustainability and scalability.
- When seeking external partners, consider alignment, expertise, track record, financial stability, reputation, network, geographic reach, and long-term commitment.
- Funding sources include CSR, philanthropic organizations, government grants, crowdfunding, social impact investing, and community fundraising.
- CFK Africa attends events, builds partnerships, and follows up.
- Sharing BSI results is crucial for demonstrating value and effectiveness.

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Appendix 1: Searching literature on Google Scholar

Google Scholar is a search engine that allows you to search for academic literature across a variety of sources (scientific articles, books, conference papers, etc.).
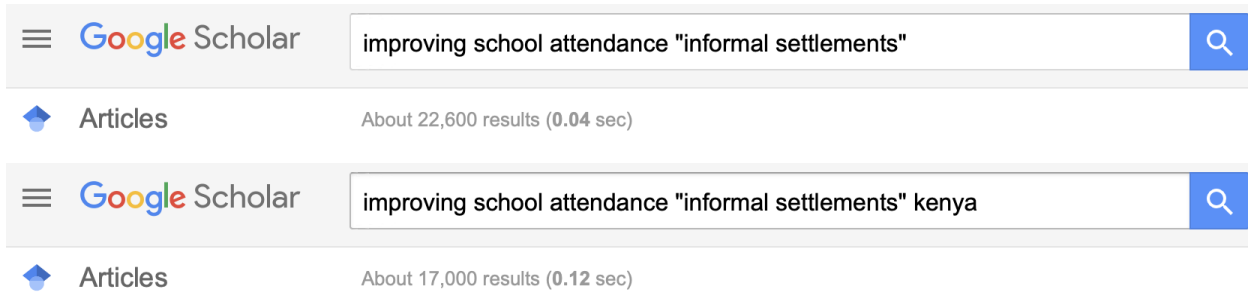
To use Google Scholar:
1. Go to scholar.google.com
2. Enter your search terms in the bar. The more terms you include, the more specific your search will be (and likely the fewer results it will yield.
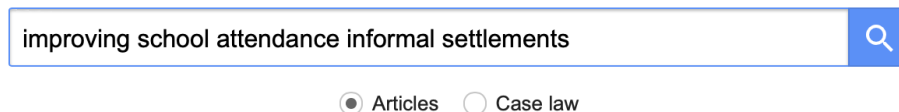
3. Refine your search (if desired) using the tools on the side bar (blue circle below) to limit by date and type of article. You can also refine your search by modifying your search terms if you did not get the results you were hoping for.
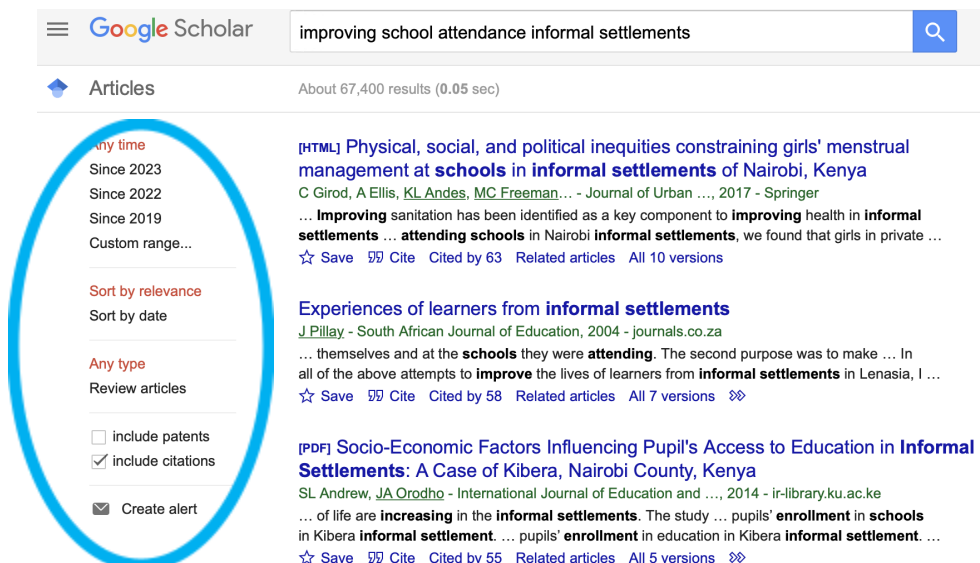
For example, you can use quotations to increase specificity of your findings, or add more terms.

4. Review the results and click on any papers that are of interest to find more information. Sometimes the links will take you to the academic journal page. There, you can read the article abstract and sometimes the full article. Other times, links may take you to a PDF file that you could download, or to an author's personal website.

5. To access the full text of the article:
    a. First check the link to see if the full text is available there. In the example above, you can click on the "Download PDF" (red arrow) to download the full text.
    b. Download directly from a PDF link in the search results.
    c. If the article is not available or is behind a pay wall on the journal site, copy and paste the title and search the title directly (in quotation marks) in google. This may yield alternate sources.
    d. If you still cannot find the full text, email the authors of the article to request a copy (find their email address in the heading of each paper).
6. You can save your search results by clicking the little star next to results.

Google Scholar | improving school attendance informal settlements

Articles | About 67,400 results (**0.05** sec)

Any time
Since 2023
Since 2022
Since 2019
Custom range...

Sort by relevance
Sort by date

Any type
Review articles

☐ include patents
☑ include citations

✉ Create alert

[HTML] **Physical, social, and political inequities constraining girls' menstrual management at schools in informal settlements of Nairobi, Kenya**
C Girod, A Ellis, KL Andes, MC Freeman… - Journal of Urban …, 2017 - Springer
… **Improving** sanitation has been identified as a key component to **improving** health in **informal settlements** … **attending schools** in Nairobi **informal settlements**, we found that girls in private …
☆ Save 🗩 Cite Cited by 63 Related articles All 10 versions

Experiences of learners from informal settlements
J Pillay - South African Journal of Education, 2004 - journals.co.za
… themselves and at the **schools** they were **attending**. The second purpose was to make … In all of the above attempts to **improve** the lives of learners from **informal settlements** in Lenasia, I …
☆ Save 🗩 Cite Cited by 58 Related articles All 7 versions »

[PDF] **Socio-Economic Factors Influencing Pupil's Access to Education in Informal Settlements: A Case of Kibera, Nairobi County, Kenya**
SL Andrew, JA Orodho - International Journal of Education and …, 2014 - ir-library.ku.ac.ke
… of life are **increasing** in the **informal settlements**. The study … pupils' **enrollment** in **schools** in Kibera **informal settlement**. … pupils' **enrollment** in education in Kibera **informal settlement**. …
☆ Save 🗩 Cite Cited by 55 Related articles All 5 versions »

Appendix 2: KoboToolbox

KoboToolbox allows data collection in multiple ways. Because KoboToolbox is built on the Xform/ODK standards, their forms are compatible with a number of different tools that can be used for data collection.

For **Android** devices, they recommend using Collect Andoid app , which can be downloaded from the Google Play Store and installed on any standard Android phone or tablet. On Android_ https://support.kobotoolbox.org/kobocollect-android.html

> Kobo Collect Android App_After deploying a project, you can go to Form - Collect data, and then select the Android application.
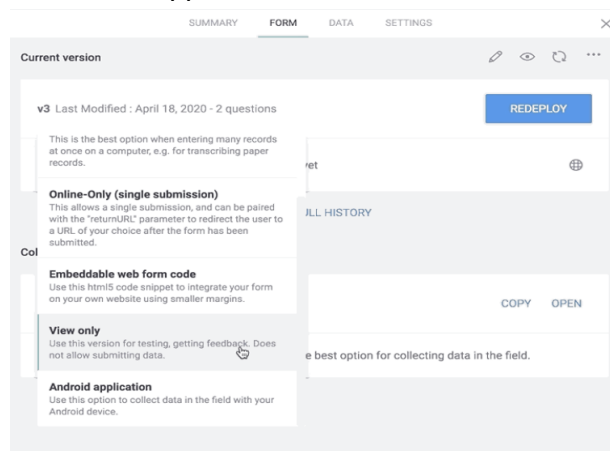
For any **other** devices (including **iPhones**, **iPads**, or any **laptop** or **computer**), they recommend using the webform for collecting data.

> Collecting Data using the Enketo Webform_To use the webform, after deploying a project, you can go to Form - Collect data, multiple options (online or offline, single or multiple submissions) are available. The default option is Online-Offline (multiple submission).

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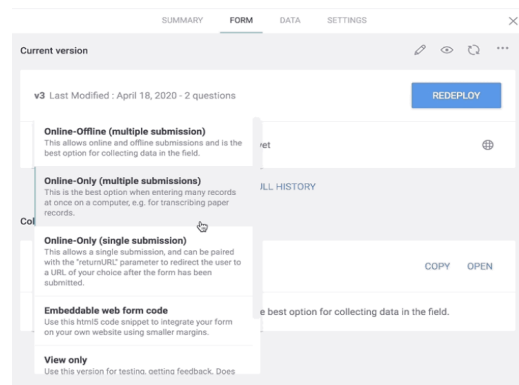
Both the webform and Kobocollect app allow data entry either online or offline.

What CFK Africa needs to do to use Kobo to collect data:
- create an account
- build data entry forms in the platform
- put together data validations rules
- download Kobo Collect on the Android gadgets
- create a server
- deploy the forms

How to create an account on KOBO TOOLBOX

1. Go to https://kf.kobotoolbox.org/accounts/signup/ to sign up for an account if you don't have one.
2. Download KoBo Collect from Playstore/Google store
2. On the application Click on the K on the top right corner.
3. Go to settings and click on Server(Top of List)
5. Type >Kob Toolbox, URL > https://kc.kobotoolbox.org 6
6. Username (Your username used to sign up)
7. Password used to open account.
8. Go back home.
9. Click on Get Blank form and select relevant Forms.
10. On the bottom right corner, click Get selected (Your forms have been downloaded successfully)
11. Go back home.
12. Fill Blank Form(On Top)
13. Select a form to fill in if more than one is on display.

Once you open an account, just share the username with me to be added to people who can submit to the forms.

Appendix 3: Additional data collection platforms

Other solutions explored for CFK Africa's electronic data collection needs

Solution	Description	Comments
Skizza	Skizaa is a powerful offline-data collection platform designed to empower organizations working with rural schools across the Sub-Saharan region. The platform offers efficient and reliable ways to gather beneficiary data, implement real-time data-driven interventions, secure funding, and communicate impact with ease.	Skizza could be an excellent option for CFK Africa due to its focus on the sub-Saharan region and offline capabilities, which can be beneficial in areas with limited internet connectivity. However, it is essential to consider the cost associated with using this platform, which may not be free.
Ona	Ona is a quantitative method for modeling and analyzing how communications, information, decisions and resources flow through an organization. It is used in a variety of fields, including business management and the social and behavioral sciences.	CFK Africa's M&E department uses Ona to collect data. However, this tool may be better suited for organizational analysis rather than data collection at schools. Additionally, the cost of using Ona should be taken into account.
Google Forms	Google Forms is a user-friendly online survey tool that allows users to create and distribute forms and surveys. It integrates with other Google tools such as Sheets, which makes it easy to collect and analyze data.	Google Forms is a free and user-friendly option for CFK Africa. However, it may lack some advanced features and offline capabilities that could be essential. It does not customize the forms to a level necessary for BSI.
SurveyMonkey	SurveyMonkey allows users to create and distribute surveys. The free version includes many basic features, but some advanced features such as skip logic and data exports require a paid subscription.	SurveyMonkey could be a useful tool for CFK Africa, but the free version might not offer all the features needed. This is better to collect qualitative data rather than quantitative data.
Typeform	Typeform allows users to create and distribute surveys and forms. The free version includes many features, but advanced features such as conditional logic and custom branding require a paid subscription.	Typeform offers a visually appealing and user-friendly interface, but like SurveyMonkey, the free version may not provide all the features CFK Africa needs for robust data collection over time.