

CREST Living Lab Documents and Materials

This document contains the main materials that were used to carry out the CREST Living Lab between March 2021 and February 2022.

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Photo Credit: Alex Smith, CREST

MECS eCooking Power Stations

Version no.: 1.1

Date: 5th July 2021

Coordinating author: Dr Marianna Couleantianos

With input from: Dr Anna Clements, Dr Meron Tesfamichael, Dr Jon Leary

With support from many other colleagues, for which we are thankful.

Status: Draft for review by Country Partners

Usage of this material

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MECS eCooking Power Stations Project Summary

The [Modern Energy Cooking Services](#) (MECS) program aims to leverage progress in electricity access in the Global South to drive forward the clean cooking agenda via a range of new electric cooking (eCooking) technologies and business models. eCooking could substantially reduce people's exposure to harmful smoke from burning biomass (e.g. firewood), health effects that mostly impact women and children, and reduce CO2 emissions and deforestation.

The Center for Renewable Energy Systems Technology (CREST) at Loughborough University has designed a set of battery-supported electric cooking devices known as eCooking Power Stations. They are designed to mitigate the unreliability of and lack of access to grid electricity with energy storage. Two models of eCooking Power Station have been designed: a grid-connected battery-supported AC (Alternating Current) model and an off-grid solar DC (Direct Current) model. The eCooking Power Stations are designed to power a range of energy-efficient eCooking appliances, such as rice cookers and Electric Pressure Cookers (EPCs).

This field trial aims to test the viability of energy storage to enable households in off-grid and weak-grid areas to cook with electricity. Specifically, it will test the eCooking Power Stations in households across East Africa to explore their technical performance and user experience in their context of use. It specifically

targets households who currently don't have access to electricity (off-grid) and people who have access to an unreliable grid (weak-grid) with frequent blackouts and/or brownouts (voltage dips) that prevent them from using electricity when they want to cook.

A total of 120 eCooking Power Stations will be field tested in Kenya, Tanzania, and Uganda. The Power Stations will be installed at participants' homes and used as part of their everyday kitchen routines for 4 to 12 months. Their experience will be monitored by enumerators who will conduct regular visits and stay in contact via instant messaging.

Three approaches are used to gather data during this field trial: cooking diaries, a Data Acquisition (DAQ) system and a living lab. The cooking diaries enable households to record their cooking practices and can evaluate the compatibility of the eCooking Power Stations with the way each household cooks. The DAQ system enables the monitoring of system performance and usage patterns by sensing, recording and transmitting a range of technical parameters. The living lab aims to set up a platform for co-creation that can empower participants to co-design the eCooking services they aspire to use.

Terminology

Term	Definition	Alternatives found across documents
Weak-grid / off-grid	Refers to the two sub-groups of participants, each receiving different equipment.	AC / DC Urban / rural (or peri-urban)
eCooking Power Station (short: Power Station)	Big blue box containing the battery system, designed to support cooking appliances, as well as lights/phone charging. Does not include solar panels or appliances, but does include the data acquisition systems.	Cooking Power Station Power station system battery system Power Hub CREST Power Station
Weak-grid or Off-grid Cooking Power Station System	The whole system composed of the eCooking Power Station, cables, monitoring equipment, electric cooking appliances, and where relevant, the solar panel.	MECS CREST Urban AC or Rural DC Battery Back-up Cooking Power Station
Participant code	Unique identifier of a participant.	Participant number
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1 Community engagement

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For example, you might have tentatively identified a village that would be a good fit for the study and have met with local leaders to inform them about the study and asked if they would be interested in the study being rolled out in their community. Future recruitment activities could include asking local leaders for help in identifying potential households and organizing a demonstration of the Cooking Power Station + electric appliance to familiarize people to the system and enable them to make an informed choice about potential participation in the study (i.e., providing potential participants to better assess if they have space in their homes for the system and if they will have security issues, for example).

2 Sampling criteria

2.1.1.1 Must have

Current cooking fuel: Participants should not be cooking with electricity as their main fuel source. Some secondary household electrical appliances are acceptable: motorised equipment (such as a blender, bread maker, fridge); resistive heating appliances **max 1kW rating** (toasters, kettles, hot-plates, hot-rings, beadmakers, rice cookers, work-top oven, mini-grill). **Unacceptable items include any equipment rated at above 1kW input, microwaves, and induction hot plate.** We are specifically interested in targeting participants who currently do not cook with electricity, so we can understand in what ways cooking with electricity could meet their needs. If participants have some electric devices, they might be more interested and excited about using Electric Pressure Cookers, which is why secondary electrical appliances are acceptable. **However, if participants use equipment rated above 1kW, the Cooking Power Station may fail and cause the participants to lose interest because they believe the Power Station to be unreliable. If there is any doubt about whether an appliance is allowed, please assume it is not allowed and if necessary, use a socket/wall power meter to measure the power used by an appliance at the normal mains voltage (230VAC).**

Tier 4 or below (Figure 1): Participants should experience more than 3 disruptions per week to their electricity provision AND more than 2 hours of disruptions per week to their electricity provision. A disruption is an event where the electricity is unstable and prevents normal use of appliances or cut off completely. *Participants who experience few disruptions should be excluded, because they would gain little to no benefit from the Cooking Power Station. We leave it to the discretion of the enumerator to assess whether participants experience enough disruptions to benefit from the Cooking Power Station.*

Literacy: Participants can read and write in the language in which the materials are translated in. *This measure ensures that participants can understand the documents provided to them during the study, including the informed consent and the user manuals, and that participants can collect high quality data about their cooking practice through writing.*

Space: Participant must have a dry place in their home to house the Cooking Power Station, electrical appliances, and monitoring equipment. A physical inspection of the home should determine the technical feasibility of always keeping the Cooking Power Station in a dry place. *It is extremely important that the AC Cooking Power Station be always protected from water from rain and spills. Outdoor cooking areas and semi-enclosed structures are not suitable places for the Cooking Power Station. If the Cooking Power Station or appliances were to suffer water ingress, this could cause damage that prevents the equipment working and will require repair at the workshop.* Clear warnings and guidance are provided in the User Manuals. Organizing a public demonstration of the system that multiple potential participants can attend might help determine if participants are a good fit. Showing potential participants a video of the system and estimating the space the system would take up in their kitchen during recruitment could help participants to assess whether they would have the space.

AC Power Station: 60kg 33x62x67cm (depth x width x height looking at the controls on the front)

AC EPC: whatever is bought, usually c.2kg 30cm cylinder

(For Tanzania and Kenya only) Mobile phone signal: Participant's house has a strong mobile phone signal which allows sending videos reliably via Whatsapp (standard network and mobile data).

2.1.1.2 Nice to have

Main contact person in the household is also the person who cooks the most. The contact person will be responsible for reporting the cooking practices of other members of the household. *This measure will ensure that the person who we train to collect the data, and therefore who will know best how to collect the data, is also the person who cooks the most, which will increase the quality of the data. However, only people 18 years old or older can be enrolled. If the main cook is not an adult, the decision as to whether the household would be a good fit is left to the enumerators and local partners.*

Convenience sampling: Participants live relatively close together in groups of 5, close to the enumerator household, so it is comfortable for enumerators to visit each participant for 30-45 minutes each within one day.

Target participants in Tier 2 and Tier 3, Tier 4 is acceptable (Figure 1). Participants should be regular users of electricity for appliances such as lighting, fans, television, or phone charging. *Because it takes 6 hours to charge the AC Cooking Power Station, participants who have a very unstable grid might have trouble charging the Cooking Power Station and therefore should be avoided as well.*

Sample representative of cooking fuel prevalence in the target region: The sample should, as best as possible, reflect the local prevalence of cooking fuels in the community. For example, if 80% of people cook mainly with charcoal and 20% cook with wood, then the sample of 20 participants should be made up of 16 participants who cook mainly with charcoal and 4 participants who mainly cook with wood. *We want to collect data that is representative of the local population. For example, if we study the transition from LPG to electricity but most people in the region do not use LPG, our results will not be as useful. However, if a few people use LPG in the region, we still want their perspectives included in the trial.*

Excitement: participants are excited to take part in the study. *If participants are excited to take part, then they will be more likely to collect high quality data, to share their experiences broadly, and to be continuously engaged in the study activities throughout the duration of the trial.*

(For Tanzania and Kenya only) Baseline knowledge of smartphone usage: Participant knows how to text & make calls, take pictures and videos, send pictures and videos. At the very least, they have an interest in learning how to use a smartphone and someone in the household can help them learn. *Participants will need to use a smartphone to regularly provide feedback and engage with the enumerator through Whatsapp, including sending pictures and videos.*

		TIER 0	TIER 1	TIER 2	TIER 3	TIER 4	TIER 5
1. Peak Capacity	Power capacity ratings ²⁸ (in W or daily Wh)		Min 3 W Min 12 Wh	Min 50 W Min 200 Wh	Min 200 W Min 1.0 kWh	Min 800 W Min 3.4 kWh	Min 2 kW Min 8.2 kWh
	OR Services		Lighting of 1,000 lmhr/day	Electrical lighting, air circulation, television, and phone charging are possible			
2. Availability (Duration)	Hours per day		Min 4 hrs	Min 4 hrs	Min 8 hrs	Min 16 hrs	Min 23 hrs
	Hours per evening		Min 1 hr	Min 2 hrs	Min 3 hrs	Min 4 hrs	Min 4 hrs
3. Reliability						Max 14 disruptions per week	Max 3 disruptions per week of total duration <2 hrs
4. Quality						Voltage problems do not affect the use of desired appliances	
5. Affordability					Cost of a standard consumption package of 365 kWh/year < 5% of household income		
6. Legality						Bill is paid to the utility, pre-paid card seller, or authorized representative	
7. Health & Safety						Absence of past accidents and perception of high risk in the future	

Figure 1: Description of 6 tiers of energy access (1)

3 Recruitment script

Name of enumerator: _____

Date: _____

Participant basic information

Participant	code:
<p>_____</p> <p><i>The following format is suggested: Country code (KE, TZ or UG) rotation (Rx x=1-3) type (AC/DC) participant number (nn = 1-20 with 21-99 for replacements) e.g. KER2DC20 or TZR1AC01 or UGR3DC35s</i></p>	
Address: _____	
<p><i>Does the participant live relatively close to 4 other participants, close to the enumerator household, so it is comfortable for enumerators to visit all 5 participants for 30-45 minutes within one day?</i></p>	

Before engaging with participants, check the phone signal strength (standard way to be decided by local partners; ideally, signal would allow sending videos via Whatsapp reliably).
If signal is strong enough, proceed.

<p>Hello, my name is _____. I am working on the _____ (an adequate name for the program is left to the discretion of the country partners) project, carried out by SCODE and the University of Loughborough.</p>	
Participant	name:
<p>_____</p>	
<p>The project will last for _____ (4, 6, 12) months, during which we will provide you with a Cooking Power Station and electrical appliances so you can use electricity for cooking purposes in your home, and we will ask you to participate in several study activities so we can understand how that changes your cooking behavior and what you think of e-cooking. Are you interested in participating?</p>	
<p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	
<p><i>If yes, proceed.</i></p>	

Before we take this conversation further, there are a few essential criteria I need to establish:

Do you experience more than 3 disruptions per week to your electricity provision?

A disruption is an event where the electricity is unstable or cut off completely.

- Yes
- No

Do you experience more than 2 hours of disruptions per week to your electricity provision?

A disruption is an event where the electricity is unstable or cut off completely.

- Yes
- No

Participants who have very stable electricity would gain little to no benefit from the Cooking Power Station. If yes to both of the previous two questions, proceed.

What do you currently use electricity for?

Examples include lighting, fans, television, phone charging.

Current electricity usage:

If the participant uses electricity for at least one activity, proceed.

What fuel(s) do you currently use for cooking?

Participants should not be cooking with electricity as their main fuel source, fuel stacking is acceptable.

Primary fuel:

Secondary fuel(s):

If electricity is not the primary fuel, proceed.

Do you have any electric cooking appliances?

*Some electrical appliances are acceptable: motorized equipment (such as a blender, bread maker, fridge); resistive heating appliances **max 1kW rating** (toasters, kettles, hot-plates, hot-rings, beadmakers, rice cookers, work-top oven, mini-grill). **Unacceptable items include any equipment rated at above 1kW, microwaves, and induction hot plate.***

List electric cooking appliances used:

If no electric pressure cooker is currently being used, proceed

Do you have the space to have a large Cooking Power Station and new electrical cooking appliance in a dry place in your home for _____ (4, 6, or 12) months?

Describe the size and weight of the Cooking Power Stations and cooking appliances and confirm with participant where these might go. Visually confirm that there is enough space.

Remind participants that should the Cooking Power Station become exposed to water, it will stop working and need to be returned to the partners for repair. Also, it could become very dangerous.

- Yes
- No

If yes, proceed.

We have determined that you meet the eligibility criteria for this study.

The project will involve us monitoring your energy use for cooking, including electricity, LPG, charcoal, wood, and kerosene. We also want to understand your cooking practices and preferences to see if cooking with electricity would work for you and if you like it. There are a variety of activities that we would want you to participate in, including:

- Setting up the Cooking Power Station and electric cooking appliances in your home;
- Training you to use the appliances and the Cooking Power Station;
- Record your cooking habits on specific days so we can capture your cooking habits;
- Visiting you in your home for you to tell us about using it;
- Ask you questions about what and why you do things;
- **(For Tanzania and Kenya)** Regularly (daily) communicate with you via WhatsApp about your experiences cooking with electricity;
- **(For Tanzania and Kenya)** We may ask you to participate in workshops if you are interested.

As you can see, there are several different tasks and activities to the project. You will always be, at any stage of the project, free to choose not to take part in any new activities and to leave at any time without any negative impacts, but we're really keen for you to continue so we'll try very hard to resolve any problems you have.

We will be providing you with other incentives to participate, which include ... **(to be confirmed)**. Unfortunately, the Cooking Power Stations we will be lending you are research devices and are not necessarily in fit state or ready for long term use. There will be no support after the pilot phase for them to be maintained and repaired. Even after a few weeks, we may find that it has stopped working for a reason, that is what we are trying to understand. That is the nature of the testing of the new device. Therefore, we cannot leave them in your home after the pilot ends, and we will be taking them back.

That is a very brief summary of what is involved in the _____ project. Do you have any immediate questions you would like to ask?

Are you still interested in finding out more about the project?

Yes
 No

If yes, proceed.

Thank you! We would like to collect a few additional details about you and your household, could you answer a few more questions?

Telephone _____ number: _____

Name & telephone of someone else in household or close friend/neighbor:

(For Tanzania and Kenya only) Are you comfortable using a smartphone?
Texting, calling, taking pictures and videos, sending pictures and videos) – ask for a quick demo if necessary.

Yes
 No

If yes, skip next two questions and proceed.

If the answer was NO to previous question

(For Tanzania and Kenya only) Are you interested in learning to use a smartphone?

Yes
 No

If yes, proceed.

(For Tanzania and Kenya only) Do you have someone in the household who knows how to use a smartphone and can help you learn?

Yes
 No

If yes, proceed.

Do you agree that you will not tamper with the equipment beyond what the user manual describes as normal use?
Enumerators can highlight that this is a safety issue.

Yes
 No

If yes, proceed.

What is your preferred way of communicating to confirm our next visit?
(Text or phone call, what is a good time of day to call)

Response:

Why are you interested in participating?

Record a qualitative answer & perform a gut check about whether this participant would be a good fit.

Response:

To be filled out by the enumerator:

Are there any specific reasons why this person should not become a participant? (e.g., safety concerns, uncomfortable...)

Are there any specific reasons why this person should become a participant? (e.g., really excited)

I will now walk you through the details of the study to make sure you have all the information.

Read through the participant information sheet for the informed consent. Answer any questions they have. If they are still interested in participating:

I will leave the participant booklet and informed consent form with you. In a few days, I will reach out to confirm that you still want to participate, and I will come collect the informed consent document. Then, we will schedule a time to have the system installed in your home.

Leave the participant booklet and consent form and tell them to be in touch when they decide if they want to participate. Follow-up with them at least a day later (to leave them enough time to re-read the participant information sheet and decide if they want to participate).

4 Safety protocol

How can we keep the enumerators and participants safe during home visits?

Recommendations for enumerators and other researchers engaging in fieldwork.

- Make sure local authorities are aware of the study happening and are supportive of it.
- Avoid dealing with children alone.
- Refuse to enter houses where people are intoxicated / aggressive.
- Do not enter a house if you feel unsafe for any reason.
- Ask in advance who will be home if you so wish, go in pairs if more comfortable.
- Always have a charged phone when visiting participants (maybe have an external battery with you as well), have phone credits.
- Have emergency money for a taxi to leave quickly if needed.
- Avoid working at night.



Photo Credit: Alex Smith, CREST

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2.1.1.1 Must have

Current cooking fuel: Participants should not be cooking with electricity as their main fuel source. *We are specifically interested in targeting participants who currently do not cook with electricity, so we can understand if cooking with electricity could meet their needs. If participants have some electric devices, they might be more interested and excited about using Electric Pressure Cookers, which is why secondary electrical appliances are acceptable.*

Technical feasibility of installing and maintaining a solar panel: a physical inspection of the home should determine the technical feasibility of installing the solar system, through a checklist. *Participants must have control over an outdoor space to erect a 2m*1m panel in a suitable location free from shading and will need to be responsible for the security of the panel. More detailed requirements for mounting the panel are left to the Country Partners.*

Literacy: Participants can read and write in the language in which the materials are translated in. *This measure ensures that participants can understand the documents provided to them during the study, including the informed consent and the user manuals, and that participants can collect high quality data about their cooking practice through writing.*

Space: Participant must have space in a dry place in their home or cooking area to house the Cooking Power Station, electrical appliances, and monitoring equipment. While indoor spaces are preferable, cooking in semi-enclosed structures used as outdoor kitchens protected may be acceptable if they are protected by a roof and the structure can prevent rain from reaching the Cooking Power Station or if the Cooking Power Station can be stored indoors when not in use and when raining. *The Cooking Power Station and appliances are not waterproof and therefore should*

not be exposed to water, in the same way that a smartphone that is not waterproof should not be exposed to water. Clear warnings and guidance are provided in the User Manuals, only the solar panel and wiring are designed to be left outside. Organizing a public demonstration of the system that multiple potential participants can attend might help determine if participants are a good fit. Showing potential participants a video of the system and estimating the space the system would take up in their kitchen during recruitment could help participants to assess whether they would have the space.

DC Power Station: 30kg 62x26x35cm

Solar panel: 21kg 1m x 2m x 40mm 360Wp

Hot plate: 1.2 kg 23cm x 4.5cm high, nominally 20A, cable length 110cm.

Rice cooker: 2.1kg nominal 3 litre, nominal 10A, 25cm cylinder, cable 110cm.

(For Tanzania and Kenya only) Mobile phone signal: Participant's house has a strong mobile phone signal which allows sending videos reliably via Whatsapp (standard network and mobile data).

2.1.1.2 *Nice to have*

Main contact person in the household is also the person who cooks the most. The contact person will be responsible for reporting the cooking practices of other members of the household. *This measure will ensure that the person who we train to collect the data, and therefore who will know best how to collect the data, is also the person who cooks the most, which will increase the quality of the data. However, only people 18 years old or older can be enrolled. If the main cook is not an adult, the decision as to whether the household would be a good fit is left to the enumerators and local partners.*

Convenience sampling: Participants live relatively close together in groups of 5, close to the enumerator household, *so it is comfortable for enumerators to visit each participant for 30-45 minutes each within one day.*

Sample representative of cooking fuel prevalence in the target region: The sample should, as best as possible, reflect the local prevalence of cooking fuels in the community. For example, if 80% of people cook mainly with charcoal and 20% cook with wood, then the sample of 20 participants should be made up of 16 participants who cook mainly with charcoal and 4 participants who mainly cook with wood. *We want to collect data that is representative of the local population. For example, if we study the transition from LPG to electricity but most people in the region do not use LPG, our results will not be as useful. However, if a few people use LPG in the region, we still want their perspectives included in the trial.*

Excitement: participants are excited to take part in the study. *If participants are excited to take part, then they will be more likely to collect high quality data, to share their experiences broadly, and to be continuously engaged in the study activities throughout the duration of the trial.*

(For Tanzania and Kenya only) Baseline knowledge of smartphone usage: Participant knows how to text & make calls, take pictures and videos, send pictures and videos. At the very least, they have an interest in learning how to use a smartphone and someone in the household can help them learn. *Participants will need to use a smartphone to regularly provide feedback and engage with the enumerator through Whatsapp, including sending pictures and videos.*

3 Recruitment script

Name of enumerator: _____

Date: _____

Participant basic information

Participant	code:
<p>_____</p> <p><i>The following format is suggested: Country code (KE, TZ or UG) rotation (Rx x=1-3) type (AC/DC) participant number (nn = 1-20 with 21-99 for replacements) e.g. KER2DC20 or TZR1AC01 or UGR3DC35</i></p>	
Address: _____	
<p><i>Does the participant live relatively close to 4 other participants, close to the enumerator household, so it is comfortable for enumerators to visit all 5 participants for 30-45 minutes within one day?</i></p>	

Before engaging with participants, check the phone signal strength (standard way to be decided by local partners; ideally, signal would allow sending videos via Whatsapp reliably).
If signal is strong enough, proceed.

Hello, my name is _____. I am working on the _____ (an adequate name for the program is left to the discretion of the country partners) project, carried out by SCODE and the University of Loughborough.

Participant _____ name: _____

The project will last for _____ (4, 6, 12) months, during which we will provide you with a Cooking Power Station and electrical appliances so you can use electricity for cooking purposes in your home, and we will ask you to participate in several study activities so we can understand how that changes your cooking behavior and what you think of e-cooking. Are you interested in participating?

Yes
 No

If yes, proceed.

Before we take this conversation further, there are a few essential criteria I need to establish:

Can you ensure the solar panel will be secure?

- Yes
- No

What are measures in place to ensure the panels will be secure:

If satisfactory measures, proceed.

What fuel(s) do you currently use for cooking?

Participants should not be cooking with electricity as their main OR secondary fuel source.

Primary fuel:

Secondary fuel(s):

If electricity is neither a primary nor a secondary fuel, proceed.

Do you own and use any electric cooking appliances?

- Yes
- No

If no, proceed.

Do you have the space to have a large Cooking Power Station and new electrical cooking appliance in a dry place in your home for _____ (4, 6, or 12) months?

Describe the size and weight of the Cooking Power Stations and cooking appliances and confirm with participant where these might go. Visually confirm that there is enough space. Remind participants that in the same way a smartphone shouldn't be exposed to water, the Cooking Power Station shouldn't either.

- Yes
- No

If yes, proceed.

We have determined that you meet the eligibility criteria for this study.

The project will involve us monitoring your energy use for cooking, including electricity, LPG, charcoal, wood, and kerosene. We also want to understand your cooking practices and

preferences to see if cooking with electricity would work for you and if you like it. There are a variety of activities that we would want you to participate in, including:

- Setting up the solar panel, Cooking Power Station and electric cooking appliances in your home;
- Training you to use the appliances and the Cooking Power Station;
- Record your cooking habits on specific days so we can capture your cooking habits;
- Visiting you in your home for you to tell us about using it;
- Ask you questions about what and why you do things;
- **(For Tanzania and Kenya)** Regularly (daily) communicate with you via WhatsApp about your experiences cooking with electricity;
- **(For Tanzania and Kenya)** We may ask you to participate in workshops if you are interested.

As you can see, there are several different tasks and activities to the project. You will always be, at any stage of the project, free to choose not to take part in any new activities and to leave at any time without any negative impacts, but we're really keen for you to continue so we'll try very hard to resolve any problems you have.

We will be providing you with other incentives to participate, which include ... **(to be confirmed)**. Unfortunately, the Cooking Power Stations we will be lending you are research devices and are not necessarily in fit state or ready for long term use. There will be no support after the pilot phase for them to be maintained and repaired. Even after a few weeks, we may find that it has stopped working for a reason, that is what we are trying to understand. That is the nature of the testing of the new device. Therefore, we cannot leave them in your home after the pilot ends, and we will be taking them back.

That is a very brief summary of what is involved in the _____ project. Do you have any immediate questions you would like to ask?

Are you still interested in finding out more about the project?

- Yes
- No

If yes, proceed.

Thank you! We would like to collect a few additional details about you and your household, could you answer a few more questions?

Telephone _____ number:

Name & telephone of someone else in household or close friend/neighbor:

(For Tanzania and Kenya only) Are you comfortable using a smartphone?

Texting, calling, taking pictures and videos, sending pictures and videos) – ask for a quick demo if necessary.

- Yes
- No

If yes, skip next two questions and proceed.

If the answer was NO to previous question

(For Tanzania and Kenya only) Are you interested in learning to use a smartphone?

- Yes
- No

If yes, proceed.

(For Tanzania and Kenya only) Do you have someone in the household who knows how to use a smartphone and can help you learn?

- Yes
- No

If yes, proceed.

Do you agree that you will not tamper with the equipment beyond what the user manual describes as normal use?

Enumerators can highlight that this is a safety issue.

- Yes
- No

If yes, proceed.

What is your preferred way of communicating to confirm our next visit?

(Text or phone call, what is a good time of day to call)

Response:

Why are you interested in participating?

Record a qualitative answer & perform a gut check about whether this participant would be a good fit.

Response:

To be filled out by the enumerator:

Are there any specific reasons why this person should not become a participant? (e.g., safety concerns, uncomfortable...)

Are there any specific reasons why this person should become a participant? (e.g., really excited)

I will now walk you through the details of the study to make sure you have all the information.

Read through the participant information sheet for the informed consent. Answer any questions they have. If they are still interested in participating:

I will leave the participant booklet and informed consent form with you. In a few days, I will reach out to confirm that you still want to participate, and I will come collect the informed consent document. Then, we will schedule a time to have the system installed in your home.

Leave the participant booklet and consent form and tell them to be in touch when they decide if they want to participate. Follow-up with them at least a day later (to leave them enough time to re-read the participant information sheet and decide if they want to participate).

4 Safety protocol

How can we keep the enumerators and participants safe during home visits?

Recommendations for enumerators and other researchers engaging in fieldwork.

- Make sure local authorities are aware of the study happening and are supportive of it.
- Avoid dealing with children alone.
- Refuse to enter houses where people are intoxicated / aggressive.
- Do not enter a house if you feel unsafe for any reason.
- Ask in advance who will be home if you so wish, go in pairs if more comfortable.
- Always have a charged phone when visiting participants (maybe have an external battery with you as well), have phone credits.
- Have emergency money for a taxi to leave quickly if needed.
- Avoid working at night.

Select those that apply

Select those that apply:

- Study involving Human Participants
- Study involving Animals or Animal Cells/Tissues
- Study involving Security Sensitive Material (e.g. online terrorist content or materials)
- New Generic Protocol Proposal - not to be used for one-off studies (select one)
- Study with Existing External Ethical Approval (select one)

There is a separate ethics process for research with [Military Applications or Dual Use Technologies](#). Details are available on our [website](#).

Select one:

- New Study involving Human Participants
- Study covered by existing Generic Protocol
- Secondary data analysis of pre-existing data only

Please refer to the guidance note on [Studies Using Secondary Data or Pre-Existing Data](#) to determine whether a submission is required.

- Module Approval (Staff Only)

Please indicate whether this is a NEW submission or a RESPONSE to feedback from the Sub-Committee?

- This is a NEW submission.
- This is a RESPONSE to Conditional Approval from the Sub-Committee.

You should select 'new submission' unless you are specifically instructed to select that the submission is a response to a Conditional Approval notification from the University's Ethics Sub-Committee (NOT your School).

- Substantial Amendment

Please select 'next' on the left hand side to continue.

Applicant Details

Title	First Name	Surname
<input type="text" value="Dr"/>	<input type="text" value="Val"/>	<input type="text" value="Mitchell"/>
Email		
<input type="text" value="v.a.mitchell@lboro.ac.uk"/>		

Applicant's School

School of Design and Creative Arts

School Responsible for Signing Submission

School of Social Sciences and Humanities

Section Responsible for Signing Submission

- Communication and Media
- Geography and Environment
- Humanities
- Politics and International Studies
- Social and Policy Studies

Applicant's Position

Staff

Are you the Responsible Investigator

- Yes
- No

Please select 'next' on the left hand side to continue.

Responsible Investigator Details

Responsible Investigator/Project Supervisor Details (* = mandatory fields)

For all student projects (undergraduate, postgraduate taught and doctoral) this will be your project supervisor.

Title	First Name*	Surname*
<input type="text" value="Prof"/>	<input type="text" value="Ed"/>	<input type="text" value="Brown"/>
Email*	<input type="text" value="E.D.Brown@lboro.ac.uk"/>	

Responsible Investigator's School

School of Social Sciences and Humanities

I confirm that I have shared this submission with the Responsible Investigator/Project Supervisor to give them read and write access to the form (the 'share' option is available in the Actions on the left hand side).

Tick to confirm this form has been shared.

Please select 'next' on the left hand side to continue.

Additional Loughborough University Investigator Details

Are there any additional Loughborough University investigators (any other students or academic staff involved in the study)?

Yes

No

Additional Investigator (* = mandatory fields)

[Redacted]

Title

Dr

[Redacted]

First Name*

Stuart

[Redacted]

Surname*

Cockbill

[Redacted]

Position*

Staff

[Redacted]

Department

[Redacted]

School*

School of Design and Creative Arts

Email*

s.cockbill@lboro.ac.uk

Additional Investigator (* = mandatory fields)

Title

Dr

First Name*

Jon

Surname*

Leary

Position*

Staff

Department

Geography and Environment

School*

School of Social Sciences and Humanities

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Additional Investigator (* = mandatory fields)

Title

Dr

First Name*

Richard

Surname*

Blanchard

Position*

Staff

Department

CREST

School*

School of Mechanical, Electrical and Manufacturing Engineering

Email*

R.E.Blanchard@lboro.ac.uk

Additional Investigator (* = mandatory fields)

Title

Dr

First Name*

Nigel

Surname*

Monk

Position*

Staff

Department

School*

School of Mechanical, Electrical and Manufacturing Engineering

Email*

N.A.Monk2@lboro.ac.uk

Additional Investigator (* = mandatory fields)

Title

Dr

First Name*

Marianna

Surname*

Coulentianos

Position*

Staff

Department

School*

School of Design and Creative Arts

Email*

M.Coulentianos@lboro.ac.uk

External Investigator Details

Are there any investigators from external organisations/institutions e.g. *other universities, sporting bodies, charities, companies*?

Yes

No

Please select 'next' on the left hand side to continue.

Project Title

Project Title

This is the title that will appear in official documents

MECS East Africa Battery-eCooking Field Trial (CREST Pilots & SD4MECS)

Project Short Title or Non-specialist Title

This is the title that will appear in all participant documents

MECS East Africa Battery-eCooking Pilots

Project Summary

Brief Summary of Project (100 words maximum)

In everyday language please provide a brief description of the study.

A total of 120 PowerHubs, consisting of a battery and electric cooking appliances, will be field tested, split evenly between in Kenya, Tanzania, and Uganda. The PowerHubs will be installed at participants' homes. Participants will undergo training to use the appliances. For 4 to 12 months, participants will use the PowerHubs in their cooking practice. Their experience will be monitored by enumerators who will conduct regular visits and stay in contact via instant messaging. Several workshops will be organized with participants to learn about their experiences and co-create ideal electric cooking services to increase uptake of e-cooking in their communities.

Does your study involve online questionnaires?

- Yes
- No

Project Dates

No research activity (including recruitment) should be undertaken until a favourable decision has been received.

Proposed Start Date

End Date

Project Location

Will Loughborough University investigators be located solely in the UK while conducting the study?

- Yes
- No

Will participants be located solely in the UK?

- Yes
- No

Please select participants' locations:

Kenya

For any research conducted outside the United Kingdom the researcher is responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Please upload copies of relevant approvals in the documents section of the form.

Please select participants' locations:

United Republic of Tanzania

For any research conducted outside the United Kingdom the researcher is responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Please upload copies of relevant approvals in the documents section of the form.

Please select participants' locations:

Uganda

For any research conducted outside the United Kingdom the researcher is responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Please upload copies of relevant approvals in the documents section of the form.

Data Protection Regulations

If you are collecting identifiable Personal Information or Sensitive Personal Information, what is the legal basis for processing 'personal information' for your study?

'Personal information' is data relating to living people from which they can be identified (directly or indirectly). This includes but is not limited to names, contact details, photos/videos, email addresses, social networking posts, unique identifiers.

'Sensitive personal information' includes but is not limited to identifiable data about health, political opinions, religious beliefs, sexual orientation, or genetic or biometric data that is uniquely identifying.

For further details see the [Guidance Note on Data Protection Requirements](#).

- Public Task (e.g. interviews)
- Legitimate Interest (commercially funded)
- Not Applicable (e.g. fully anonymous questionnaires/observations)

Please select 'next' on the left hand side to continue.

NHS Ethical Review

Does your research involve direct recruitment of NHS patients or staff or the use of NHS data, premises or equipment or recruitment of patients from the National Centre for Sport and Exercise Medicine (NCSEM)?

Yes

No

Please select 'next' on the left hand side to continue.

Section A

Section A - please tick all that apply

- A1 - Does your research involve participants who are knowingly recruited from vulnerable groups? For example, but not limited to, children under 18 years of age, pregnant women, prisoners/detained persons, persons lacking mental capacity to making an informed decision for themselves, adults in care homes, adults who are vulnerable because of their social, psychological or medical circumstances, other vulnerable group.
- A2 - Is your study being carried out overseas by investigators travelling to (or being present in) a country or area deemed to be high or very high risk by the insurers or the Foreign and Commonwealth Office?
- A3 - Does your research involve participants who are outside of the UK that will be exposed to increased physical, emotional or cultural risk because of taking part in your study?
- A4 - Does your research involve participants taking part without their written informed consent (or without parental consent for under 18 year olds)?
- A5 - Does your research involve intentional deception of participants?
- A6 - Does your research include the observation or recording of participants without their knowledge?
- A7 - Will it be necessary for participants to take part without their knowledge and consent at the time or without being informed of objectives of the study or the use of the data collected?
- A8 - Does the proposed study involve the administration of over-the-counter or prescription medicines or drugs, placebos or other substances (e.g. food substances, vitamins) to the research participants?
- A9 - Does the proposed study involve the testing of non-CE marked medical equipment/devices or a medical device which has been modified or is being used outside of its CE marked intended purpose?
- A10 - Does the proposed study involve intake of compounds additional to daily diet, or other dietary manipulation/supplementation or topical application (e.g. to the skin) of substances that could be irritants?
- A11 - Does the proposed study involve the collection of bodily samples from participants?
- A12 - Will your research involve procedures which are physically invasive, e.g. the collection of bodily secretions by physically invasive methods?
- A13 - Is your research designed to be challenging physically or psychologically in any way (includes any study involving physical exercise/activity)?
- A14 - Does your research expose INVESTIGATORS to risks or distress greater than those encountered in their normal lifestyle?
- A15 - Does your research expose PARTICIPANTS to risks or distress greater than those encountered in their normal lifestyle? For example, does it involve discussion of sensitive topics (e.g. sexual activity, drug use, illegal activities), the recall of distressing experiences, or procedures which could cause physical, psychological, social or emotional distress to participants?
- A16 - Does the proposed study involve any process that would:
- involve an **MRI scan**
 - affect **contraception** or assist/alter the process of **conception**?
 - involve the use of **radiation**? (Please refer to published [guidelines](#) and contact the University's Radiological Protection Officer before beginning any study which exposes participants to ionising radiation)
 - involve the use of **hazardous materials**? (Please refer to [guidelines](#) published on using hazardous materials)
 - involve **genetic engineering**?
 - involve analysis of DNA from bodily material or acellular material without consent?
- A17 - Will your research involve the sharing or use of data or personal information, including transcripts and video/audio recording of participants, beyond the initial consent given?
- A18 - Will your research involve sharing participant's IDENTIFIABLE personal information (such as contact details or identifiable results etc.) with third parties e.g individuals or organisations who are not researchers on the study?
- NONE OF THE ABOVE

Please select 'next' on the left hand side to continue.

Section B

Section B - please tick all that apply

- B1 - Does your study involve participants who are under the direct authority of investigators (e.g. academic staff directly recruiting their students as participants, sports coaches recruiting his/her athletes in training, school teachers recruiting their pupils)?
- B2 - Does your study involve any incentives, reimbursements or payments being offered to the PARTICIPANTS?

Please refer to our guidance on [Incentives](#).

- B3 - Does your study involve any incentives, reimbursements or payments (additional to salary) being offered to the INVESTIGATOR(S) to conduct the study? Do investigators stand to gain from particular conclusions of the study?
- B4 - Does your proposed study involve testing of new non-medical equipment/product/prototype? (excluding non-mechanical/non-electrical prototypes made from paper, cardboard, modelling clay or blue foam.)
- B5 - If your study involves working alone with participants or visiting them at home, will any of your procedures conflict with the guidance and recommendations given in the Guidance Note on Conducting Interviews off Campus and Working Alone.

Refer to our guidance note on [Conducting Interviews off Campus and Working Alone](#).

- B6 - Will your study involve administrative or secure data that requires permission from the appropriate authorities before use?
- B7 - Will your study involve collecting personal information or sensitive personal information using assumed or opt-out consent (e.g. not using explicit written informed consent or parental consent for under 18 year olds)?
- B8 - Will storage of data and personal information conflict with Data Protection legislation or the Guidance Note on Data Collection and Storage?

Refer to our guidance notes on [Data Protection Requirements](#) and [Data Storage](#).

- B9 - Does your study involve the use of bodily samples previously collected with consent for further research?
- B10 - Will your study involve participants being identifiable in the resulting outcomes e.g. name included in published material or identifiable features recognisable in videos or pictures?
- NONE OF THE ABOVE

B1: Additional Information

As you have answered 'yes' to one or more of the questions in section B, please provide further details and explain how this would be addressed.

B2 - Our local partners who will be responsible for implementing the field trial in their respective countries have been asked to recommend suitable incentives for participants who will be recording detailed records of their cooking practices in diaries over the course of 4 to 12 months. These will be designed so that they will not affect cooking practices (for example culinary ingredients) and in proportion to local income levels, based on the estimated time participants will spend each day on the research tasks. Payments will be made pro-rata, on a weekly basis. We are not assessing willingness to pay as part of this study, merely whether these new cooking devices are fundamentally compatible with local cooking practices.

Participants will receive phone minutes to be able to communicate with enumerators via Whatsapp for study purposes. Participants will also receive reimbursement for transportation to a central location to participate in workshops. Participants will be provided with lunch on days where activities exceed 2 hours, which include the onboarding, exit activities, and three workshops during the course of the field trial. The study team deemed it ethical to provide lunch for study activities that could extend during a normal meal time. In addition, we are not conducting research in areas that are flagged as experiencing food insecurity, as the locations of the study are all close to major cities with stable food systems.

Lastly, participants will be invited to take part in a cooking competition at the end of the field trial, for which the winner will receive a prize. The cooking competition is meant to assess participants' skills in cooking with electric appliances and the prize will be determined by our local partners to be appropriate for the local context. We do not anticipate any additional risks to be experienced by participants during this competition as they will be using the same cooking equipment they have been using for the duration of the trial and will have been trained to use it during onboarding.

Details about the country partners are included below:

TaTEDO is a Centre for Sustainable Energy Services committed to facilitating access to sustainable energy services for all in Tanzania; through different approaches depending on a number of factors i.e. social economic and cultural context. The main objective of TaTEDO is Facilitate Improvement of peoples' Livelihoods so as to Contributes to increased Access to Sustainable Energy Services. Estomih Sawe is the Executive Director of TaTEDO and will supervise the field trial implementation in Tanzania. More information about TaTEDO can be found here: <https://www.tatedo.or.tz/who-we-are/about-tatedo>.

SCODE (Sustainable Community Development services) is a community based organization started in the year 1996 whose aim is to enable people in Kenya especially the poor, to improve their quality of life by adopting technologies and approaches that are environmental friendly and contribute towards sustainable development. One of the organization's key programs is the following: Renewable Energy Technologies (RETs) which focuses on the conservation & sustainable utilization of renewable energy resources to reduce Indoor air pollution enhance food security and improve income of both men and women. John Maina is the Director of SCODE and will supervise the field trial implementation in Kenya. More information about SCODE can be found here: <https://social.scode.co.ke/>.

CREEC is a research centre focused on thematic areas of: rural electrification, energy for productive use, energy efficiency, energy for household use, energy testing services and energy entrepreneurship under the two departments: Project engineering and Testing Services. The centre aims at application and adaptation of technologies to the specific Ugandan and local environment with an emphasis on systems with components that can be locally manufactured. CREEC also carries out activities in different renewable energy technologies. Agnes Naluwagga is the Regional Testing and Knowledge Center Coordinator at CREEC and will be the project lead for the trial implementation in Uganda. More information on CREEC can be found at <https://www.creec.or.ug/about/what-we-do/>.

B10 - We would like to use photos and videos to communicate the study outcomes to external audiences. Permission will be sought from participants for use of any photos or videos captured by the study team or by the participants themselves, should they choose to share them with the study team. Permission for photo and video use will be sought on the consent form in addition and separately to consent to participate in the study. Participants names and all other identifiable data collected through interviews, surveys, and cooking diaries will be anonymized, hence, photo and video data will be separated from the other participant data at the end of the data collection period of the field trial.

Please provide details of the product/prototype, what it is intended to do and a description of the testing.

B4 - Under the MECS programme, CREST has developed two pilot battery-supported eCooking systems (AC and DC), called PowerHubs. The products to be tested have been designed and tested in the lab by CREST. The systems are fundamentally a box with batteries and electronic controllers that can store energy and are sized to be able to support a full day's cooking. The DC version is charged by solar PV, and therefore includes solar panels, while the AC version is charged by the grid, with the energy storage designed to mitigate high power draws and blackouts when cooking. The field trial is designed to test the performance of these devices in real-life situations. The devices will therefore be installed in participants' homes, and will be used for 4-12 months. Qualitative and quantitative monitoring data will be collected via enumerators and via sensors on the devices during the period of the trial. This data will be used to evaluate the technical performance of the devices (e.g., energy efficiency, cooking time) and their ability to meet the cooking needs of the participants.

Testing: Each device will be tested by a licensed electrician before being deployed to a participant's house. The testing includes fully unboxing and assembling the components, charging the battery, checking that the monitoring systems are working, performing a test cooking task, and sign off. Upon successful testing, clear signage on the device will indicate on the appliances that the devices have been safety tested.

Installation: Devices will be installed in participant homes by enumerators and when needed, a licensed solar technician.

Participant training: Participants will be trained to use the devices and will be given a user manual for the PowerHubs and recipe book.

Training will include cooking each participant's five most commonly cooked dishes with them using the PowerHub. Enumerators will go through health and safety procedures with participants and go over how to report faults.

Participant support: Participants will be able to contact enumerators via instant messaging during normal working hours to request support on the devices, should they have questions, or should something not function properly. Enumerators will respond to requests through a home visit with an electrician if needed, depending on the urgency and nature of the request for support.

Standard usage: Participants will use the PowerHubs daily to cook their foods, should they desire to. They will record their cooking experiences daily, in a cooking diary. Cooking diary requirements will be relaxed after 3-4 weeks and regular communication with enumerators about their cooking experiences through Whatsapp will be favored instead.

Re-installation: Once the trial ends for a participant, the PowerHub device will be uninstalled and moved into storage to await testing before being re-deployed to a different participant.

A detailed presentation of the prototypes, including visuals, is included as an additional document, titled CREST - Cooking Power Stations introduction and overview ethics committee.

Please select 'next' on the left hand side to continue.

C1(a): Aims and Objectives

Aims and Objectives of the study (200 words maximum)

The aims of this study are to examine the technical performance in real-life use and user experience of battery-augmented electric cooking equipment. Specifically, we are aiming to answer the following questions:

- How will this technology perform in a real life situation, with real cooks? What technical changes are needed in the future to make this product more attractive to everyday cooks?
- How will cooks respond to using the technology? How do they adopt it over time?

In addition, we will be studying the following:

- Are the devices compatible with traditional cooking practices? Could they encourage households to move towards clean energy stack? How to everyday cooks use the devices? What are their preferences for features of the devices? How can we make the devices more desirable and sustainable? What are gender implications of using the device?
- What is the commercial viability of e-cooking (socially, technically, financially viable)?
- How do the batteries perform in a real life setting? How much wear does the battery undergo? What are potential impacts on the grid? When, how, and to what extent is the battery power used?
- What are health impacts of using the device?

C1(b): Lay Summary

Lay or Non-Specialist Summary of Study Background (500 words maximum).

This should be understandable to a non-expert and should not be a description of the study design or methods. In everyday language it should include the reasons for the research, the background to it and why the area is important to investigate. In cases where the use of technical or discipline specific terms is unavoidable please explain their meaning clearly.

The Modern Energy Cooking Services (MECS) program focuses on increasing access to clean energy for cooking with electricity in the Global South. A transition to clean energy sources for cooking could substantially reduce people's exposure to harmful smoke from burning biomass (e.g., wood), health effects that mostly impact women and children, and could reduce CO2 emissions and deforestation, both consequences of biomass-based cooking. The Center for Renewable Energy Systems Technology (CREST) field trial, which is part of the MECS program, specifically targets people who currently don't have access to electricity (off-grid) and people who have access to an unreliable grid (weak-grid) who experience a lot of black-outs and therefore can't reliably use electricity for cooking. The CREST field trial aims to test the potential of two new PowerHubs (each designed for one of the target populations: off-grid and weak-grid) to meet the needs of everyday cooks and facilitate a transition to electricity-based cooking. The PowerHubs consist of a battery system that can be charged by solar panels for off-grid participants or by the grid for weak-grid participants, and which can then power electric cooking appliances such as an electric pressure cooker.

Please select 'next' on the left hand side to continue.

C2(a): Study Method

Description of Study Design and Methodology

In everyday language, please provide an outline of the study in a clear step by step chronological order. It should be clear what each participant will have to do, how many times, and in what order. All of this information should also be included on the Participant Information Sheet.

Recruitment: Participants will be recruited by our local partners through convenience sampling and snowball sampling. Potential participants will be given the information sheet, an enumerator will then go through the sheet, answer any questions, then ask them to contact the enumerator in the next few days if they decide to participate in the study. Participants will then have time to discuss the study with family members and will not feel pressured to sign up right away. Once participants have decided to sign up, a day and time will be confirmed for the onboarding process.

The geographical areas of the study are as follows: Dar es Salaam and Coast Region of Tanzania; Kampala and Jinja, Uganda; Nakuru, Kenya.

Onboarding: At an agreed upon date and time, the enumerator will visit the participant's home, where they will conduct the following activities: participants will partake in an intake survey, they will be trained to record their cooking experiences in a cooking diary provided, they will receive their first week's incentive for participating, the PowerHub system will be installed in their home, they will be trained to use the PowerHub and receive a user manual and cook book, participants will receive phone minutes and will be added to a whatsapp group conversation with other participants and the enumerator, participants will be trained on how to use the Whatsapp group and on the norms of the group. Onboarding activities will take about half a day. Examples of the types of questions asked during the exit survey are provided in the additional document titled "CREST-revised Registration Form Cooking Diaries KE 17_5_18".

Daily study activities for the first few weeks: Participants are expected to record their daily cooking activities and experiences cooking with their traditional cooking methods and/or the PowerHub system in their cooking diaries. A template of a cooking diary is provided in the additional documents, titled "Cooking Diaries - Diary form". The requirements for cooking diaries will be relaxed after 3-4 weeks of using the PowerHub. Participants will be asked to complete the cooking diaries again, once a new electric-cooking appliance is introduced, as well as towards the end of the field trial, so as to capture changes in behavior. Participants are expected to check-in, in person, with the enumerator, at their home, for the first couple of weeks of the trial, to make sure they are recording data appropriately, to make sure the devices are working, and so the enumerator can answer any questions about the PowerHub. These meetings will last no more than 30 minutes and will occur at an agreed upon time between the enumerator and participant.

Daily study activities: Participants are expected to actively participate in Whatsapp group conversations which will be monitored by an enumerator and include around 4 other participants. Participants will be encouraged to cook with the PowerHub system daily but usage of their traditional cooking methods in conjunction is expected.

Additional study activities: Participants will be asked to participate in three co-creation workshops where they will be invited to share their experiences and frustrations with the PowerHub system, and will partake in co-creative activities around different themes.

Workshop 1 will center around imagining the ideal cooking experience; workshop 2 will center around co-creating prototypes to address the current issues they are facing. These prototypes can include better signage on the devices, cooking recipes that are compatible with the devices, promotional materials, or more convenient electric-cooking appliances. Workshop 3 will center around co-designing a service model for electric cooking. Topics such as payment systems, procurement, maintenance and repair, will be addressed to capture the full experience of cooking with electricity.

Participants will also be asked to participate in a mid-point survey.

Exiting activities: On an agreed upon date and time, enumerators will visit participants' homes. Participants will partake in an exit survey, the PowerHubs will be uninstalled from their homes, participants will receive their final incentive, and participants will partake, if they wish to, in the eco-cooking challenge where they will cook a staple dish while trying to use the least amount of electricity possible. A goodbye call will be organized with the Whatsapp group members before the participant is removed from the group. Examples of the types of questions asked during the exit survey are provided in the additional document titled "Cooking Diaries - Exit Interview".

Details of Measurements to be Taken

All measurements and samples to be taken from participants should be included here. Measurements can include interviews, questionnaires, observations and photographic data.

Enumerators will take pictures of the kitchen before and after the PowerHub is set-up, in each participant home. Participants will take part in three surveys: intake, mid-point, and exit surveys, which will be audio recorded and transcribed. Monitoring devices on the batteries and on the electric pressure cookers will collect usage data, such as voltage, current, time of use, power input, and air quality. Participants will fill in cooking diaries which will report their cooking behaviors, including who was the cook, what was cooked, what devices were used, how much time did it take, how much power did it require. Participants will share their experiences through a Whatsapp group: those conversation will be collected as data, including any photos and videos participants choose to share. Enumerators will visit participants' homes daily during the first few weeks of the field trial and will note down their observations related to cooking habits and the PowerHub system. Participants will partake in three co-creative workshops and the ideas generated and feedback collected during those workshops will be recorded through written documents, recorded conversations later transcribed, photos, and videos. All data, excluding pictures and videos, will be subsequently de-identified and any audio recording will be deleted after transcription is completed.

Please provide details of each investigators experience in the methods to be used in this study. For student projects this must include details of the project supervisor's relevant experience.

A short paragraph should be included for each investigator listed.

Dr. Richard Blanchard leads the CREST team, consisting of Dr. Martin Bliss and Dr. Nigel Monk. Dr. Blanchard has been the technical lead for a range of renewable energy projects in the Global South, including the EPSRC/DfID/DECC-funded Solar Nano-grids (SoNG) project. SoNG involved the co-creation of a community solar hub designed to provide access to productive energy services, as well as household battery charging. SoNG founded the partnership between the Kenyan social enterprise, SCODE and Loughborough University, which laid the foundation for our work with SCODE on this research project. Dr. Monk has carried out a comprehensive testing programme for electric cooking appliances under the MECS programme, which has informed the design and testing that he has carried out with Dr. Bliss for the hardware to be used in this field trial.

Prof. Ed Brown is the PI for the MECS programme and has several decades of experience working in international development. He has led a number of major UK government funded research projects, including the SoNG project described above.

Dr. Jon Leary is a Senior Researcher with MECS and has 10 years of experience with energy for development research. He has conducted cooking diary studies in Kenya, Tanzania, Zambia and Myanmar and advised a range of MECS partners to develop similar studies to explore cooking practices in their countries. Dr Leary also recently designed and supported the implementation of a usability testing programme for electric pressure cookers in Kenya, which also used mobile ethnography to establish WhatsApp groups as data collection tools.

Prof. Val Mitchell has over 20 years multidisciplinary research experience specialising in the development of User Centred Design (UCD) and User Experience Design (UX) methodologies for eliciting user requirements for future technologies and services, in particular understanding user needs and requirements for mobile communication products and services. She was Co- I on the recently completed EPSRC funded LEEDR project which explored from an interdisciplinary perspective how energy and media fit into domestic life and identified opportunities to reduce domestic energy demand through innovative use of digital media.

Dr. Stuart Cockbill is a Research Associate on the DICE project and member of the User Centred Design Research Group. Dr. Cockbill has a broad range of research and design expertise, gained throughout his studies and several years of hands-on experience working for a number of small design consultancies and as a freelance designer. Stuart has applied a variety of user centred methods early on in the research and design process, collaborating with end users to identify their needs before developing solutions.

Dr. Marianna Couletianos is a Research Associate on the Service Design for Modern Energy Cooking Services project and has deep expertise in socially-engaged design processes, especially prototyping and stakeholder engagement in the design front-end. Dr. Couletianos has a broad range of research and design expertise and has used various user-centered design methods, including design ethnography (interviews and observations), focus groups, rapid prototyping, ideation and creativity methods, usability testing, surveys, in various studies conducted in Ghana, Thailand, and India.

Do any of the researchers stand to gain from a particular conclusion of the research study or have a conflict of interest in relation to the study?

- Yes
- No

Please select 'next' on the left hand side to continue.

C3(a): Researcher Safety

Are there any potential risks to the researchers in this study?

- Yes
- No

Please select 'next' on the left hand side to continue.

C4(a): Participant Details

Number of Participants to be Recruited per Participant Group and reason for selecting this number

Each country will receive 40 PowerHubs. In Tanzania, the power hubs will be distributed to 40 participant homes for a year in Tanzania. In Uganda, the PowerHubs will be distributed to 40 participants for 6 months, then they will be moved to a new set of participants for another 6 months (80 participants total). In Kenya, the PowerHubs will be placed at participant homes for 4 months, then moved to new participant homes, totalling 120 participants.

We are targeting two population types (off-grid and weak-grid) in three countries. Hence, our target number was 60 participants per country per target group, as is typical in similar field studies. We are limited by the number of PowerHub devices that have been sent to the three different countries, as well as by the budget. For example, the local partners in Tanzania could not support transferring the devices to new participants within the budget limits allocated. We believe the current participant numbers are still adequate for our study, since while we will recruit fewer participants in Tanzania than in Kenya, they will be participants in the study for longer periods of time.

Please give details of Participants.

For instance, age, gender, special interests etc. If there is more than one participant group please give details of each group.

Participants will all be at least 18 years of age and will be the main cooks in their families. We therefore anticipate recruiting a majority of women. Half of recruited participants will be off-grid, meaning they do not currently have access to grid-powered electricity in their homes; and the other half will have a weak-grid connection, meaning their homes have access to grid-powered electricity but their area has regular blackouts and brownouts, during which electricity supply is unstable. The information will be found through public records and confirmed with the participants upon recruitment. Participants will live in peri-urban communities for convenience sampling and ease of travel to workshop locations as well as to facilitate enumerator visits.

How will Participants be selected?

Include the inclusion/exclusion criteria to be used.

Participants have to be legal adults (over 18 years old); have to do most of the cooking in the house (cook over 50% of the meals); have and use a phone which can take pictures, videos, and operate Whatsapp; and be either off-grid or have a weak-grid connection.

How will Participants be recruited?

If an advertisement or forum post is to be used, please attach this in the documents section under 'other'.

Neighborhood areas will be selected by our in-country partners to meet the off-grid and weak-grid criteria, and to be easily accessible by enumerators. Participants will be recruited by our local partners through convenience sampling, snowball sampling, and word of mouth, in those neighborhoods. Should there be any difficulty in recruiting enough participants, we anticipate recruiting participants at neighborhood community locations, such as at the market.

Please state the demand on a Participant's time *including a breakdown of how long each part of the study will take, as well as the total time demand.*

We first detail the total estimated time participants will spend on study activities that they would not normally take part in, if they were not to participate in the study.

Recruitment: 30-60 minutes to go over the information document and answer any questions.

Onboarding (installation, training, intake survey): 4 hours.

Cooking diaries: 1h/day for 6 weeks (in two week increments)

In person check in with enumerator: 30min/day for 2-3 weeks.

Whatsapp group participation: 15min/day.

Workshops: 3 workshops of 3hours each with a half hour commute each way.

Mid-point surveys: 60min.

Exit activities (uninstallation, eco-cooking challenge, exit survey): 4 hours.

Total standard activities for all participants: 58 hours

Total additional time for participants in Kenya (up to 4 months): 21 hours

Total additional time for participants in Uganda (up to 6 months): 31.5 hours

Total additional time for participants in Tanzania (up to 12 months): 63 hours

We now detail the total estimated time participants will spend cooking, which is the activity studied in this field trial. This time would have been spent on cooking regardless of participation in the study. Furthermore, we anticipate time saving if participants choose to use the PowerHub system over their traditional cooking method, which will balance any additional time spent learning to use the PowerHub.

Average time spent per day on cooking: 3 hours (based on prior research conducted on cooking practices, includes boiling water)

Total additional time for participants in Kenya (up to 4 months): 252 hours

Total additional time for participants in Uganda (up to 6 months): 378 hours

Total additional time for participants in Tanzania (up to 12 months): 756 hours

Are there any potential risks to the Participants?

- Yes
- No

What are the potential risks to the Participants?

The risks to potential participants and measures to address these risks are detailed in two attached documents titled: "1010 - GE - MECS East Africa Battery eCooking pilots 2021_03_08" AND "LEON Risk Assessment CREST Battery-eCooking Field Trial SD4MECS". Here, we present a summary of these documents.

The first category of risks involve any potential failures of the various parts of the PowerHub, including the battery, cables, and the electric pressure cooker. Risks involved with the failure of various components of the PowerHub are that participants could be exposed to electrical current or could injure themselves with the devices.

The second risk relates to participants contracting COVID-19 during a group session.

Thirdly, participants and enumerators run the risk of overwhelmed or harassed through Whatsapp communication.

What measures have been put in place to address these risks?

The risks to potential participants and measures to address these risks are detailed in two attached documents titled: "1010 - GE - MECS East Africa Battery eCooking pilots 2021_03_08" AND "LEON Risk Assessment CREST Battery-eCooking Field Trial SD4MECS"

To address the first category of risks linked to the potential failures of the PowerHubs, we have devised strict testing protocol of all PowerHubs before these are deployed in participants' homes, we plan to train participants during onboarding to use the PowerHubs, and we have planned that enumerators visit the participants' home every day for the first few weeks to provide in person support as participants familiarize themselves with the PowerHubs. Furthermore, enumerators will be available to provide support during business hours and in cases of emergency, via Whatsapp, and technicians will be used if needed, to address failures, malfunctions, or other applicable concerns.

To address the risks of contracting COVID-19, we have made all workshops optional in the study, and will have measures in place to ensure social distancing. These include smaller group sizes, distance between seats, the wearing of masks, and the availability of hand sanitizer. We will also ensure these measures are respected when enumerators visit participant homes, and during the installation and de-installation of the PowerHub. Should anyone show symptoms, the activities will be paused until the participant or enumerator has tested negative and/or recovered, following public health guidelines.

Lastly, to address the risk of overwhelm and harassment, participants and enumerators will be given specific guidelines for engaging in Whatsapp groups, including working hours and norms. A zero tolerance policy for harassment will be made clear and participants will be dropped from the study if they do not comply.

C4(b): Control Participants

Will control participants be used in the study?

- Yes
- No

Please select 'next' on the left hand side to continue.

E1: Personal Information

Are you collecting identifiable 'Personal Information' or 'Sensitive Personal Information' as defined under the General Data Protection Regulations?

'Personal information' is data relating to living people from which they can be identified (directly or indirectly). This includes but is not limited to names, contact details, photos/videos, email addresses, social networking posts, unique identifiers.

'Sensitive personal information' includes but is not limited to identifiable data about health, political opinions, religious beliefs, sexual orientation, or genetic or biometric data that is uniquely identifying.

For further details see the [Guidance Note](#).

- Yes
 No

Please give details of the identifiable Personal Information or Sensitive Personal Information that you are collecting and how it will be used in the study.

We plan to record participant names, addresses, phone numbers, bank details for incentive payments. This information will be used by enumerators to engage study participants throughout the study, which includes talking to them regularly via in person visits to their homes and via Whatsapp.

We plan to audio-record participants during the intake, mid-point, and exit surveys to as to capture rich answers to open-ended questions. The recordings will be later transcribed.

We plan to collect pictures and videos of the participants' kitchen, kitchenware, any pictures and videos the participant chooses to share with the study team, and pictures/videos of the workshops. These pictures and videos will be used to fully capture the cooking environment of the participants and their experiences. These will be used as data entry for the study, and a subset may be used for communication of the results, and therefore will be shared to the wider public. At the end of the study, participants will be able to review the pictures in which they appear, and decide to remove any picture or video from the data sample.

Will participants identifiable personal information be stored securely and deleted when no longer required for this study?

- Yes
 No

Please give details of how long personal information will be kept and how it will be stored.

The identifiable information will be deleted once the field trial is completed and all data has been collected for a given participant, at which point the data will be identified by a randomly generated identifier (e.g., P123).

The recording will then be transcribed by the local partner, once the transcription is complete, the audio will be deleted permanently. We anticipate transcription to take up to a year after the completion of the field trial, at which point the audio recordings will be deleted.

Pictures and videos of participants will be stored on a password protected OneDrive folder owned by Prof Ed Brown, will not be shared in any public manner unless explicitly selected for a specific purpose, such as a social media post, a report, a publication, or a policy brief. This data will be deleted after 10 years after the end of the data collection phase.

Will the results of the study be anonymised/de-identified?

- Yes
 No

Please explain why identifiable data/results are not being anonymised/de-identified and give details of how participant's consent is being obtained for use of their personal information in outputs.

The pictures and videos captured will be used to fully capture the cooking environment of the participants and their experiences. These will be used as data entry for the study, and a subset may be used for communication of the results, and therefore will be shared to the wider public. Consent to use pictures and videos will be sought from participants separately from consent to participate.

E2: Data Storage and Security

Will the study include the use of any of the following? Select those that apply

- Observation of participants
- Audio recording
- Video recording
- Photographs of participants (or other identifiable individuals)
- None of the above

Please give details of where the study data/results will be stored and how long it will be retained. If you are sharing data with external partners please explain how it will be securely shared.

The study data and results will be stored on password protected computers operated by the enumerators and managed by our country partners for the duration of the partnership with Loughborough, after which all data pertaining to the study will be removed from their computers. Any paper data will be digitized then destroyed. Data will be stored on a password protected OneDrive folder, which will be shared between the in country partners and the Loughborough research team. Access to the shared folder will be managed by Prof Ed Brown, who will grant access to the data to partnering universities as and when necessary. After the study has completed, fully anonymized datasets (e.g. battery performance, cooking diaries quantitative data) will be made available open access via the University's data repository to accompany research publications.

Please give details of where original hard copies of study documents (interview notes/transcripts/questionnaires/consent forms) will be stored and how long they will be retained)

No original hard copies of study documents will be retained, all will be digitized (including scanning) and original copies will be destroyed.

Will data/results be permanently archived to the University's Research Repository or another repository?

- Yes
- No

Data from undergraduate or taught postgraduate projects is not usually added to the Repository. Please check with your project supervisor if you are unsure.

Will the deposit to the Repository be open or confidential?

- Open
- Confidential

Please select 'next' on the left hand side to continue.

F1: Funding/Sponsorship

Is the study being externally sponsored/funded?

- Yes
- No

Please provide the name and address of the organisation which is sponsoring/funding the study.

Foreign, Commonwealth and Development Office (FCDO), King Charles St, Whitehall, Westminster, London, SW1A 2AH,

F2: Insurance

Who will be insuring the study?

- Loughborough University
- Sponsor/Funder
- Other

Will any part of the study result in unavoidable injury or damage to participants or property?

- Yes
- No

Is the study classed as normal activity?

The University's insurance relates to claims arising out of all normal activities of the University. Insurers should be notified of anything that falls outside the scope of the policy or is taking place outside of the UK.

- Yes
- No

Have you received confirmation of insurance from the Insurance Support Office?

- Yes
- No
- Not applicable - online only (researcher in UK)

Please select 'next' on the left hand side to continue.

Participant Information Sheet

Please upload Participant Information Sheet(s).

Only include the latest version, superseded versions should be deleted.

If your study is an online questionnaire please include the version which will be used within the online form.

Documents					
Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	NEW Participant Information Sheet	NEW Participant Information Sheet.docx	08/04/2021	MJC	44.4 KB

Informed Consent Form

Please upload Informed Consent/Assent Form(s)

DO NOT ATTACH FORMS THAT HAVE BEEN COMPLETED BY PARTICIPANTS. YOU SHOULD NOT RECRUIT UNTIL THE ETHICAL REVIEW IS COMPLETED AND A FAVOURABLE DECISION HAS BEEN ISSUED.

Only include the latest version, superseded versions should be deleted.

If your study is an online questionnaire please include the version which will be used within the online form. Assent Forms for participants who are under 18 years old should also be submitted here.

Documents					
Type	Document Name	File Name	Version Date	Version	Size
Informed Consent Form	UPDATED - Informed Consent MECS EA eCooking Pilot	UPDATED - Informed Consent MECS EA eCooking Pilot.docx	11/04/2021	MJC	39.6 KB

Risk Assessment

Please upload Risk Assessment

You must use the relevant Risk Assessment for your School. Please ensure that you are following the appropriate School process.

Only include the latest version, superseded versions should be deleted.

Documents					
Type	Document Name	File Name	Version Date	Version	Size
Risk Assessment	1010 - GE - MECS East Africa Battery eCooking pilots 2021_03_08	1010 - GE - MECS East Africa Battery eCooking pilots 2021_03_08.docx	08/03/2021	JL SF CB	227.4 KB
Risk Assessment	LEON Risk Assessment CREST Battery-eCooking Field Trial SD4MECS	LEON Risk Assessment CREST Battery-eCooking Field Trial SD4MECS.docx			230.8 KB

Other Documents

Are there any other study documents?

This might include Repeat Visit Forms, Health Screen Questionnaires, Interview Questions, Questionnaires (including demographic questions), Posters etc.

Yes

No

Please upload all other documents

Please DO NOT upload sensitive personal documents such as DBS checks or occupational health records. You will be asked to remove them.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Other Document	Cooking Diaries - Diary form	Cooking Diaries - Diary form.xlsx	08/03/2021	JL	27.7 KB
Other Document	Cooking Diaries - Exit Interview	Cooking Diaries - Exit Interview.docx	08/03/2021	JL	61.0 KB
Other Document	CREST - Cooking Power Stations introduction and overview ethics committee	CREST - Cooking Power Stations introduction and overview ethics committee.pdf	08/04/2021	1	643.0 KB
Other Document	CREST-revised Registration Form Cooking Diaries KE 17_5_18	CREST-revised Registration Form Cooking Diaries KE 17_5_18.docx	08/04/2021	2	8.7 MB

Please select 'next' on the left hand side to continue.

Applicant Signature

Applicant's Signature

I confirm that I have read the Code of Practice on Investigations Involving Human Participants and have accurately completed this application. I understand that the approval will only apply to the activities indicated and will not apply to activities that are undertaken which are beyond the scope of this submission.

Once you have signed the submission you should request the relevant signatures listed below. These can all be requested consecutively (at the same time) or one at a time.

Once all of the signatures are obtained the proposal will automatically be submitted for review.

Responsible Investigator Signature

Responsible Investigator's Signature

For Student Projects this will be your Project Supervisor.

I confirm that I have checked that this application has been completed accurately and reflects the nature of the study. The supporting documentation has been reviewed and is appropriate. I understand that the approval will only apply to the activities indicated and will not apply to activities that are undertaken which are beyond the scope of the submission.

I confirm that the above named study/protocol complies with published codes of conduct, ethical principles and guidelines of professional bodies associated with my research discipline.

MECS East Africa Battery-supported eCooking Pilot Adult Participant Information Sheet

We would like to invite you to take part in our study. Before you decide to participate, we would like you to understand why the research is being done and what it would involve for you. One of our team will go through the information sheet with you and answer any questions you have. Take time to decide whether or not you wish to take part in the study.

What is the purpose of the study?

This study aims to explore the potential for electric cooking appliances to meet the cooking needs of East African households. Specifically, we are exploring if our device can make it cooking with electricity more accessible to households.

Who is doing this research and why?

This project is being designed and supported by Loughborough University and implemented by our local partners (SCODE – Kenya, CREEC – Uganda, TaTEDO – Tanzania). This research is funded by the UK government's Foreign Commonwealth and Development Office (FCDO) under the Modern Energy Cooking Services (MECS) programme.

Why have you been chosen?

You have been chosen because you with don't have access to grid electricity, or you have access to unreliable grid electricity.

What will I be asked to do and where?

As a participant in this study, you will be required to:

- *Use a battery-supported eCooking system at your home for several months, recording what you cook and how in a cooking diary, with the support of an enumerator whose role is to facilitate your participation in the study. Your enumerator will train you on how to use this new cooking device safely and how to record data for the study.*
- *Participate in a WhatsApp group to share your everyday experiences with these new cooking devices. We will provide you with mobile data.*
- *Attend a series of workshops to explore your experiences and collaboratively develop solutions to some of the challenges you may have faced (dependant on local COVID-19 situation).*
- *Participate in interviews (at your home) at the mid-point and end of the study.*

Once I take part, can I change my mind?

After you have read this information and asked any questions you may have, if you are happy to participate we will ask you to complete an Informed Consent Form. However if at any time, before, during or after the sessions you wish to withdraw from the study please contact your assigned enumerator. You can withdraw at any time, for any reason and you will not be asked to explain your reasons for withdrawing. However, once the results of the study are anonymized (expected to be by the end of 2021), it may not be possible to withdraw your individual data from the research.

How long will it take?

The home testing will take place over several months (your enumerator will tell you when your expected finish date will be), however it is expected that the testing will fit around your existing routine. An enumerator will visit once a day to collect data from your household by asking you questions about what you have cooked that day and how. These visits are expected to last an average of 30 mins and will be carried out at time that is convenient for you.

Are there any disadvantages or risks in participating?

The risks you may face are comparable to those when learning to use and regularly using any new electric cooking appliance. To reduce the risk of malfunction of the device, we have implemented a strict testing protocol of each device and the successful passing of the test will be clearly indicated on the device when you receive it. To reduce risks associated with misuse from using a device you are not familiar with, we will train you to use the device and provide ongoing support throughout the duration of the trial, should any questions, concerns, or need for maintenance on the device arise.

What are the possible benefits of participating?

During the study, you will learn to use new electric cooking devices. You will be given many opportunities to provide your feedback on the device, which will influence how the device will be changed. We are especially interested in learning about any potential expenditures and time saving as a result of using the device, as well as any changes to your wellbeing, as reported in your feedback to us.

Data Protection Privacy Notice

Loughborough University will be using information/data from you in order to undertake this study and will act as the data controller for this study. This means that the University is responsible for looking after your information and using it properly.

What personal information will be collected from me and how will it be used?

We will collect the following personal information during the course of the study: name, contact details and for arranging meetings and recording consent. We will also carry out a registration survey to capture basic information about your household and the way you cook.

How long will my personal information be retained?

We will keep identifiable personal information about you for 1 year after the study has finished. The identifiable data will then be destroyed, and nothing will tie you to our results.

Will my personal information be shared with others?

The records from this study will be kept as confidential as possible. Only the local country partners and the research team at Loughborough University will have access to the data collected. Your data will be anonymised – your name and other identifiable information will not be used in any reports or publications resulting from the study. The only identifiable data that will be publicly available will be the edited video/audio footage, which you can choose to opt out of but still participate in the study (see next section on Data Protection Privacy Notice: Pictures and Videos).

How will the anonymised data/results collected from me be used?

The anonymised data/results collected from your household will be retained in the MECS data repository and will be used in reports, journal publications and conference papers. Data that is used in these publications will become available for other researchers via the MECS open access data repository, and additional data will be made available to other researchers upon request. However, only the anonymized data will be shared on the open access data repository and no identifiable information, such as your name and address, will ever be made public or shared with people outside of the research team and local partner.

Data Protection Privacy Notice: Pictures and Videos

Loughborough University will act as the data controller for this data. This means that the University is responsible for looking after your information and using it properly.

What personal information will be collected from me and how will it be used?

The research team will be collecting pictures and videos captured throughout the study. The pictures and videos might include pictures of your home, kitchen utensils, and home cooked meals; of you cooking; and of you participating in a workshop. The pictures and videos might be captured by the research team or be footage that you have chosen to share with our research team via WhatsApp. The research team will be collecting pictures and videos of the study in edited productions to communicate the findings of this research. These communications may include social media posts, reports, academic papers, and policy reports. However, at the end of the study, I will have the opportunity to review the content and ask for any or all pictures or videos to be permanently remove from the study data.

How long will my personal information be retained?

We will keep identifiable personal information about you, in the form of pictures and videos, for up to 10 years after the study has finished.

Will my personal information be shared with others?

Data will be shared with investigators involved with the study, both in your country and in the UK.

Will my taking part in this study be kept confidential?

All data collected from your household will be kept on a password protected shared folder within the research team.

Where will the pictures and videos be retained?

The pictures and videos collected from your household will be retained in the MECS data repository. This data repository can only be accessed by MECS researchers.

I have some more questions; who should I contact?

If you have any concerns or questions regarding the way your data is being used, you may contact the investigators of the study Jon Leary or Marianna Coulentianos, through your enumerator, or directly. Please use the following contact information: (enumerators, write your contact information here)

Investigators Details:

Jon Leary, School of Social Science, j.leary@lboro.ac.uk, +447540449624

Marianna Coulentianos, SDCA, M.Coulentianos@lboro.ac.uk, +17342726770

What if I am not happy with how the research was conducted?

If you are not happy with how the research was conducted, please contact the Secretary of the Ethics Approvals (Human Participants) Sub-Committee on email:

researchpolicy@lboro.ac.uk

The University also has policies relating to Research Misconduct and Whistle Blowing which are available online at <http://www.lboro.ac.uk/committees/ethics-approvals-human-participants/additionalinformation/codesofpractice/> .

If you require any further information regarding the General Data Protection Regulations, please see: <https://www.lboro.ac.uk/privacy/research-privacy/>.

Participant ID: _____

MECS East Africa Battery-supported eCooking Pilot

INFORMED CONSENT FORM

(to be completed after Participant Information Sheet has been read)

Taking Part

Please initial to confirm agreement

The purpose and details of this study have been explained to me. I understand that this study is designed to further scientific knowledge and that all procedures have been approved by the Loughborough University Ethics Approvals (Human Participants) Sub-Committee.

I have read and understood the information sheet and this consent form.

I have had an opportunity to ask questions about my participation.

I understand that taking part in the project may involve being photographed, interviewed and recorded (audio and video).

I understand that taking part in the study has cooking with a new device as a potential risk.

I understand that personal information, such as name, address, contact number and socio-economic data will be collected.

I understand that I am under no obligation to take part in the study, have the right to withdraw from this study at any stage for any reason, and will not be required to explain my reasons for withdrawing.

Use of Information

I understand that all the personal information I provide will be processed in accordance with data protection legislation on the 'public task' basis and will be treated in strict confidence unless (under the statutory obligations of the agencies which the researchers are working with), it is judged that confidentiality will have to be breached for the safety of the participant or others or for audit by regulatory authorities.

I understand that information I provide will be used for publications, reports, web pages and other research outputs.

I understand that personal information collected about me that can identify me, such as my name or where I live, will not be shared beyond the study team.

I agree that information I provide can be quoted anonymously in research outputs.

I give permission for the anonymised data I provide to be deposited in the MECS data repository so that it can be made publicly available for future research at the end of the project.

I agree that anonymous data from this study can be used for other, future research projects that may be unrelated to the aims of this study.

Consent to Participate

I voluntarily agree to take part in this study.

Consent to use video & pictures

I voluntarily agree for any video or picture that I appear in to be used in edited productions to communicate the findings of this research. I understand that these communications may include social media posts, reports, academic papers, and policy reports. I am aware of my right, at the end of the study, to review the content and ask for any picture or video to be remove from the study data.

Name of participant [printed]

Signature

Date

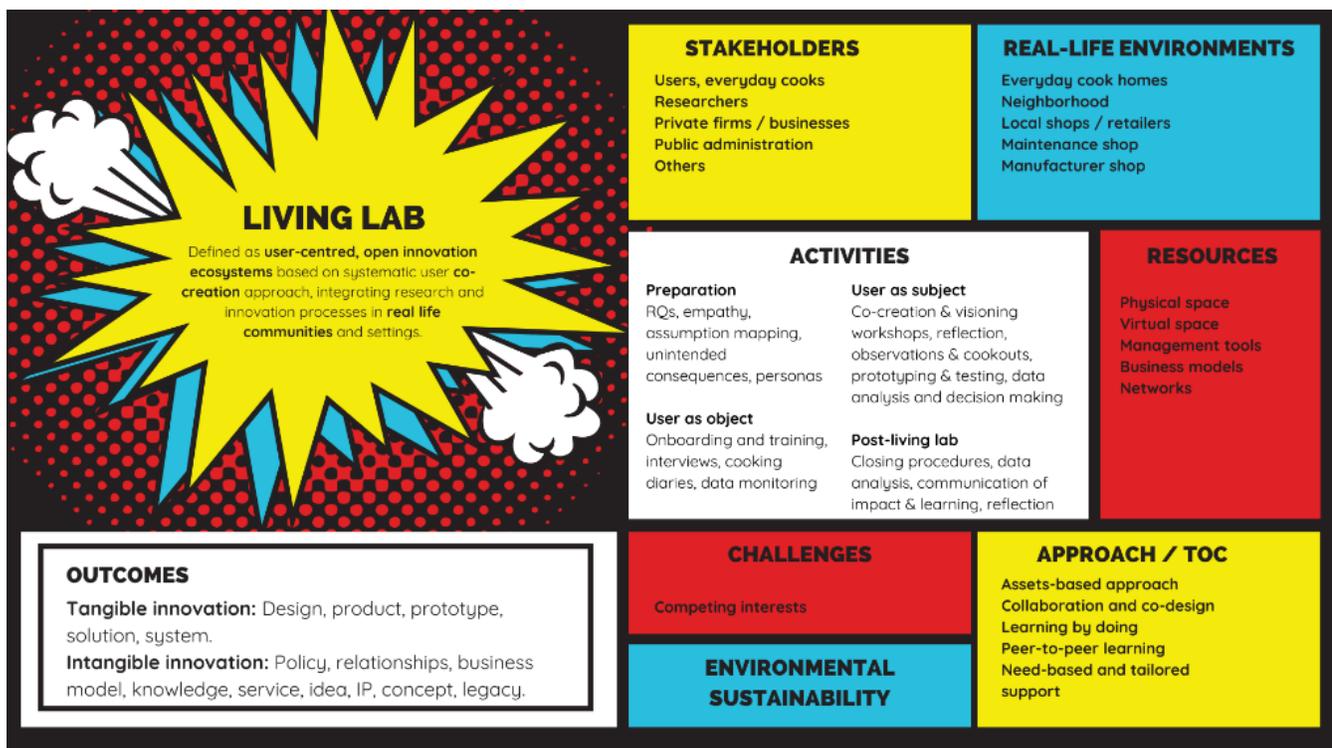
Researcher [printed]

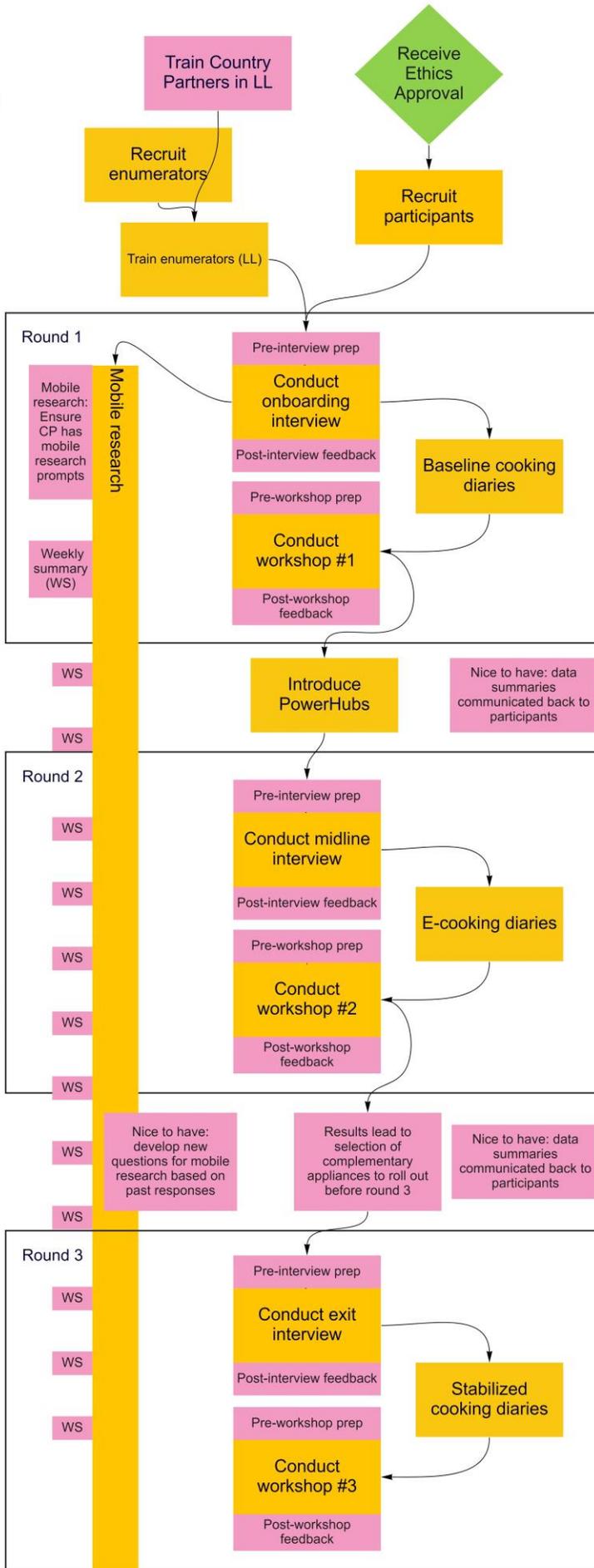
Signature

Date

THE MECS LIVING LAB AIMS TO:

1. ENSURE A POSITIVE AND MEANINGFUL TRIAL EXPERIENCE, IN WHICH PARTICIPANTS FEEL HEARD, ABLE TO LEARN, AND EMPOWERED TO INFLUENCE THE TRIAL AND TRIAL OUTCOMES.
2. MAKE VISIBLE THE COMMUNITY'S SHARED STRENGTHS, BARRIERS, AND PROCESSES FOR CHANGE RELATED TO E-COOKING.
3. ENGAGE USERS AS CO-CREATORS OF AFFORDABLE, RELIABLE AND MODERN ENERGY COOKING SERVICES.





LL / SD4MECS Country Partners

Pre-interview prep
 - Verify that CPs have the translated interview guides
 - Verify that enumerators are trained (provide training materials) & have practiced

Post-interview feedback
 - Gather feedback from enumerators about how it went
 - Prepare a 'retraining' doc to improve enumerator interviewing skills
 - Nice to have: if some data is translated, analyse it

Pre-workshop prep
 - Verify that CPs have the translated workshop guides
 - Train CPs in a practice run of the workshop

Post-workshop feedback
 - Reflection session with team (possibly: cross CP).
 - Feeds into iteration for next implementation

WS Nice to have: data summaries communicated back to participants

WS Nice to have: develop new questions for mobile research based on past responses

WS Results lead to selection of complementary appliances to roll out before round 3

WS Nice to have: data summaries communicated back to participants

Living Lab

Facilitation Guide

THE MECS LIVING LAB AIMS TO:

- 1. ENSURE A POSITIVE AND MEANINGFUL TRIAL EXPERIENCE, IN WHICH PARTICIPANTS FEEL HEARD, ABLE TO LEARN, AND EMPOWERED TO INFLUENCE THE TRIAL AND TRIAL OUTCOMES.**
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- 3. ENGAGE USERS AS CO-CREATORS OF AFFORDABLE, RELIABLE AND MODERN ENERGY COOKING SERVICES.**



LIVING LAB

Defined as **user-centred, open innovation ecosystems** based on systematic user **co-creation** approach, integrating research and innovation processes in **real life communities** and settings.

STAKEHOLDERS

- Everyday cooks
- Enumerators
- Country Partners
- Researchers
- HCD practitioners

REAL-LIFE ENVIRONMENTS

- Everyday cook homes
- Neighborhood
- Local shops / retailers

RESEARCH ACTIVITIES

INTERVIEWS

WORKSHOP/FOCUS GROUP

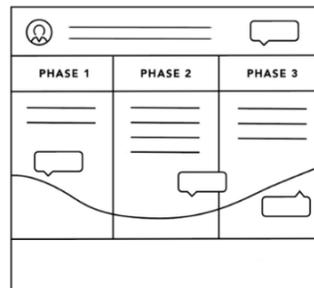
MOBILE RESEARCH

- Testing and iterating methods
- Training and capacity building
- Onboarding and training
- Cooking diaries
- Personas
- Reflection
- Collaborative decision making
- Communication of learning

OUTCOMES

Everyday cook journey maps, including:

- Personas + scenarios + goals
- Phases + user actions, thoughts, emotions
- Opportunities + insights



CHALLENGES

Trial not designed as a Living Lab
Capacity to carry out research activities:

- qualitative data collection,
 - timely translation,
 - collaborative analysis,
 - synthesis
- Competing interests

APPROACH

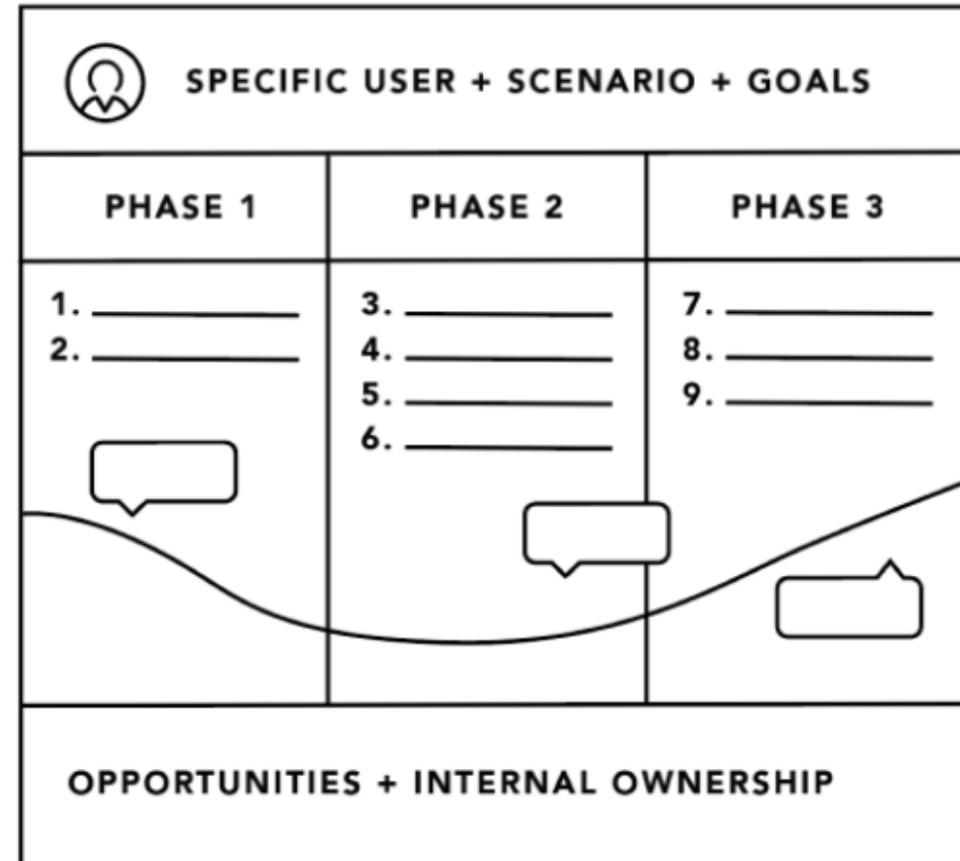
Assets-based approach
Collaboration and co-design
Spectrum of public participation

Living Lab activities will
help us build journey
maps for everyday cooks

Summary: A journey map is a visualization of the process that a person goes through in order to accomplish a goal.

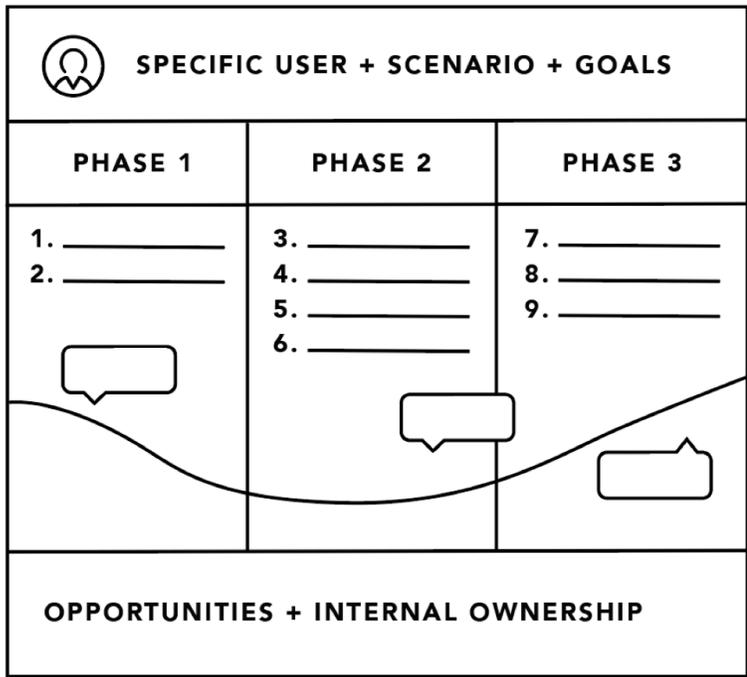
- *At the top, a specific user, a specific scenario, and corresponding expectations or goals*
- *In the middle, high-level phases that are comprised of user actions, thoughts, and emotions*
- *At the bottom, the takeaways: opportunities, insights, and internal ownership.*

CUSTOMER/USER JOURNEY MAP

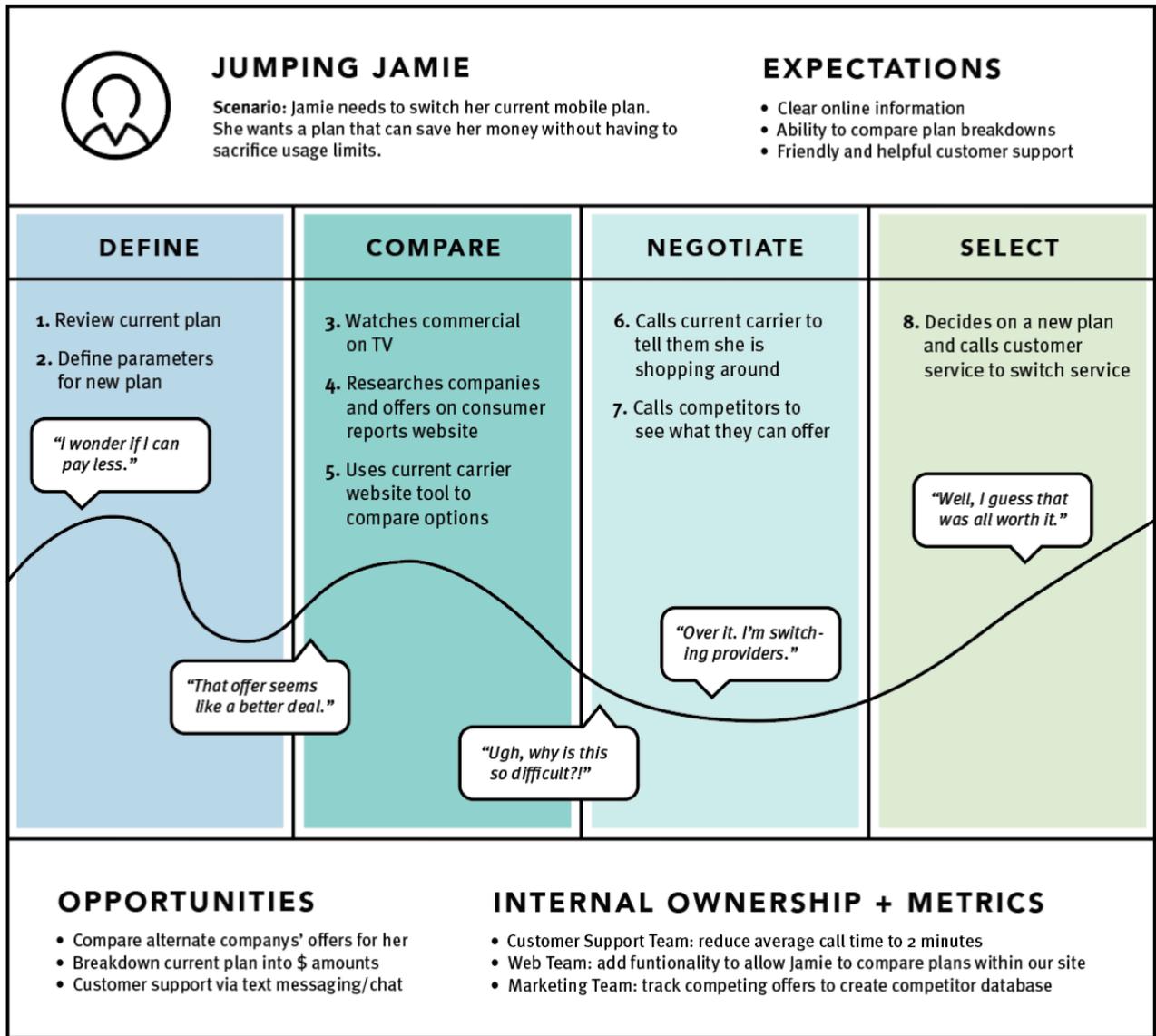


CUSTOMER JOURNEY MAP Example (Switching Mobile Plans)

CUSTOMER/USER JOURNEY MAP



NNGROUP.COM N



Why use journey maps?

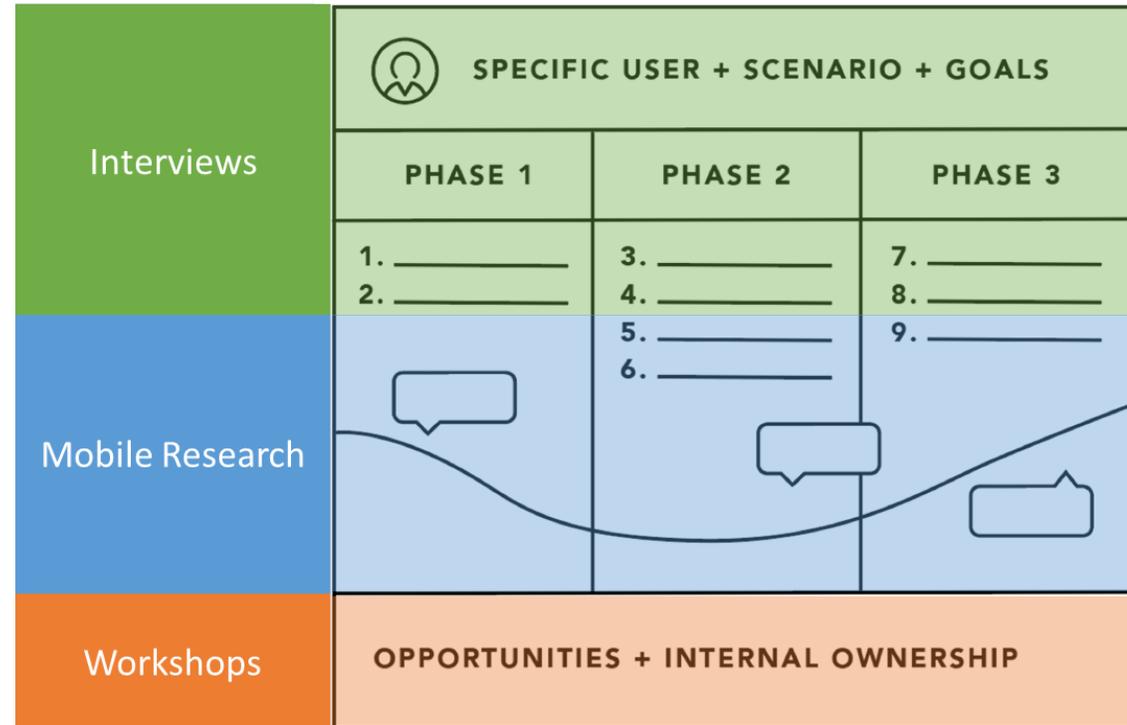
- Synthesize qualitative research
- Discover opportunities for innovation
- Get the team on the same page & create a shared vision
- Communicate information in a way that is memorable & concise
- Use as a basis for decision making

Tips for journey mapping

- Involve people into the making of the maps
- Base the map on research (don't guess what the user experience is)
- Don't average experiences
- Don't restrict the journey to a small task

How to use the Living Labs activities to build user journey maps?

CUSTOMER/USER JOURNEY MAP



Example of Everyday Cooks Journey Maps from the literature.

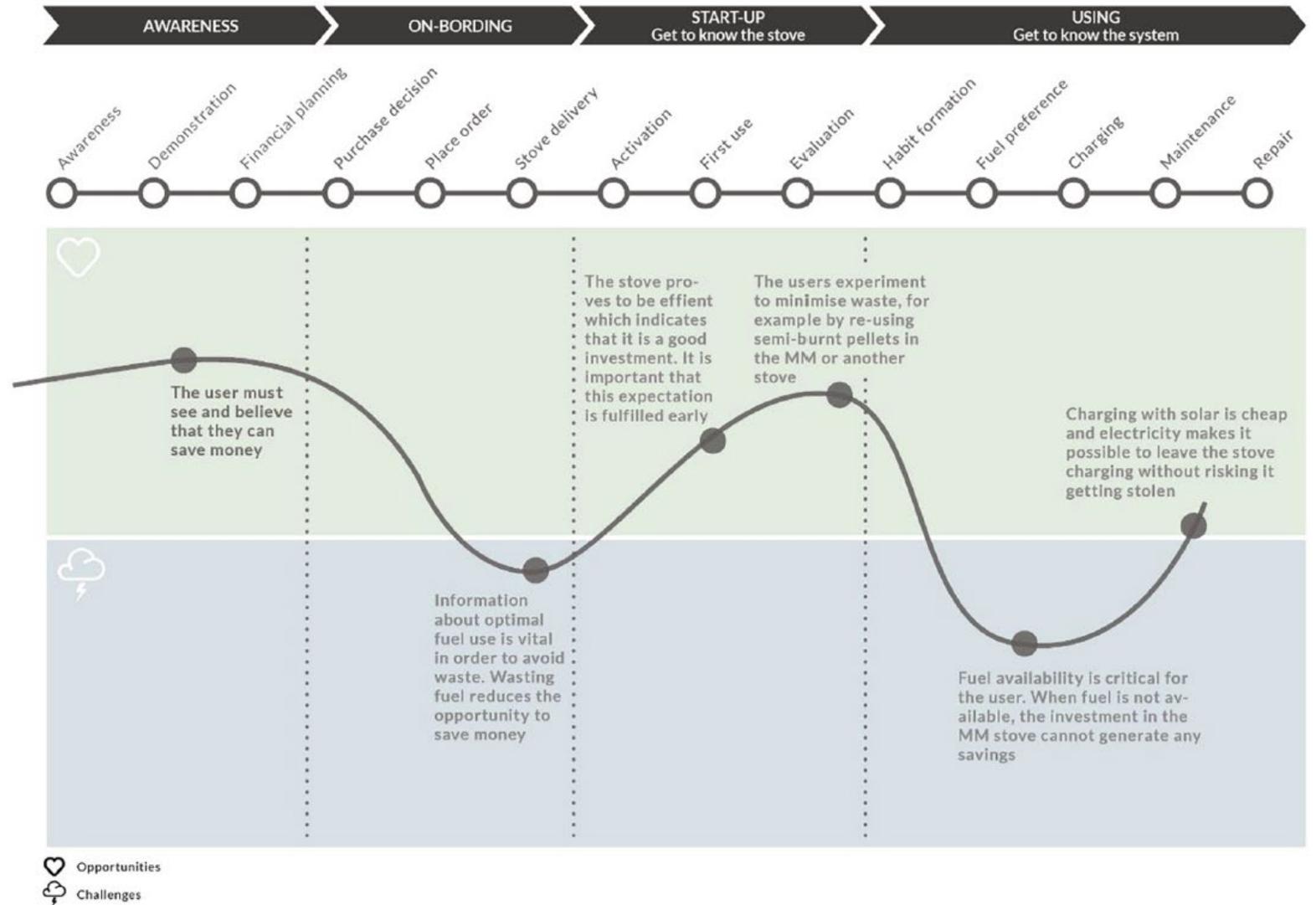


Fig. 5. User journey for using the Mimi Moto (MM) stove of the archetype group 'saving money'.

Living Lab Activities that will help us build the journey maps:

1. Interviews
2. Focus Group Workshops
3. Mobile Research

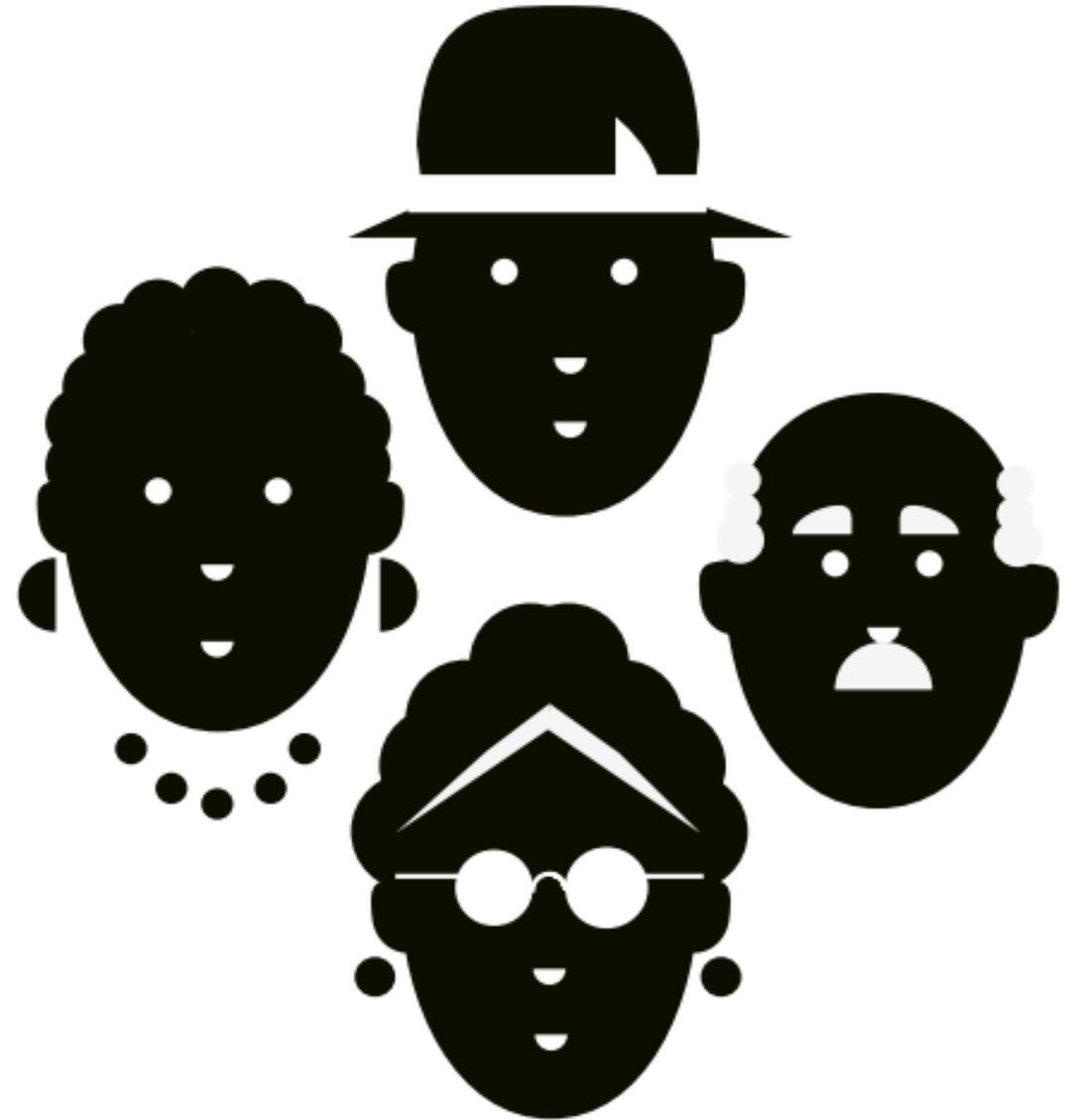
The following 3 sections give details about each of these methods.

Qualitative Interviews

Facilitation Guide

Definition and Goals

- Qualitative interviews are a more personal form of research where the enumerators can ask follow-up questions to better understand the needs, wants, and motivations of participants. As part of iteration one of the Living Lab, participants will partake in three interviews: (1) an intake interview, (2) a midway interview, and (3) an exit interview.
- Qualitative interviews predominantly ask open ended questions (i.e., questions that cannot be answered by 'yes' or 'no' and require a detailed response). Enumerators are encouraged to ask follow-up questions that are not scripted, if participants share a new or surprising piece of information. Asking probing questions about *why* participants act or feel a certain way can be very informative.



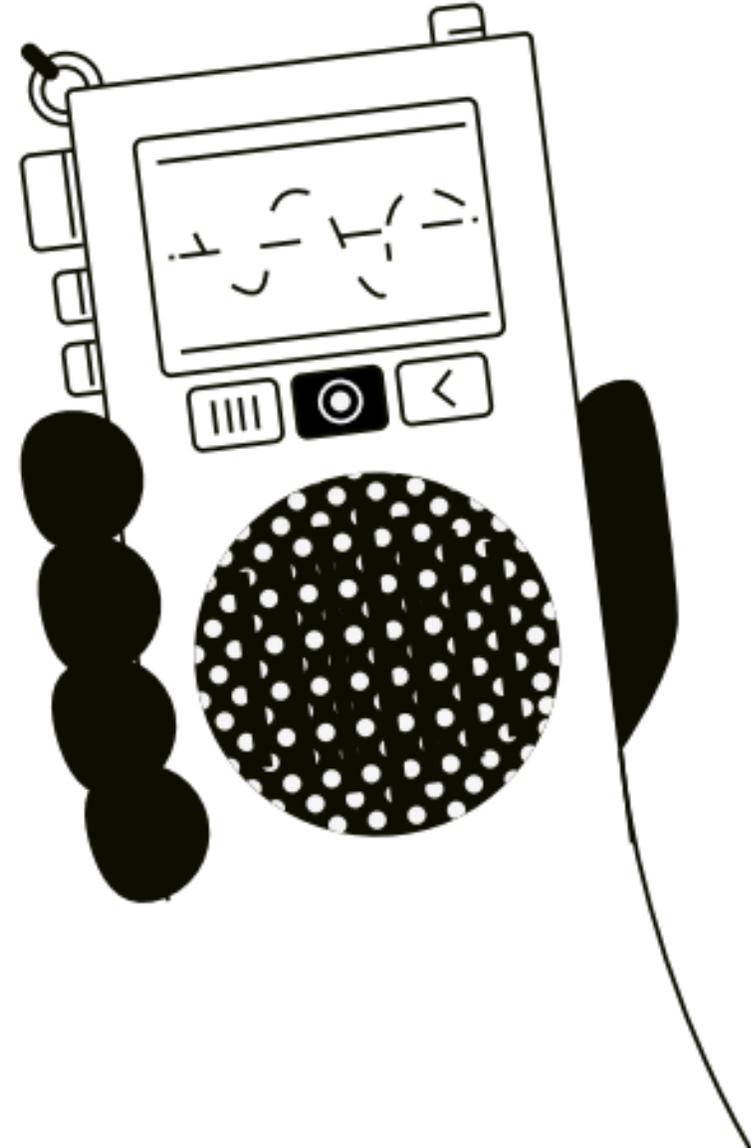


Logistics

	Logistics	Proposed topic	Goal
Intake interview	One-on-one in-depth discussion, approx. 60min, should be conducted before participants start filling out cooking diaries, for example, during onboarding.	Prior experience with cooking with different fuels, aspirations with regards to cooking, motivations to participate in the trial, feedback on trial experience so far.	To understand how participants currently cook and why. To capture feedback about the trial onboarding experience.
Midway interview	One-on-one in-depth discussion, approx. 60min; can be conducted anytime between the second and third workshop.	Experience, benefits, and pains of cooking with electricity, feedback on trial experience.	To reflect upon participant's experience with both the new technology and the trial itself.
Exit interview	One-on-one in-depth discussion, approx. 60min; can be conducted during the last two weeks of the trial period or during exiting activities.	Ideal cooking futures, e-cooking services, feedback on trial experience.	To reflect upon participant's experience with both the new technology and the trial itself.

Data Collection

- Qualitative interviews typically generate rich data which is difficult to capture via notetaking. Therefore, we recommend using audio recording devices to record each interview for later transcription. It is always useful to have 2x recording devices in case one malfunctions (e.g., use a smartphone with a voice recording app as a backup).
- We propose that interviews be audio-recorded and transcribed and translated within three weeks. The timeline for transcription should allow for at least two weeks of data analysis by Loughborough researchers before the start of the first midway interview.



Training Enumerators

The training session should take about 2 hours. It can take time for the team to get comfortable with interview techniques and enumerators should be encouraged to learn from one another and throughout the study as they conduct more and more interviews with participants.

Topics covered in a potential SD4MECS training workshop:

1. Explain the goals of the study as a whole and what the living lab approach and activities are.
2. Introduce the method of interviewing:
 - Explain that their role is to uncover rich stories from participants, their context and activities, and the use of products/services as related to his motivations.
 - Watch an example interview and reflect on key aspects of interviewing.
3. Interviews in MECS: What are the logistics of the interview?
 - Go over who, what, when, where, how, why
 - Explain that after the interview, enumerators will share quick learnings in a dedicated WhatsApp group and will upload interview recording to dedicated location.
4. Go over the interview guide slowly and in detail, ensuring everyone knows exactly what information to gather for each point.
5. Conduct a practice interview with the intake interview protocol.
 - Enumerators get into pairs and practice asking open questions and probing. Reflect on the process as a group.
6. Ask for feedback from enumerators about the training: What did they learn? What did they already know? How can we make it better in the future?



Training Enumerators (continued)



Informal Interviewing:

- Put aside any ideas and expertise you might have, and listen with an open, fresh mind to the wisdom of the people you interview. Try not to make assumptions as to whether anything is 'good' or 'bad'.
- Your questions should not be biased towards your own ideas, but should openly investigate the lives of the people you are designing for.
- It can be very difficult to stay in this mindset. At critical times such as during Fieldwork assign a particular person the role of watching for others slipping out of Beginner's Mind. Assign a particular word/gesture that they use to raise awareness.
- Look for Inconsistencies: Sometimes what people say and what they do are different. These inconsistencies often hide interesting insights

Digging Deeper

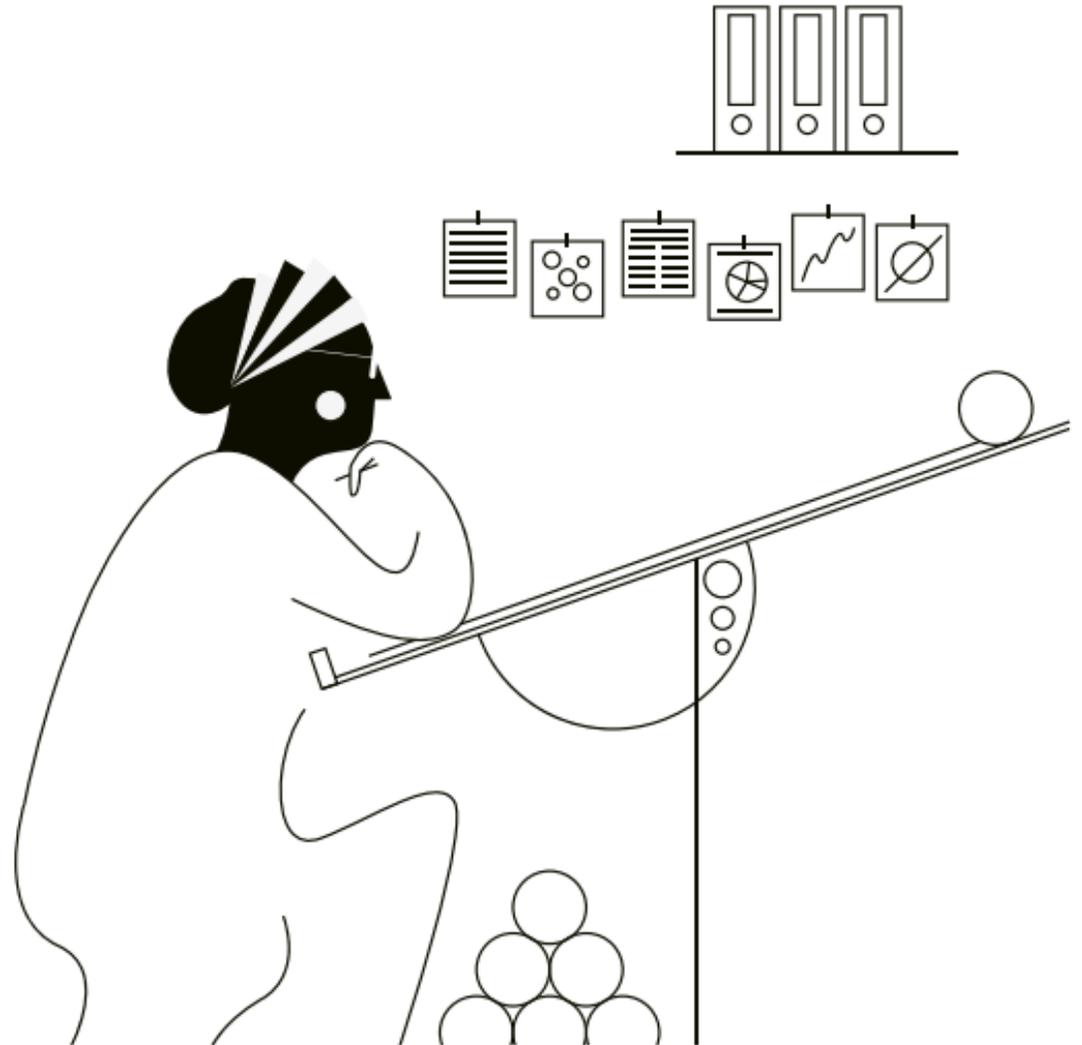
- Probing is a vital interview technique. Probing is pushing the respondent for more information without intruding too much and affecting their flow of thought. Probes should always be open-ended questions.
Example: "Have you ever sold produce outside the village?" "Yes" "Like where?" "Oh many places around here." "Can you name a few?"
- **Your most important probing question is 'Why?'** Even when you think you know the answer, ask people why they do or say things. The answers will sometimes surprise you.
- The silent probe: To encourage a respondent to keep speaking, keep silent just long enough. You could nod and encourage them with a positive 'uh-huh' so they feel you are happy with what they are saying.
- The echo probe: A useful way to encourage a person to keep talking about a particular topic is to repeat what they said and ask 'and then what?' or 'and what else happens?' etc.
Example: "I see. You buy seeds, and pesticide and shade-cloth. What else?" or "I understand. At the end of the day you pack things away and close up. Then what do you do?"

Its Not About You!

- As an interviewer, do not interject your own opinion. Your role is to be as neutral as possible, only encouraging the respondent to speak about certain topics.
- The interviewer's role is to get the respondent onto a particular topic and then 'get out the way'. Let the respondent tell you what they want to tell you about that topic.
- Ask Neutral Questions. "What do you think about buying gifts for your colleagues?" is a better question than: "Don't you think shopping is great?" because the first questions doesn't imply that there's a right answer.
- Never say 'usually' when asking a question. Instead, ask about a specific instance, such as "Tell me about the last time you____"
- As an interviewer, be aware that some people take a while to respond. Let a respondent think and take their time before adding more words. Don't be afraid of silence. Give people time to reflect and they may reveal something deeper

Intake Interview Protocol Development

1. Develop interview protocol draft based on literature and good practices (DONE)
2. Test interview protocol with Country Partner Referent
3. Iterate based on Country Partner Referent feedback
4. Country Partner Referent translates and conducts several mock interviews in local language with proxy participants
5. Iterate based on mock interviews
6. Send protocol for review by wider team and finalize
7. Country Partner Referent trains team and enumerators to conduct interviews



Example Interview Protocol

Introductions (if interviewee knows the interviewer, skip)

Hello, my name is _____. I work on _____ (project title) with _____ (organization name). As you may know, we are hoping to learn about your needs and aspirations regarding cooking. I would like to ask you some questions to learn more about you, your cooking experiences, and what you hope to discover about cooking with electricity during the trial.

Kickoff

- The interview should take about 60minutes, does that still work for you?
- Do you have any questions about the project?
- Is it alright if I record your answers? We won't keep the recording; the interview will be transcribed. This measure ensures that I don't forget to write down anything you say. We will use your answers to help us design better cooking products and services.

Building rapport

- What is your favorite food?
 - Can you tell me about it? (who was it for, why did you pick that meal, how did you cook it...)

Focus Group Workshops

Facilitation Guide

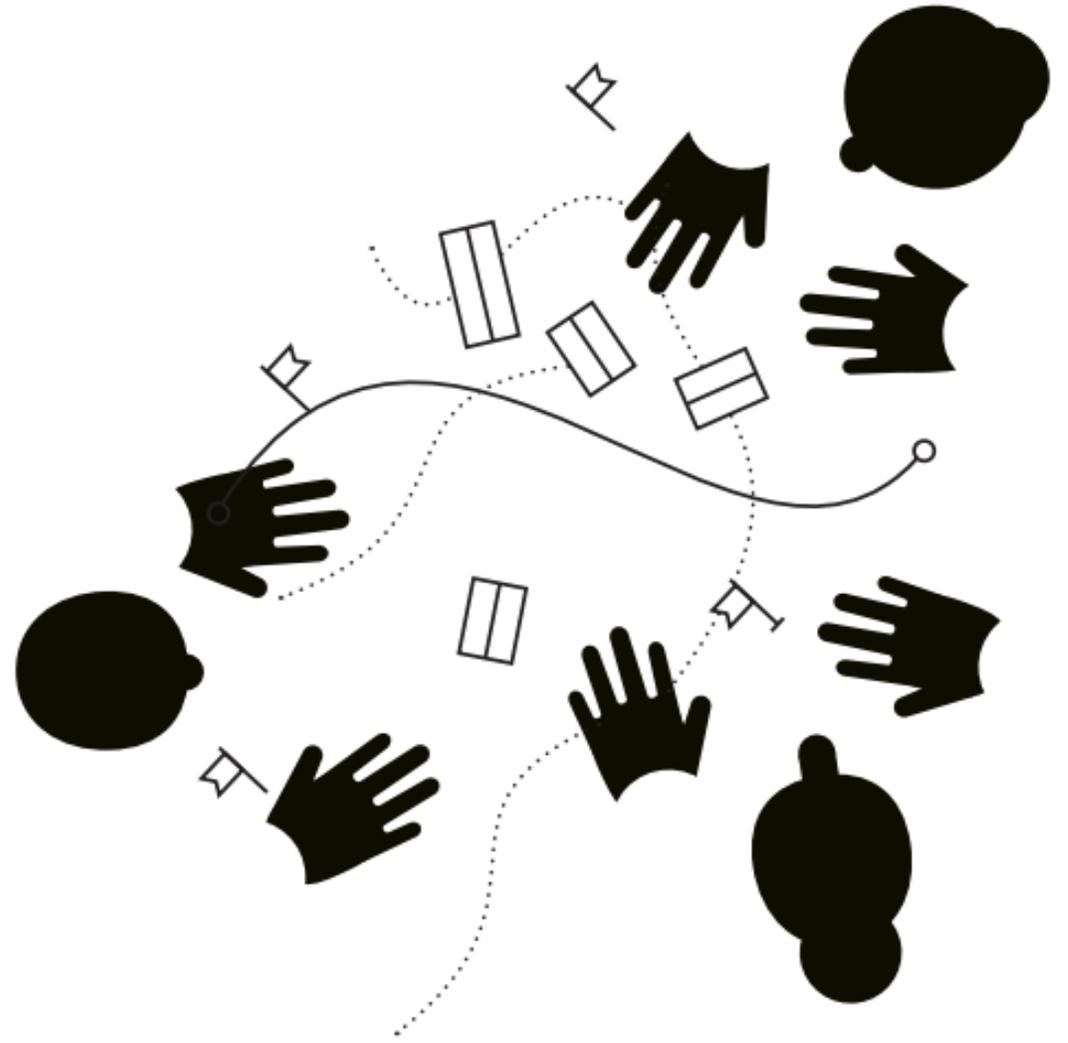
Definition and Goals

- A 'workshop' brings together groups of people and engages them in discussions and activities on a particular subject or project. Three workshops will be organized to provide a platform for co-creating solutions *with* end users by enabling them to:
 1. Reflect upon their cooking experiences
 2. Reflect upon their trial experiences
 3. Share potential solutions to the challenges they have faced with regards to e-cooking.
- The first workshop will be a discovery workshop to capture participants' visions for ideal cooking experiences, as well as what an ideal field trial experience might look like for the participants. These themes are particularly important to uphold the 'democracy' and 'empowerment' philosophy underpinning the Living Lab. The second and third workshops will be co-creation workshops; opportunities to collaboratively develop innovative solutions to the challenges experienced by participants. The workshop themes are as follows:
 1. Discovery Workshop 1: Ideal Cooking Futures
 2. Co-creation Workshop 2: Improving the Experience of Cooking with Electricity
 3. Co-creation Workshop 3: Co-designing E-cooking Services



Logistics

- Participants will be divided into two groups: weak-grid and off-grid. Hence, for each iteration of the trial, a total of six workshops will be held, each with 20 participants.
- We propose that participants be organized into groups of 4-6 per table with 1 facilitator and 1 notetaker per table for small group activities.



Data Collection

- Data from the workshops will be recorded through the participant notes taken throughout the workshop, through note taking by enumerators observing various groups, and by recording the larger group share-outs and a subset of activities via video recording.



Training Country Partners to facilitate

1. Country partners who will be facilitators participate in a workshop following the same protocol
2. Facilitators then review good practices for facilitating workshop

HCD Africa Toolkit

Facilitator's Notes

Note to Facilitator 

The creative process is inherently tricky and uncomfortable as one navigates into new ideas and new ways of understanding. Working in groups, made up of a purposeful variety of characters can, at times, raise even more challenges.

The facilitator is charged with the responsibility of managing the process and ensuring that everyone is heard, participates and brings their unique perspectives and talents to the task. **Here are a few tips and tricks to help you sail through the process and some of the common difficulties that may arise.**

Creating an environment that nurtures creativity

Make sure that the group always knows what the desired outcome of the process as a whole is, as well as individual activities. Outline the goals at the start of each activity.

The best way to foster creativity is to establish a relaxed, comfortable atmosphere, away from phones and computers.

Find a dedicated space to use for the duration of your process. Equip it well with an assortment of stationery, post-its and big pieces of paper. Ensure the space encourages teamwork, with enough space to gather around a table or a poster on the wall.

Remind the team of the progress they are making as they go.

Keep a positive atmosphere by praising people's contributions, ideas, and involvement.

Sometimes, the best insights are gathered in more relaxed settings, like around the water cooler, or lunch table. **Allow for this to happen.**

Be ready for discomfort

Be prepared for the fact that at certain times you will feel like you are not making any progress.

Use role-play to get ideas flowing and people speaking.

If the group is struggling to make a decision – take a vote.

If the group is getting stuck in one way of thinking – use one of the tools listed in this guide to help encourage divergent thinking.

If the group gets very stuck, take a quick break to stretch and refresh. **Remember that discomfort is inevitable; you're tackling a difficult task.**

Manage group dynamics

As a facilitator, you should be confident enough to ask someone (politely) to wrap up their point and let another person speak.

Set clear 'rules of the game'. These should be clearly communicated right at the start of your process, and teams may be reminded of these as you go.

"Yes, and" not "Yes, but" – no negative judgements on others' ideas.

Religion is important across the continent. Maybe ask whether someone would like to offer a prayer to begin, and also at the end to show thanks.

Allow team members to negotiate time and breaks so that the facilitator becomes part of their process.

Timing & Resource Allocation

It is important to stick to the timeframes you decide for each exercise, given that you are probably dealing with overall time constraints in which to deliver a solution.

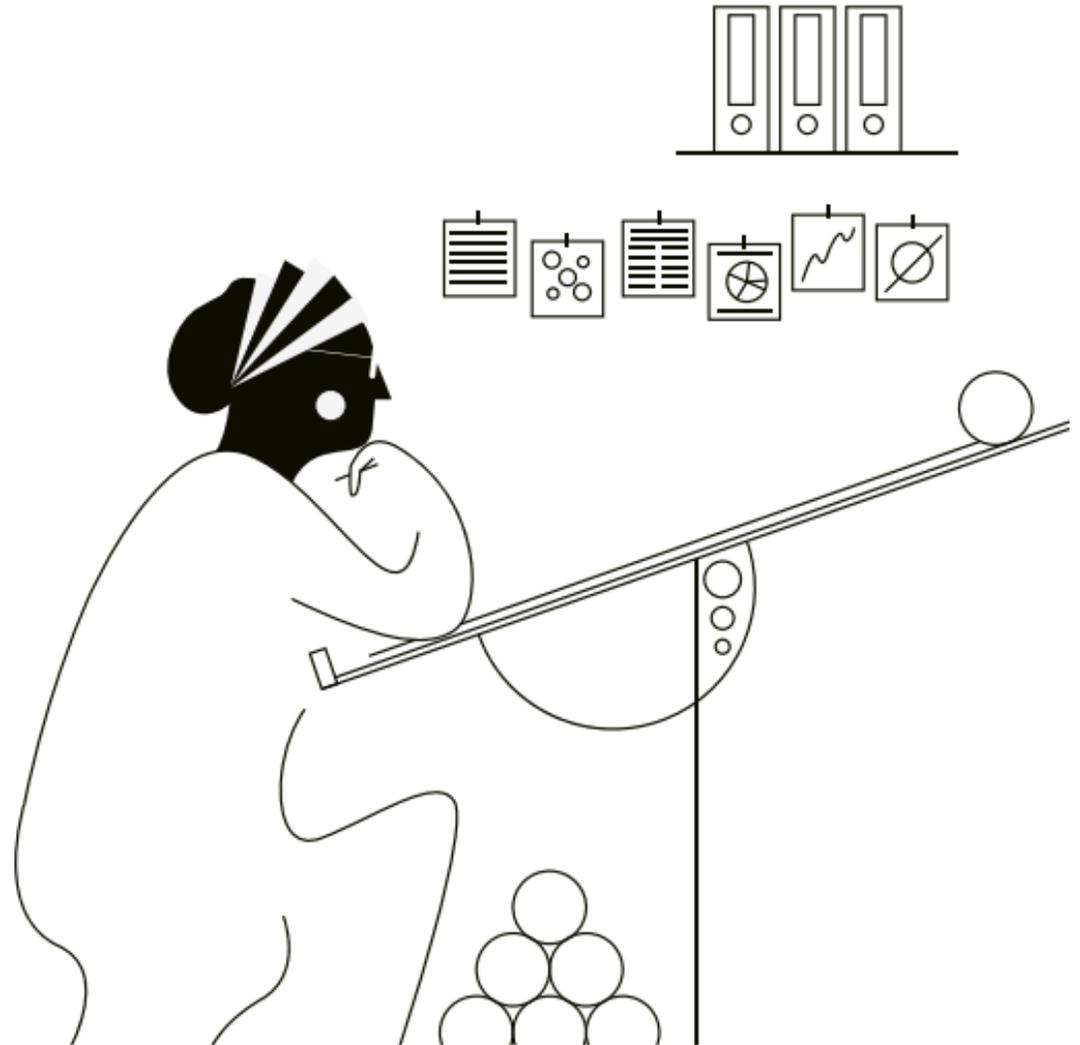
Recommended timings are included in this toolkit but the time you allocate depends on many factors, such as: the experience of the group and the facilitator, stakeholders' availability and budgets. It is important to design your HCD process accordingly.

The process requires the full-time commitment from the team leader and the core team. Subject matter experts, customers, and other stakeholders will need to be consulted from time to time.

A lot of the background work requires a dedicated project manager or team to make phone calls, travel arrangements, as well as document management and reporting. Having a 'central hub' is very useful in keeping track of processes and progress, and to build a knowledge base from which to easily share insights with other stakeholders.

First Workshop Protocol Development

1. Develop workshop protocol draft based on literature and good practices (DONE)
2. Review workshop protocol with Country Partner Referent
3. Iterate based on Country Partner Referent feedback
4. Country Partner Referent and other MECS team members participate in a mock workshop following the protocol
5. Country Partner Referent translates workshop into local language
6. Send protocol for review by wider team and finalize
7. Country Partner Referent trains team to facilitate workshop by conducting a mock workshops then reviewing good practices for facilitating



Mobile Research

Facilitation Guide

Definition and Goals

Mobile-based research is a method that uses technology such as smartphones and other wearable devices to conduct research, with roots in ethnographic methods. Traditional ethnographic methods are used by researchers with the aim of observing and interacting with people in their environment to understand their behavior, values, and beliefs. Because of our increasingly connected world, mobile ethnography allows us to observe and interact with participants through smartphones.





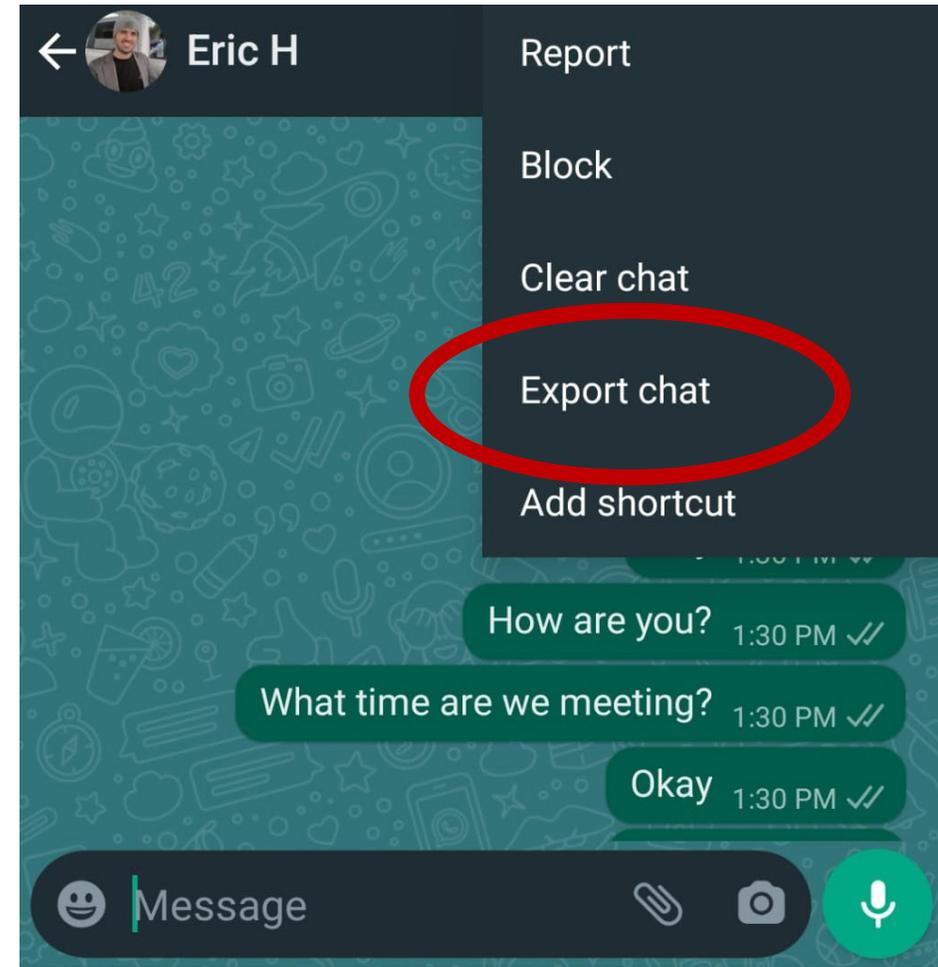
Logistics

- WhatsApp groups for mobile research. We are proposing to use WhatsApp groups, consisting of an enumerator and the participants the enumerator is responsible for (around 5 participants), as a tool for mobile research. Each participant will receive a phone and be trained, if needed, in how to use WhatsApp to send messages, pictures, videos, and audio messages, both to groups and to individuals.
- *Weekly themes.* Mobile research has significant flexibility. We propose that each week will have a theme. A prepared list of themes will include questions for participants about the theme. We would also like to encourage country partners and enumerators to propose topics each week. These can be based on contextual factors or on observations of participant behavior. For example, if a particular celebration is upcoming, which involves traditional dishes, that week's topic might be around how e-cooking is used to cook all/part these traditional dishes and what challenges arise.
- *Daily interactions.* The weekly theme and questions will be shared at fixed times and days (for example, each Monday at 10AM and Thursday at 3PM), so that participants can anticipate when they might need and want to respond. Participants will be encouraged to answer questions posed by enumerators, to discuss and comment on others' answers (e.g., if they agree or have experienced the same thing as someone else, if they have found a work around to a problem, etc.), and to share pictures and videos relevant to the theme. Participants are also encouraged to ask any questions they have to the group or propose suggestions.

Data Collection

At the end of each week, enumerators will extract a couple of highlights from their conversations with participants, which they will share in a group conversation with all enumerators, country partners, and Loughborough research team. The group conversations will also be exported weekly and sent to the country partners and Loughborough research team. Highlights from WhatsApp group conversations would ideally be translated and communicated to the Loughborough research team weekly.

Each month, enumerators will be invited to propose new themes to explore based on their intuition and interactions with participants.



Training Materials

Training for Mobile Research complements the training for conducting Qualitative Interviews. We propose the following training activities:

1. Remind enumerators of the goals of the research
2. Review proposed themes and questions, as well as an example conversation.
3. Reflect on the themes and example conversation: what might work well? What might be a challenge? Review good practices for asking for Feedback.
4. Brainstorm a few additional theme.
5. Go over the data collection and reporting method

Support could be provided to enumerators by Country Partners by monitoring the WhatsApp group conversations during the first few weeks of mobile ethnography and encouraging the enumerators to ask appropriate follow-up questions based on participant responses to the prompts.

Feedback



→ How to get feedback

Silence is good.

Just hand the person your product and watch how they figure out everything for themselves.

Encourage stories.

Let them tell you how they figure things out.

It's about the user, not you.

Ask "why" and "how do you feel about this"

Emotions and reasoning help you see how the person sees the world around them.

Ask for specific instances.

Use open body language, eye contact and smile.

Do not interrupt.

→ How NOT to get feedback

"Do you like this"

People usually want to validate other people. They'll just say yes, and not give their actual opinion.

"Would you use this"

Humans tend to agree with people and avoid interpersonal conflict. They will just say yes again, and you won't know whether they mean it.

NO yes/no questions

Keep everything open. Yes/No tells you nothing. It's very hard to verify whether people actually mean the yes. Yes/no doesn't tell you what exactly the person likes/doesn't like. It asks for an overall summation. Even if the user says "No" all you've gotten is a no. There's nothing there that's going to help you.

"I worked really hard on this part, what do you think?" - You're priming the user to agree with you. If you show any kind of attachment to your product, then people will not tell you their real opinion.

"How much would you buy this for?"

"Do you USUALLY do this or that"

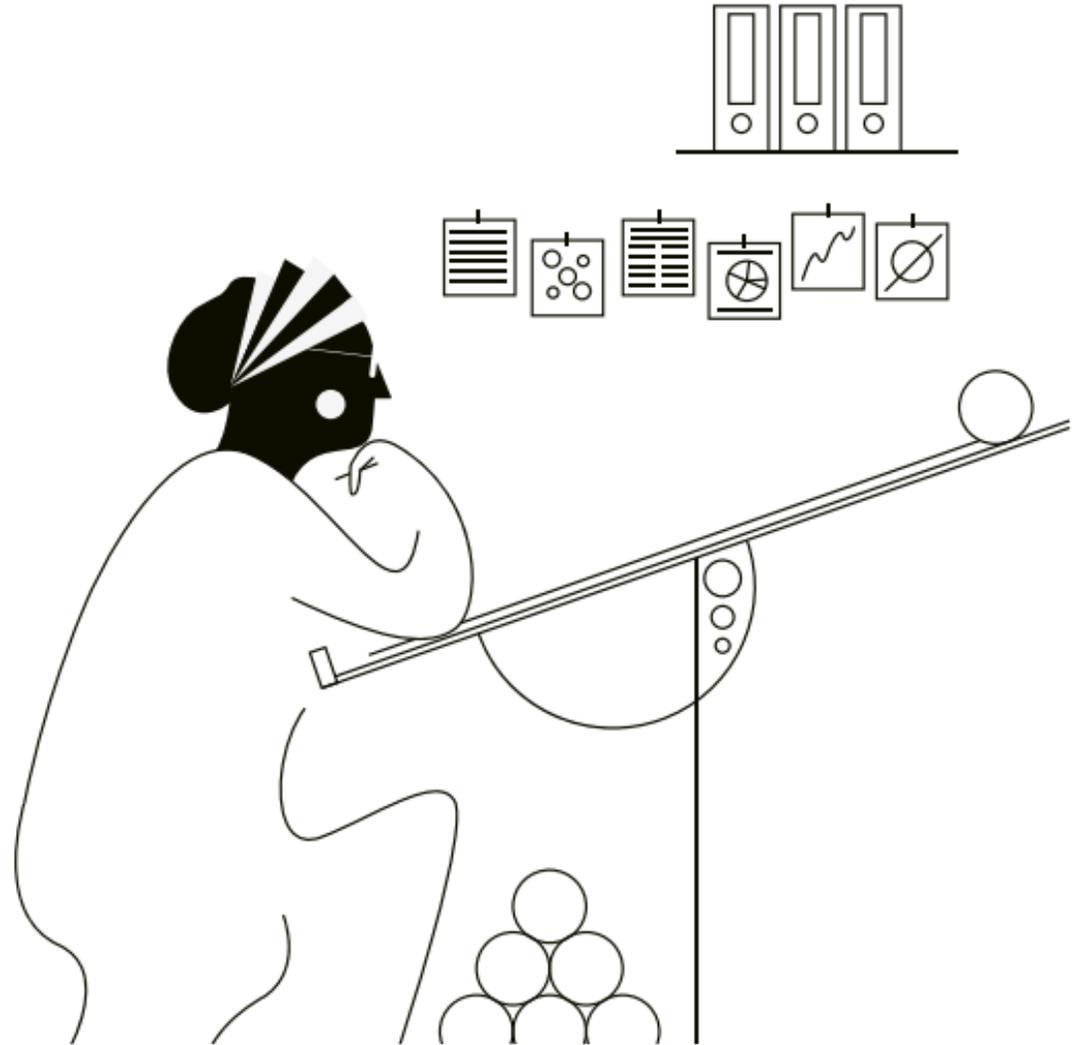
"How often do you"

"Is it because ..."

You are giving the respondent an answer.

Mobile Research Method Development

1. Develop themes examples based on literature and good practices (DONE)
2. Review proposed themes and method for setting up mobile research with Country Partner Referent
3. Iterate based on Country Partner Referent feedback
4. SD4MECS and Country Partner Referent take part in a mock Mobile Research for a few weeks
5. Iterate based on mock Mobile Research
6. Country Partner Referent trains enumerators to conduct mobile research
7. Set up a WhatsApp group for all trial stakeholders (Country Partners, Lboro team, enumerators) to provide regular input and flag potential themes for future use during the trial
8. Country Partner Reference monitors and helps enumerators in their respective WhatsApp groups during the first few weeks



Example Themes for Mobile Research

Theme	Participant questions / suggestions
Burning food	Have you burned any food so far? If so, tell us about what happened.
	What have you tried doing to prevent food from burning? What do you still need help with?
Re-organizing the cooking space to accommodate the EPC	How have you organized your cooking space now that you have the Power Station and the EPC?
	What do you still struggle within the organization of your cooking space? Have you benefitted in any way?
Cooking breakfast on the EPC	What breakfast foods have you cooked on the EPC?
	What were pros/cons of cooking breakfast on the EPC?
	In the next few weeks, what breakfast foods will you cook on the EPC / with other methods? Why?
Hacking the kitchen	What have you been able to do with the EPC that you couldn't do without it?
	This week, try cooking something in the EPC that you had not cooked before, or try using the EPC for something new (e.g., yogurt, baking, popcorn)
Preparing the midpoint & exit interviews	We're about to start conducting mid-point interviews, what are some questions you'd like to ask other trial participants? what are you curious to know about how other people are experiencing the trial & e-cooking?

Sources

Content

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Pictures

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- “HCD Africa Toolkit | Future By Design.”

Coordinating LL methods during the CREST trial

WhatsApp groups, Translations, and other topics

Interviews

Assign the lead researcher.

When: Before baseline & workshop

- Interview recordings uploaded in a shared folder
- Summary of the interview on the dedicated WhatsApp group (Eng + Kisw)
 - what went well,
 - what didn't go well,
 - what was some surprising things you learned.
- Interviews translated 2 weeks after conducted (format to be discussed)
- After interview #1, journey maps need to be translated **eng→kisw** before the Workshop #1

Mobile Research

Assign the lead
researcher.

- [Translation needed of themes & questions](#)
- Mock WhatsApp group with enumerators observation (if possible)
- WhatsApp group for coordination & weekly summary of mobile research (which includes all enumerators, Katarina, Anna, & Marianna)
 - Coordination of themes/questions to be sent that week
 - Enumerators summarize the weekly content (if not possible in English, have a weekly turnaround of translation of the summaries)
- Access all WhatsApp groups with participants at the end of the study

Workshop

Assign the lead researcher.

- Decide if there is a need to translate Workshop #1 slides – translate all
- Debrief of the workshop with enumerators a few days after the workshop
- Workshop materials translated 2 weeks after the workshop was held (and photos sent)

General

- Three reflection sessions throughout the study (after baseline & introduction of PowerStations; at midline; after endline)
- These sessions might be the same as the debriefs after the workshops

Intake Interview Protocol: In work

Practice interviews

- Marianna ran a practice interview with partner on 4/7/2021
- Anna ran a practice interview with Shukuru and larger TaTEDO team on 5/7/2021, Marianna observed (notes at the bottom of the doc).
- Marianna ran a practice interview with Mercy via Teams, Anastacia and Francis observed, on 7/7/2021. Recording available [here](#).
- Mercy interviews Jon on 14.7.2021 via teams, Anastacia, Francis, and Marianna observed.

*Interviewee: *insert participant code**

*Interviewer: *insert enumerator code**

Date:

*Recording mechanisms: *insert audio recording device code + backup recording process (e.g., cellphone or tablet)**

Folder name & location:

Interview topic: prior experience with cooking with different fuels, aspirations with regards to cooking.

Guide to interviewer:

- **The interview should be conducted AFTER the cooking diaries intake survey, and you should study the survey responses of the interviewee before you interview them.** Having a copy of the responses during the interview could be helpful, for reference.
- **You should read and familiarize yourself with the interview beforehand.**
- **If participant gives short answers, don't hesitate to probe more by asking follow up questions.**
- **When you get to a new question, if the participant has already answered (or partially answered) a question earlier in the interview, repeat back their answer to them and ask them to elaborate or ask them to confirm.** For example, if the protocol says to ask "how many times do you eat a day?" but the participant has already answered, don't simply ask the question (makes it seem like you are not listening), rather, say: "earlier you said that you eat three times a day, could you confirm that that is the case? Could you tell me more about those three times?"
- **If the data doesn't match up between responses, ask for clarification if data doesn't match up.**

Introductions (to build credibility and trust, if interviewee knows the interviewer, you may skip over sections already shared in earlier study activities or choose to remind the interviewee.)

Hello, my name is _____. I work on the MECS e-cooking project (project title) with Loughborough University/GAMOS/TaTEDO/SCODE (organization name). Our aim is to better understand decision making in households to improve and develop better electricity-based-cooking services together with the households, services that help both people and the environment.

As you may know, we are hoping to learn about your needs and aspirations about cooking, and later on in the study, about your experience using the Power Hub and e-cooking appliance we will provide you. As part of this interview, I would like to ask you some questions to learn more about you and your cooking experiences. Your input is very valuable and we will use your responses to develop our work further.

Practicalities (build understanding and set expectations)

- Is now still a good time? The interview should take about an hour.
- Do you feel comfortable with speaking English in the interview?
- Is it alright if I record your answers? We won't keep the recording; the interview will be transcribed. This measure ensures that I don't forget to write down anything you say.
- I'd like to remind you that your responses will not be identifiable, all data will be de-identified, meaning your name will not be attached to any of your responses.
- As part of the larger study, you have already consented to take part in this interview, but you are free to stop the interview at any point and for any reason, without any penalty to you.
- You are welcome to skip any question that you don't want to answer.
- **If any question feels repetitive, it means that we are really interested in that topic, so please feel free to elaborate on your responses and give us additional details.**
- Do you have any questions about the project? Or any other questions, before we begin? // Can I clarify anything further for you at this point?

Let's get started!

Building rapport

- What is one of your favorite foods? *Feel free to share your personal reaction and personal favorite food as well, to build rapport with the interviewee.*
 - When do you have it?
 - What do you like about it?
 - How do you eat/prepare it?

Evoking stories and exploring emotions

- What are some of the most important things for you, when it comes to cooking? (e.g., time/efficiency, cost, convenience, taste, quality, diversity, sharing food with loved ones...)
 - Why is that?
 - Are there any other important things?
 - *Summarize the key things*
- I have a few general questions about how cooking is organized in your home:
 - **We asked you in the intake survey about who cooks in the household, and you mentioned *name the people*.** Could you tell me a bit more about who cooks, when, and how that decision is made?
 - **You told us that X people live in your household,** could you tell me a bit about the people who we haven't talked about yet?
 - **You've told us a bit about your cooking space: where you cook, what appliances and cooking devices you have, what fuels you use.** Could you tell me three things you like about your cooking space and three things you dislike about it?

- How often do you cook?
 - What influences when you cook?
- How often do you eat in a day?
 - What influences when you eat?
- What meals are home cooked and what meals are bought?
 - What influences whether you eat out or cook your own meals?
- What is the first thing you do when you start cooking a meal? You can think about a meal you cook often for example.
 - Could you now tell me about your cooking process for that meal?
 - *Prompt participant to start at the planning, and then walk you through all the different stages of 'cooking': planning / preparing ingredients / using utensils/appliances/fuels / waiting / washing / storing / serving / eating / washing / leftovers / trash...*
 - *If any steps were not mentioned, you can probe interviewee and ask if they do that step*
 - *At the end, repeat back the steps described by the interviewee and ask if any step was forgotten.*
- Thinking of the different steps we walked through, how does cooking make you feel? (ask about the different steps talked about earlier: planning / shopping / preparing ingredients / using fuel / waiting / washing / storing / serving / eating / washing / leftovers / trash...)
 - What are some of the steps that you like? Why?
 - What are some of the steps that you don't like? Why?
 - How would you change this?
 - How would that affect you?
 - *Ask follow up questions about the most important stages described by the interviewee for them to give you more info about how those steps make them feel.*
- Thinking back to the last time you cooked, could you tell me about it? (*who was it for, why did you pick that meal, how did you cook it...*)
 - In what ways was it similar to this 'average' experience you described to me?
 - In what ways was it different?
- Let's dive a little deeper into the fuels and appliances you use. So far, you've talked about **repeat back the fuels and cooking appliances**
 - How do you choose which fuel & appliance to use? (ask about likes, dislikes, problems, constraints)
 - Thinking of the different fuels you use (*refer back to the survey to recall all the fuels they said they use*), what are likes and dislikes you have about cooking with each.
 - What are some appliances/fuels that you have that you don't use much?
 - Why don't you use them much?
 - Are there appliances that you are aspire to buy / acquire?
 - Which ones and why?
 - *You've told us about procuring cooking fuels: how you pay the bill, how often you purchase each fuel, how hard it is to procure...*
 - What are some likes and dislikes you have about the way you procure different fuels?

Reflection

- Based on what we've talked about, how would you summarize the most important things to you related to cooking?

Wrap up

- Is there anything that we haven't talked about yet that you think would be important for us to know? Is there anything you would like to add, clarify, or adjust?
- Do you have any questions for us?

Before leaving

Thank you very much for participating in this interview, your answers are really valuable to the project. We'll invite you to further take part in our research through later interviews and through the workshops! If you have any questions in the meantime, you can always reach out to me (*assumed enumerator*).

Instruction for data management

Create a new folder in the shared data folder (TBD) and clearly note the date, the activity, the name of the participant, and their individual ID number. Upload recording to folder along with any notes and pictures you may have taken during the interview by the end of the day of the interview. Share any notable notes/things that stood out to you in the designated WhatsApp chat (TBD).

Second interview URBAN: post-installation interview protocol

Aims: To gain an understanding of participants' recent post-installation experience (2 weeks post-install) of the Power Station and electric cooking appliances.

Guide to interviewer:

- **The interview should be conducted two or three weeks after the Power Stations were installed in a participants' home.**
- **You should read and familiarize yourself with the interview protocol beforehand, AND CONDUCT A PRACTICE INTERVIEW.**
- *If a participant gives short answers, don't hesitate to probe more by asking follow up questions. Also feel free to ask for clarification, but be careful not to insert your assumptions when you ask for clarification, try to simply repeat back what the participant says to make sure you understood.*
- *If the data doesn't match up between responses, ask for clarification.*

Introductions

Hello, my name is _____. I work on the MECS e-cooking project (project title) with TaTEDO/SCODE (organization name). Our aim is to better understand decision making in households to improve and develop better electricity-based-cooking services together with the households.

As part of this interview, I would like to ask you some questions to learn more about your experience with the Power Stations these past few weeks. Your input is very valuable and we will use your responses to develop our work further.

Practicalities (build understanding and set expectations)

- Is now still a good time? The interview should take about an hour.
- Do you feel comfortable with speaking _____ in the interview? (language check)
- Is it alright if I record your answers? We won't keep the recording; the interview will be transcribed. This measure ensures that I don't forget to write down anything you say.
- I'd like to remind you that your responses will not be identifiable, all data will be de-identified, meaning your name will not be attached to any of your responses.
- As part of the larger study, you have already consented to take part in this interview, but you are free to stop the interview at any point and for any reason, without any penalty to you.
- You are welcome to skip any question that you don't want to answer.
- **If any question feels repetitive, it means that we are really interested in that topic, so please feel free to elaborate on your responses and give us additional details.**
- Do you have any questions about the project? Or any other questions, before we begin? // Can I clarify anything further for you at this point?

Let's get started!

Throughout the interview, we'll refer to cooking with electricity as "e-cooking". We'll refer to the battery system and cables as the PowerStation. And we'll refer to the EPC and lights as e-appliances.

Icebreaker: e-cooking tour

- Could you give me a tour of e-cooking in your home? (ask participant to give you a physical tour to show where the PowerStation and appliances are, where they use them, store them, wash them, etc. They can mimic cooking.)

First impressions

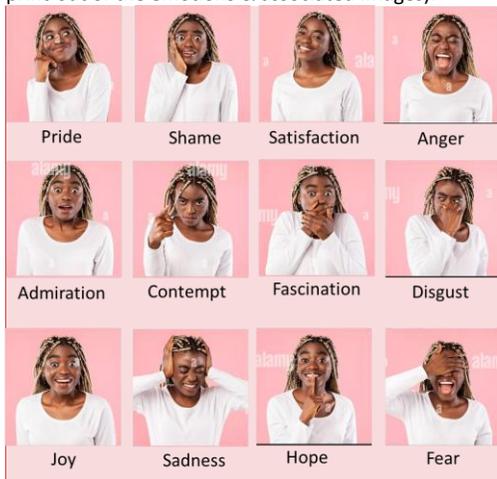
- Remember when you first saw the e-cooking during a demonstration by (SCODE/TaTEDO). What did you think about e-cooking?
 - what did you like about it?
 - what did you dislike about it?
- Remember the day of the installation, what was your reaction to the Power Station and the e-appliances?
 - What was surprising?
 - What did you like?
 - What did you dislike?

First exploration

- What were the first couple of things you did to explore the PowerStation and appliances? Tell me about:
 - the first thing you cooked with the EPC
 - what you have used the battery for
- How did you learn to use the PowerStation and appliances? Tell me about how you learned.
 - Youtube? Seek out any help at any point from family & friends? WhatsApp groups?
 - Have you looked at the user manual?
 - What do you like & dislike about the manual?
 - Where do you keep it?

Likes and dislike of e-cooking

We're going to talk about your experiences with e-cooking so far using some images (give participants a print-out of the emotions & associated images).



- What have been some highlights/good experiences with e-cooking so far? (ask for many details, ask the participant to tell a story)
 - How did e-cooking make you feel during the good experience? (encourage the participant to use the images)
 - Why did you feel this way?
 - How did you feel about the e-appliances during this experience?
 - How did you feel about the PowerStation during this experience?
- What were some hurdles/problems you've had with e-cooking so far? (ask for many details, ask the participant to tell a story)
 - How did e-cooking make you feel during the problem? (encourage the participant to use the images)
 - Why did you feel this way?
 - How did you feel about the e-appliances during this experience?
 - How did you feel about the PowerStation during this experience?
- Ask about how meals have been tasting with e-cooking compared to the traditional way
- What changes have you noticed to your electricity bill?

Electricity cuts (urban only)

- How many electricity black- or brown-outs have you experienced since the Power Station was delivered?
- How many disruptions have you had to your cooking due to electricity black- or brown-outs?
 - **If more than zero:** how did having the Power Station change your experience of the cut? What did you do during the cut? (for example, do you change fuels still? Does it interrupt your cooking? Where you able to continue cooking thanks to the battery?)
 - **If zero:** how do you think the Power Station will change your experience of power cuts?

Other's perceptions

I'd like to ask you some questions about how others in the household, what they think of e-cooking.

- Let's go through the people in your household, could you tell me about what they think of e-cooking? (if the family members are around and want to speak for themselves, encourage that!)
 - Have they tried e-cooking?
 - If yes
 - What have they used the PowerStation and appliances for?
 - How did they feel about the experience? (encourage the participant to use the pictures of feelings again)
 - If no
 - Why haven't they used it?
 - What do they like/dislike about e-cooking? Why?
- Who have you told about e-cooking or shown them how you e-cook? (family not living in the household, neighbors, friends, colleagues...)
 - What did you say?
 - What did they think of the system when they heard about it / saw it for the first time?

Looking forward

- Thinking of the next few months, during which you'll be e-cooking, how do you think e-cooking will impact your daily life and routine? What will change?
- What are you still unsure of? Do you still have questions about e-cooking?

- What, if anything, are you looking forward to with e-cooking? (are you hoping to learn to cook more things in the future? are you hoping to try different functions?)

Wrap up

- Is there anything that we haven't talked about yet that you think would be important for us to know? Is there anything you would like to add, clarify, or adjust?
- We are thinking of asking the questions we just asked you to many different people. Imagine we were asking these questions to a friend of yours or a family member of yours.
 - Are there any questions that you think will be difficult for people to answer?
 - how could we make this interview better for others?
 - Do you think we should add any questions?
- Do you have any questions for us?

Before leaving

Thank you very much for participating in this interview, your answers are really valuable to the project. We'll invite you to further take part in our research through one last interview and through the workshops! If you have any questions in the meantime, you can always reach out to me. Hopefully, we can share some of the outcomes of the research with you, if you are interested.

Instruction for data management

Upload the interview file in the right folder (to be determined by Country Partners) and clearly note the date, the activity, the name of the participant, and their individual ID number in the name of the file. Upload any notes and pictures you may have taken during the interview by the end of the day of the interview. Share any notable notes/things that stood out to you in the designated WhatsApp chat.

Third interview: endline interview protocol

Aims: To gain an understanding of participants' long-term usage (3+ months post-install) of the Power Station and electric cooking appliances.

Interviewee: **insert participant code**

Interviewer: **insert enumerator code**

Date:

Recording mechanisms: **insert audio recording device code + backup recording process (e.g., cellphone or tablet)**

Folder name & location:

Interview topic:

Guide to interviewer:

- **The interview should be conducted before the last cooking diaries, several months after the Power Stations were installed in a participants' home.**
- **You should read and familiarize yourself with the interview protocol beforehand.**
- *If a participant gives short answers, don't hesitate to probe more by **asking follow up questions**. Also feel free to **ask for clarification**, but be careful not to insert your assumptions when you ask for clarification – try to simply repeat back what the participant says to make sure you understood correctly.*
- *When you get to a new question, if the participant has already answered (or partially answered) a question earlier in the interview, repeat back their answer to them and ask them to elaborate or ask them to confirm. For example, if the protocol says to ask "how many times do you eat a day?" but the participant has already answered, don't simply ask the question (makes it seem like you are not listening), rather, say: "earlier you said that you eat three times a day, could you confirm that that is the case? Could you tell me more about those three times?"*
- *If the data doesn't match up between responses, ask for clarification.*

Introductions (to build credibility and trust, if interviewee knows the interviewer, you may skip over sections already shared in earlier study activities or choose to remind the interviewee.)

Hello, my name is _____. I work on the MECS e-cooking project (project title) with TaTEDO/SCODE (organization name). Our aim is to better understand decision making in households to improve and develop better electricity-based-cooking services together with the households.

We are hoping to learn about your experience using the Power Station and e-cooking appliances we provided you these past few months. Your input is very valuable and we will use your responses to develop our work further.

Practicalities (*build understanding and set expectations*)

- Is now still a good time? The interview should take about an hour.
- Do you feel comfortable with speaking _____ in the interview? (language check)
- Is it alright if I record your answers? We won't keep the recording; the interview will be transcribed. This measure ensures that I don't forget to write down anything you say.
- I'd like to remind you that your responses will not be identifiable, all data will be de-identified, meaning your name will not be attached to any of your responses.
- As part of the larger study, you have already consented to take part in this interview, but you are free to stop the interview at any point and for any reason, without any penalty to you.
- You are welcome to skip any question that you don't want to answer.
- **If any question feels repetitive, it means that we are really interested in that topic, so please feel free to elaborate on your responses and give us additional details.**
- Do you have any questions about the project? Or any other questions, before we begin? // Can I clarify anything further for you at this point?

Let's get started!

Habits

- How long have you had the EPC and PowerHub in your home?
- When is the last time you cooked with it?
- How often would you say you cook with it?
- What are some of the things you do regularly with the e-cooking appliances?
 - How has this changed your routine?
 - What would you wish you could do regularly with the EPC?
- **How do you decide whether to use the EPC or something else?**
- What are three things you really like about the EPC and the PowerHub?
 - Why do you like these things?
- What are three things that really annoy you about the EPC and the PowerHub?
 - Why do these things annoy you?
- What are some things that you didn't know it could do but discovered along the way?

Other new appliances

- Have you gotten any other new e-appliances through the study?
 - Which ones?

For each new appliance:

- How long have you had the appliance in your home?
- When is the last time you used it?
- How often would you say you use it?
- What are some of the things you do regularly with the e-cooking appliance?
 - How has this changed your routine?
- What are three things you really like about the EPC and the PowerHub?
 - Why do you like these things?
- What are three things that really annoy you about the EPC and the PowerHub?
 - Why do these things annoy you?

Other appliances

- What is still missing from your kitchen do you think?
 - What would be your ideal combination of e-appliances?

Disruptions and change to the physical home

- How have you set up the Power Station? Can you describe to me how you've organized it in your home? How long has it been there?
- How have you organized the e-appliances in your home? (Where do you store them, where do you use them, where do you wash and dry them...)
- Tell me about something that went wrong with the Power Station and e-appliances? What happened? How did you overcome the issue?

Electricity cuts (urban only)

- How did having the Power Station change your experience of electricity brown outs and black outs?
 - In what ways has this change impacted your life?

Cost-benefit

- What do you think about the cost of using the e-appliances?
 - How do you budget for cooking with electricity?
- Have you been able to save money during this trial?
 - What have you done with the savings?

Cooking habits

- Since you knew this interview was coming, did you change anything?
- What are some dishes you've now switched to cooking with the EPC? Why these?
- What have you avoided cooking on the EPC? What are dishes you still cook with your traditional method?
 - What is the easiest dish to cook with the e-appliances?
 - What is the hardest dish to cook with the e-appliances?

Other's perceptions

- Who in the household has been using the system?
 - What do they each use it for?
- How have your household organization and roles changed since the Power Hub and appliances have been introduced into your homes?
- What do other household members think about the e-appliances?
- What do other people think your use of e-appliances? (neighbors, extended family, friends...)
- If you had to give the PowerHub and e-appliances away, who do you think it would be the best person to gift each item to? And why?

Augmented uses of the e-cooking system

- What have you used the Power Station for that doesn't involve cooking?
 - Heating water for a bath / laundry / washing dishes...
 - Table, storage surface, etc...
 - Powering the TV and other non-cooking e-appliances

Future of cooking

- Will you keep cooking with electricity after the trial ends?
 - Why?
 - In what ways could e-cooking make your life easier?
 - In what ways could e-cooking make your life harder?
(ask about cost, convenience, fuel stacking...)
- How do you imagine your cooking habits will be different after the trial (compared to before the trial)?

Looking forward

- What advice would you give to our next round of participants who are about to get this installed?
- What are you still unsure of? What questions do you still have about cooking with electricity?

Impact of trial on future

- What was a good thing that happened because of you taking part in this trial?
- What was a bad thing that happened because of you taking part in this trial?
- Do you have any feedback about the trial as a whole?

Wrap up

- Is there anything that we haven't talked about yet that you think would be important for us to know? Is there anything you would like to add, clarify, or adjust?
- Do you have any questions for us?

Before leaving

Thank you very much for participating in this interview, your answers are really valuable to the project. We'll invite you to further take part in our research through one last workshop! If you have any questions in the meantime, you can always reach out to me (*assumed enumerator*). Hopefully, we can share some of the outcomes of the research with you, if you are interested.

Instruction for data management

Upload the interview file in the right folder (to be determined by Country Partners) and clearly note the date, the activity, the name of the participant, and their individual ID number in the name of the file. Upload any notes and pictures you may have taken during the interview by the end of the day of the interview. Share any notable notes/things that stood out to you in the designated WhatsApp chat.

Cooking Futures

Focus Group #1

English version text only 16/9/2021

The goal is to bring together everyday cooks to identify current strengths and pain points in cooking practices to imagine cooking futures together.

We will also discuss questions about current cooking practices and cooking with electricity.

- August 6th, 2021
- SCODE factory, Nakuru, Kenya & remote (Teams)
- Attendees: Anastacia, Mercy, Francis, Jon
- Facilitator: Marianna
- COVID-19 guidelines: /
- Data recording: workshop will be audio and video recorded through Teams, Marianna will be taking notes, photos will be taken of any notes and drawings that participants make.

Agenda

1. Introduction to the workshop (10 min)
2. Icebreaker (10 min)
3. Likes and dislikes in cooking practices (50 min)
4. Break (10 min)
5. Uncovering questions about current cooking practices (20 min)
6. Uncovering questions and assumptions about cooking with electricity (20 min)

Logistics

- You will mostly sit in your enumerator groups, so you will know the other people with you today, from your prior interactions in the WhatsApp group!
- Each group will have one facilitator, and the enumerator will take notes during the focus group activities.
- You will need to write notes on paper, post-its, and documents we give you. We will also ask you to share your thoughts with the group and react to what other people say. There are no wrong answers. We simply ask that you remain respectful of one another and actively listen to each other's experiences.
- We encourage you to react and build on each other's responses.
- Feel free to get up to go to the bathroom, or get some water, or stretch, at any time.
- Feel free to switch to speaking in the language you are most comfortable expressing yourself in, then make sure that someone translates what you said to the group, so everyone understands.

1. Icebreaker

Take turns introducing yourself and share a memorable meal you prepared during the pandemic.

2. Likes and dislikes in cooking practices

1. The facilitator presents the exercise, so everyone understands what we will do.
2. Participants receive their personal journey map, created from the interview data, and read through it. They append it with comments and corrections, additions...
 1. What are some additional likes & dislikes you want to add to the journey map?
As participants discuss, the facilitator adds the likes and dislikes to a large sheet of paper for all to see, at the end, there is a compiled list of likes and dislikes. Discuss similarities and differences.
3. All participants share their most important likes and dislikes. As each participant shares, the facilitator builds a likes and dislikes map with post-its.
4. Participants then vote on the most important likes and dislikes. Participants are each given 10 round stickers (5 green for likes and 5 red for dislikes), they can place their stickers next to the most important likes and dislikes, they can put any number of stickers next to any like or dislike, up to 5 total.
5. The group then brainstorms what their ideal journey map would look like.

Break

3. Uncovering questions about current cooking practices.

1. Participants are each given a stack of “cards”. On each card is a question about cooking.
2. Participants read through the cards and each add at least one question they are interested to learn more about regarding cooking.
3. Participants then each choose 3 questions that are most important to them and share them with the group.
4. Participants must then collectively decide, among all the questions they each chose, which 3 most important to pick.
5. For each of the top 3 cards, participants discuss & synthesize why that is an important question for them.

4. Uncovering questions and assumptions about cooking with electricity.

1. Participants now discuss what their hopes and fears are for the PowerHubs. *The goal of the activity is to uncover assumptions and questions participants have about cooking with electricity.* Everyone first takes some time to think about it silently. After 3-4 min, the group starts discussing, by going round to each person and letting others react to their hopes and fears. The facilitator creates a map of hopes and fears listed by participants.
2. Share to larger group: As a closing activity, all participants assemble together, and one person from each group will take 2 min to present what are the main changes the group anticipates from switching to cooking with electricity, and the main questions they have.

Thank you!

- Thank participants for their contributions
- Let them know what comes next: interview & workshop #2

Workshop #1 materials

1. Icebreaker
 - None
2. Likes and dislikes in cooking practices
 - Individual journey map (1/person)
 - markers/pens
 - blank paper
 - sticky notes
 - timer
 - small colored stickers of two different colors (10/person of each color, 20 total / person)
3. Uncovering questions participants have about current cooking practices
 - card set (1/person) – slide 5
4. Uncovering questions and assumptions participants have about cooking with electricity
 - post-it notes
 - markers/pens

How nutritious are the meals I cook?

How much do I spend on fuel each week?

What is the air quality in my kitchen?

...

What meals do I cook the most?

How much of each fuel do I use each week?

How hot is my kitchen?

...

How much time do I spend on cooking each week?

Why should I move from biomass cooking to a cleaner cooking fuel?

...

...

How much time does it take me to cook each dish?

How much money do I spend on ingredients for each meal?

...

...

How much does each dish cost in fuel?

How much money do I spend on ingredients each week?

...

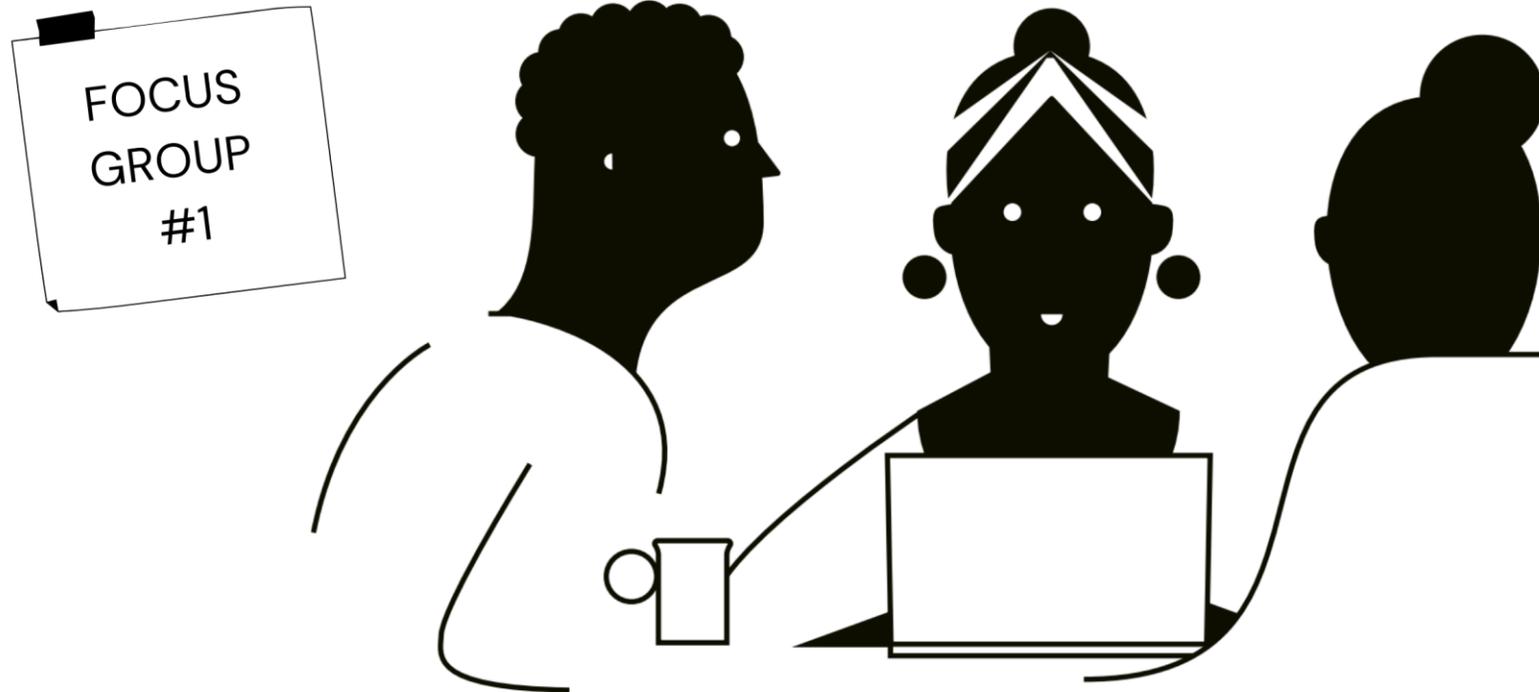
...

Cooking Futures

Focus Group #1

English version formatted 16/9/2021

Cooking Futures



Date

COVID-
19 rules

**Goal: Identify
current strengths
and pain points of
cooking**

Location

Data
recording

Attendees

Facilitators

Today's Agenda

1

Introduction to the workshop
(10 min)

2

Icebreaker (10 min)

3

Likes and dislikes in cooking
practice (50 min)

4

Break (10 min)

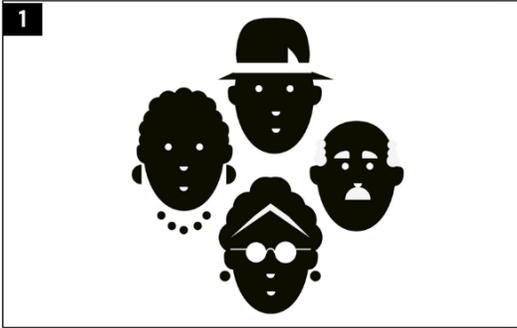
5

Questions about current cooking
practices (20 min)

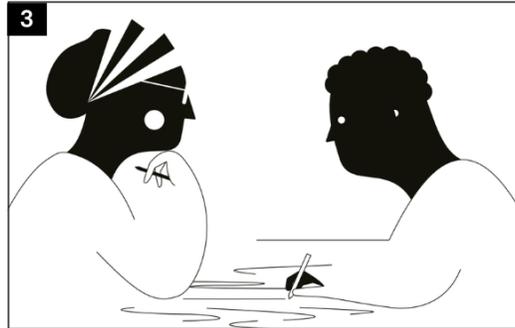
6

Questions about cooking with
electricity (20 min)

Logistics



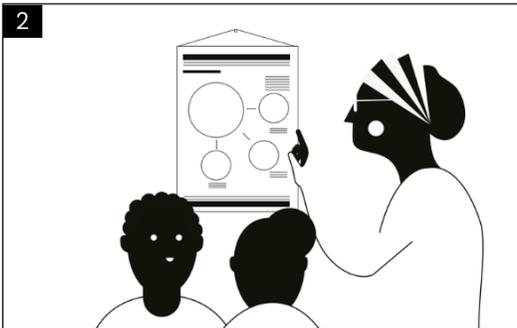
Sit with your enumerator group



You will need to write notes on paper, post-its, and documents we give you.



Speak in the language you are most comfortable in.



One facilitator & one notetaker (enumerator) per group



Share your thoughts, be respectful, build on others' ideas.



Take breaks when needed.

Let's get started!



Icebreaker

Before we start with the session,
let's warm up a little with this icebreaker:

**Take turns introducing yourself
and share a memorable meal
you prepared during the past year.**

Time: 10 minutes



Likes and dislikes of cooking



Activity overview

1

Participants receive their personal journey map and append it.

2

Participants share their main likes and dislikes to the group, the facilitator maps them out with post-it notes.

3

Participants vote on the most important likes and dislikes.

4

The group discusses why those are the most important likes and dislikes.

Total time: 50 minutes

Likes and dislikes of cooking



1

Participants receive their personal journey map and append it with comments, corrections, and additions. Answer:

What are some additional likes & dislikes you want to add to the journey map?

Time: 5 minutes

Likes and dislikes of cooking



2

All participants share their most important likes and dislikes. As each participant shares, the facilitator builds a likes and dislikes map with post-its.



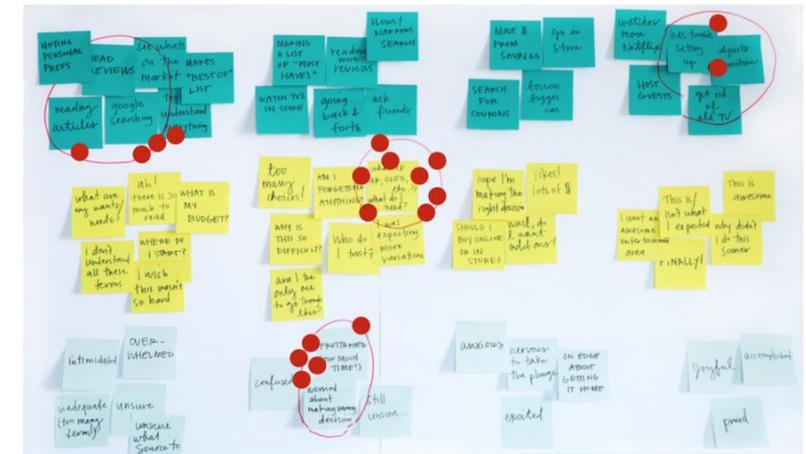
Time: 15 minutes

Likes and dislikes of cooking



3

VOTE



Time: 5 minutes

Likes and dislikes of cooking



WHY?

Time: 20 minutes

Take a break!

Time: 10 minutes



Questions on current cooking practices

Activity overview

1

Participants receive a stack of “cards”. On each card is a question about cooking.

How nutritious are the meals I cook?

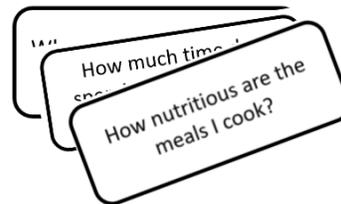
2

Participants read the cards and add at least one question they are interested in, on a blank card.

...

3

Participants choose the 3 most important questions to them and share with the group.



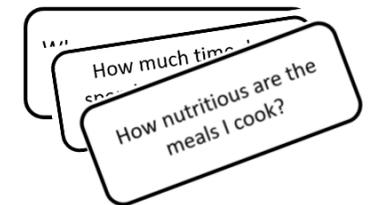
4

Participants collectively pick the 3 most important questions for the group.



5

For each of the top 3 questions, participants discuss why they picked that question.

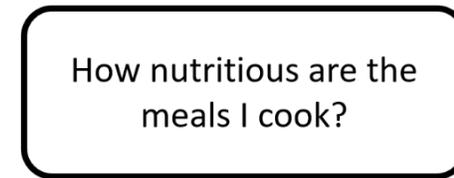


Total time: 20 minutes

Questions on current cooking practices

1

Participants receive a stack of “cards”.
On each card is a question about cooking.



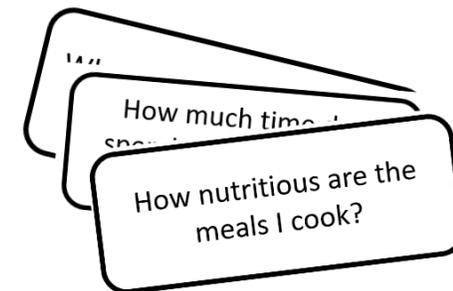
2

Participants read the cards and add at least one question they are interested in, on a blank card.



3

CHOOSE 3



Time: 7 minutes

Questions on current cooking practices

4

**COLLECTIVELY,
PICK 3**

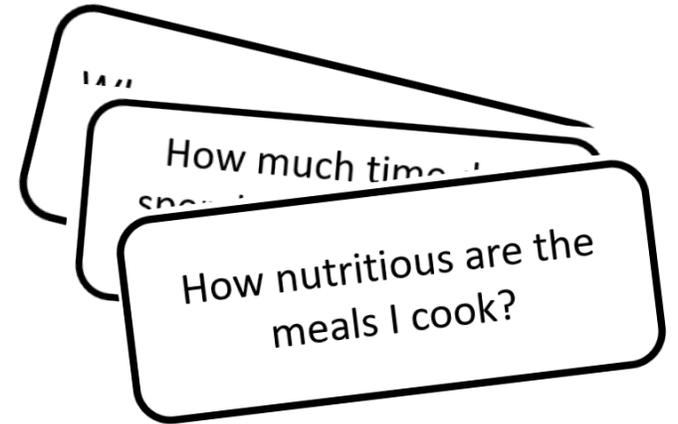


Time: 7 minutes

Questions on current cooking practices

5

WHY?



Time: 7 minutes

Questions on electricity-based cooking

Activity overview

1

Participants write down questions they have about the PowerStations.

2

Each participant shares their thoughts with the group. The facilitator creates a map of questions.

3

Participants organize questions into themes.

4

If there is time, one participant will present to the whole room what the main themes are.

Total time: 20 minutes

Questions on electricity-based cooking

1

Participants write down questions they have about the PowerStations.

What are some question you have about the Power Stations?

What are pros and cons of using the Power Station you anticipate?

Time: 4 minutes

Questions on electricity-based cooking

2

Each participant shares their thoughts with the group. The facilitator creates a map of questions.

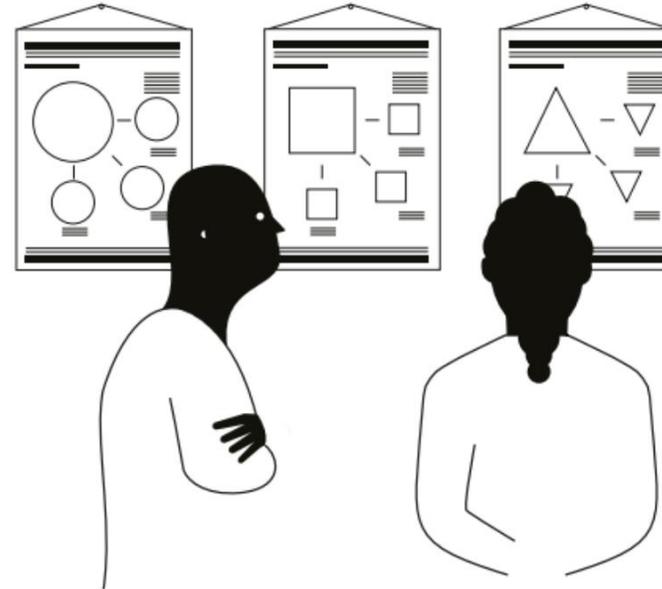


Time: 12 minutes

Questions on electricity-based cooking

3

Participants organize questions into themes.

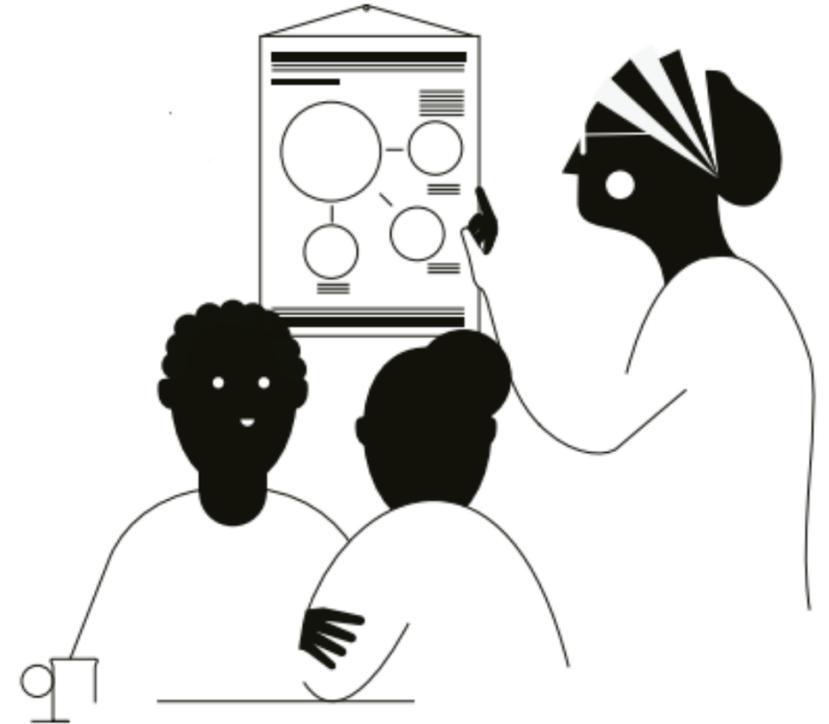


Time: 4 minutes

Questions on electricity-based cooking

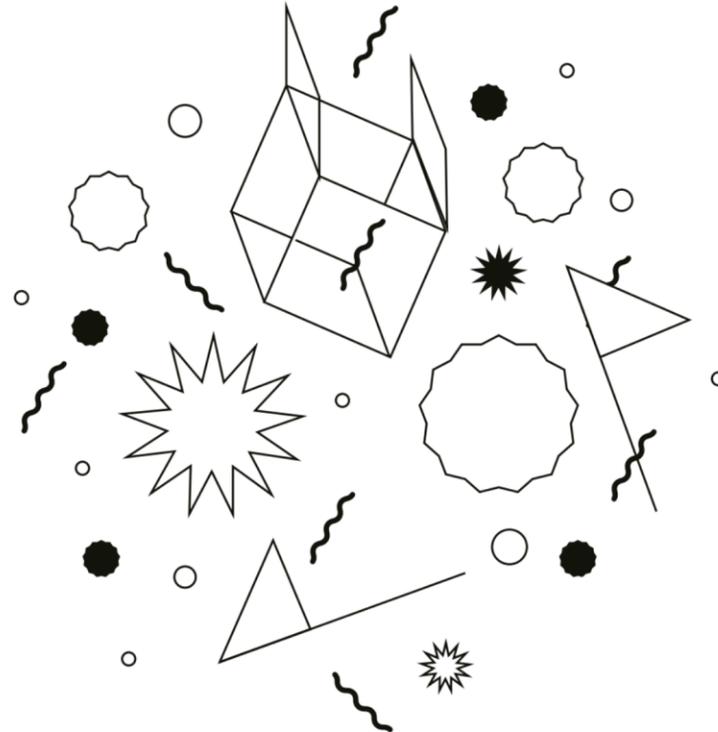
4

If there is time, one participant will present to the whole room what the main themes are.



Time: 5 minutes

Thank you!



Workshop #1 materials

1. Icebreaker
 - None
2. Likes and dislikes in cooking practices
 - Individual journey map (1/person)
 - markers/pens
 - blank paper
 - sticky notes
 - timer
 - small colored stickers of two different colors (10/person of each color, 20 total / person)
3. Uncovering questions participants have about current cooking practices
 - card set (1/person) – slide 5
4. Uncovering questions and assumptions participants have about cooking with electricity
 - sticky notes
 - markers/pens

How nutritious are the meals I cook?

How much do I spend on fuel each week?

What is the air quality in my kitchen?

...

What meals do I cook the most?

How much of each fuel do I use each week?

How hot is my kitchen?

...

How much time do I spend on cooking each week?

Why should I move from biomass cooking to a cleaner cooking fuel?

...

...

How much time does it take me to cook each dish?

How much money do I spend on ingredients for each meal?

...

...

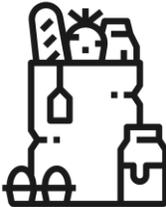
How much does each dish cost in fuel?

How much money do I spend on ingredients each week?

...

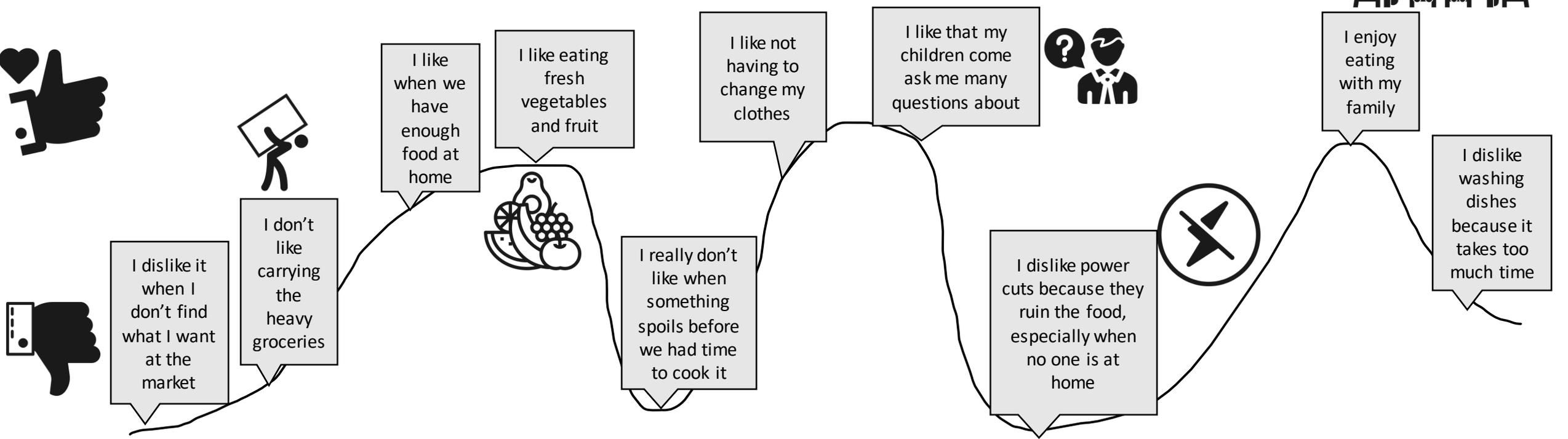
...

Katarina cooks once a day, in the evenings. She cooks for her family: husband, 4 children, and a housemaid. She uses an EPC. Her goals are to save time, since she is extra busy with work and commuting! She likes delicious and well-cooked food that is easy on the teeth, and to keep it simple.

 Before	 During	 After
<p>Actions Katarina buys food every day based on what she will cook for dinner.</p> 	<p>Actions</p> <ul style="list-style-type: none"> - The children and housemaid prepare ingredients and appliances so Katarina can go straight to cooking - Katarina usually uses her EPC to cook, she might cook a side dish on the wood stove that is lit up by the housemaid 	<p>Actions</p> <ul style="list-style-type: none"> - Katarina serves the food to her family directly from the EPC bowl - Someone else washes the dishes because Katarina doesn't have time to do so
<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - Katarina likes having fresh food - Katarina likes to be able to decide each day what she will cook for dinner based on what she feels like eating 	<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - Katarina likes that her EPC can cook many foods very fast, and that the food is well cooked and easy to chew. 	<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - Katarina likes that she can serve the food directly from the EPC because it makes it convenient - Katarina likes washing the dishes! 
<p>Dislikes / problems</p> <ul style="list-style-type: none"> - Family dislikes having a fixed schedule for food - Katarina doesn't like creating a new menu each day since she would have to make sure everyone wants to eat the proposed dish - Katarina doesn't like shopping everyday because it is tiring 	<p>Dislikes / problems</p> <ul style="list-style-type: none"> - Katarina doesn't like waiting for the pressure to build up and to depressurize in the EPC 	<p>Dislikes / problems</p>

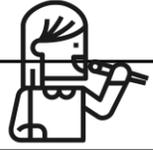
Shukuru: I cook for my family during weekends or on special occasions. I cook Pilau. I use an EPC and an LPG stove. My goals are to save time and money, and to cook in a convenient way.

 Before	 During	 After
<p>Actions</p> <ul style="list-style-type: none"> - I see what is in the fridge and in storage at home - I go buy missing things at the market, based on what we plan to cook for the whole week - I wash the produce and put it away 	<p>Actions</p> <ul style="list-style-type: none"> - I wash and prepare the food (meat, rice, vegetables) - I put the food in the EPC on the fry mode for a maximum of 30 minutes - While waiting for the food to cook, I usually take a nap 	<p>Actions</p> <ul style="list-style-type: none"> - I put food on the table - I serve the food directly from the EPC bowl - I clean off the table and put leftovers on people's plate in the dustbin - If there is remaining food, I store it for later





Shuma: Cooks food for a family of 4 people once a day with an EPC
 My goal is to save time and save electric energy.

 Before	 During	 After
<p>Actions</p> <ul style="list-style-type: none"> - I start by making a list of the things I need to buy from the market - I buy food at the market then carry it home - I wash the food when I get home - Some of the food goes into the refrigerator, other food goes into the cupboard 	<p>Actions</p> <ul style="list-style-type: none"> - I prepare the ingredients for the food I want to cook - I put the food in the EPC and boil it - I mix the boiled food with other ingredients and let it finish cooking - I cover it with the lid and pressure cook the food - After 30-40min, the food is ready to be served 	<p>Actions</p> <ul style="list-style-type: none"> - I set the table and put the food on the table - I welcome the family to eat - I wash up the utensils and clean the cooking area - I put any leftovers in the dustbin 
<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - I like buying food because I can socialize with the vendors and talk to community members - I like when the family hangs out with me when I cook, so we can talk about family issues 	<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - Using the EPC is easy - I can do other things while cooking 	<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - I really like when the family eats up everything I cooked - Eating a meal with my family is an enjoyable time 
<p>Dislikes / problems</p> <ul style="list-style-type: none"> - I dislike carrying heavy bags of groceries 	<p>Dislikes / problems</p> <ul style="list-style-type: none"> - I dislike powercuts - I dislike spending a lot of time in the kitchen 	<p>Dislikes / problems</p> <ul style="list-style-type: none"> - I dislike washing the dishes 

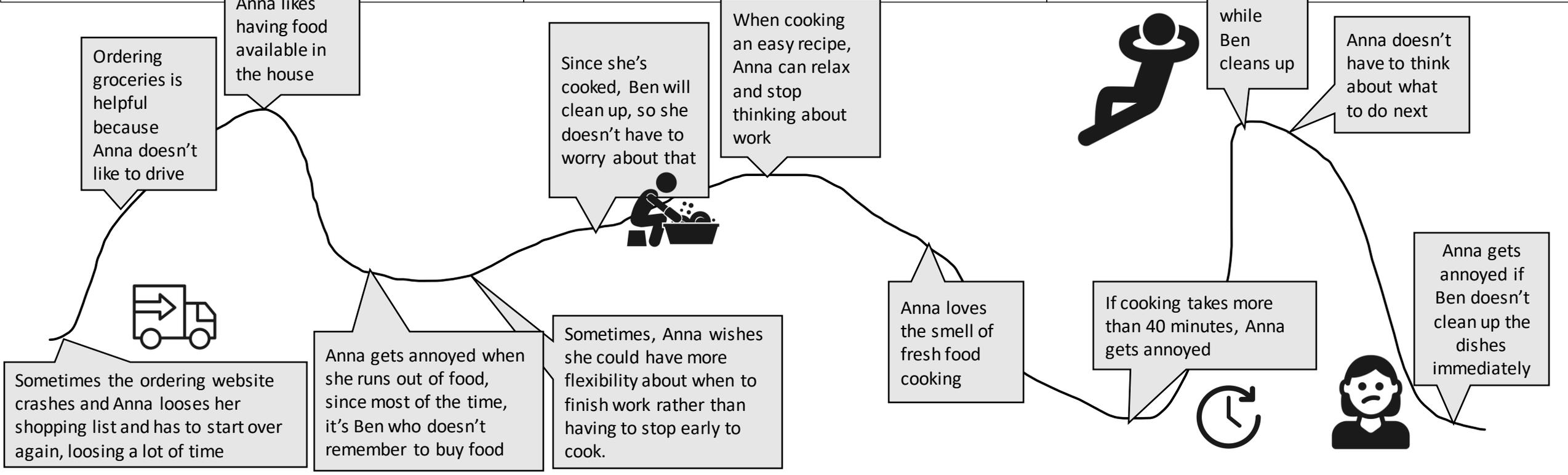
Sawe cooks for his family: his wife and three children. He uses an EPC. His main goal is to cook nutritious tasty foods.

 Before	 During	 After
<p>Actions</p> <ul style="list-style-type: none"> - Sawe identifies what is missing in the kitchen and creates a shopping list and a budget for what to buy - Sawe goes to the market to buy food - When back home, Sawe washes the food. 	<p>Actions</p> <ul style="list-style-type: none"> - Sawe prepares the food: washing and cutting into pieces - Sawe then prepares the pot and put the food in the pot to cook 	<p>Actions</p> <ul style="list-style-type: none"> - Sawe serves the food - Sawe washes the dishes - Any leftover food is saved in the fridge 
<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - Sawe really likes finding low price bargains at the market - Sawe gets excited when new fruits and vegetables are available at the market 	<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - The EPC is very convenient to use 	<p>Likes / positive emotions</p> <ul style="list-style-type: none"> - Sawe likes it when everyone finishes their plate 
<p>Dislikes / problems</p> <ul style="list-style-type: none"> - Sawe really dislikes hitting traffic on the way to or from the market - Sawe doesn't like when he can't find something on his list at the market 	<p>Dislikes / problems</p> <ul style="list-style-type: none"> - Sawe dislikes when the EPC malfunctions 	<p>Dislikes / problems</p> <ul style="list-style-type: none"> - Sawe dislikes when some people don't like the food or leave some on their plate which results in waste 



Anna cooks for her partner Ben and herself. They switch off who cooks each day. She has an electric oven and hotplates, a kettle, and an EPC. Her goals are to cook fast because she is often tired at the end of a long day of work.

Before 	 During	 After
<p>Actions</p> <ul style="list-style-type: none"> - Anna plans what needs to be bought and puts in an order for a delivery - When the order arrives, Anna puts the food away - Anna and Ben keep track of whose turn it is to cook so that person can stop work a little earlier to start cooking 	<p>Actions</p> <ul style="list-style-type: none"> - Anna prepares the ingredients - Anna usually uses the hotplates and the kettle to boil water - Anna sets a timer for how long the food should cook - Anna does some cleaning up while waiting and when the food is almost ready, she tells Ben to set the table 	<p>Actions</p> <ul style="list-style-type: none"> - Anna serves the food at the table and eats with Ben, they talk about their day - After eating, Anna relaxes while Ben cleans up and puts leftovers away



Workshop 2

Outline

- Ice breaker (20 min)
 - Likes and dislikes of e-cooking (1h20min) // Spouse's perspective
 - Break (15 min)
 - Tips and ideas to improve e-cooking (40 min)
 - Ideation (1h)
-
- Break (15 min)
 - Benefits of battery (30 min)

Ice breaker

- Each person shares a short story (2 min) about using the EPC for the first time: what did they cook, how did it go, did anything surprising or frustrating happen?



Likes and dislikes of e-cooking

- Participants spend a few moments individually writing down all your likes and dislikes of e-cooking (using the guide – see next slide).
- Participants share with the group and start clustering the post-it notes into categories.
- Participants decide on the names of the different categories together.
- They then vote (dot voting) for the 3 most important likes and dislikes.
- Participants discuss as a group **why** those were the 3 most important likes and dislikes.
- There can be a small competition between the two groups to see who generates the most ideas.

What do you like / dislike about...

- The EPC
- The PowerHub
- Other electrical appliances you have
- Cooking with electricity
- Having a battery in your home
- Cables
- Solar panel
- ...

Tips and ideas to remove the dislikes

Share tips and ideas that you've found out related to these dislikes.
How have you made e-cooking work for your needs?

(Each person shares at least one tip / idea)

Ideation: How might we remove the dislikes?

- In their enumerator groups, participants think of additional ways to remove the dislikes.
- Once the number of ideas starts to diminish, participants use the prompt cards (on the next slide) to generate ideas
 - For example
DISLIKE fan noise of the PowerHub + PROMPT CARD Change the time of day =
Charge the PowerHub when no one is home
- Once all prompt cards have been used, the group picks 3 best ideas to present to the whole room.
 - Participants vote for the best idea (they can't vote for their own) and the enumerator group with the best idea wins a small prize.



Prompt cards

Change the technology: the EPC, the battery, the solar panel, or the lights		The neighborhood shop is selling a new product that can remove the dislike! What is it?		Change how to cook the meal		Change the time of day
The enumerator helps you cook for a week, what do you ask them to do?		Spend 100\$ to remove the dislike		Change the kitchen or the house		Change the meal being cooked
Add one thing to the EPC, the battery, the solar panel, or the lights						

Break

- During the break, set up the 'cooking accessories' shop. Each item is placed on a display table with its market price.
- A 'thank you' video (or something) is played from all the researchers at Lboro and Gamos working on the CREST pilot.

How to improve your e-cooking experience?

It's time to shop! (1 hour)

- "If we gave you KSH XX, what would you buy with the money?"
 - Give participants a paper where they can select what they would buy.
 - Explain that they should select these with a lot of thought because the SCODE team will try their best to actually buy them.
 - If there is an item they would like to buy but the given budget won't cover it, they can supplement the budget with their own money to buy it.
 - While participants are browsing, the facilitators can answer questions about the items in the 'store'.
 - Participants are able to suggest other things that are not in the store (related to cooking).
 - Facilitator team is able to add suggestions as the workshop unfolds.
- In their enumerator groups, participants share with one another what is on their list and **why** they want to buy those things. The enumerator writes down all the reasons

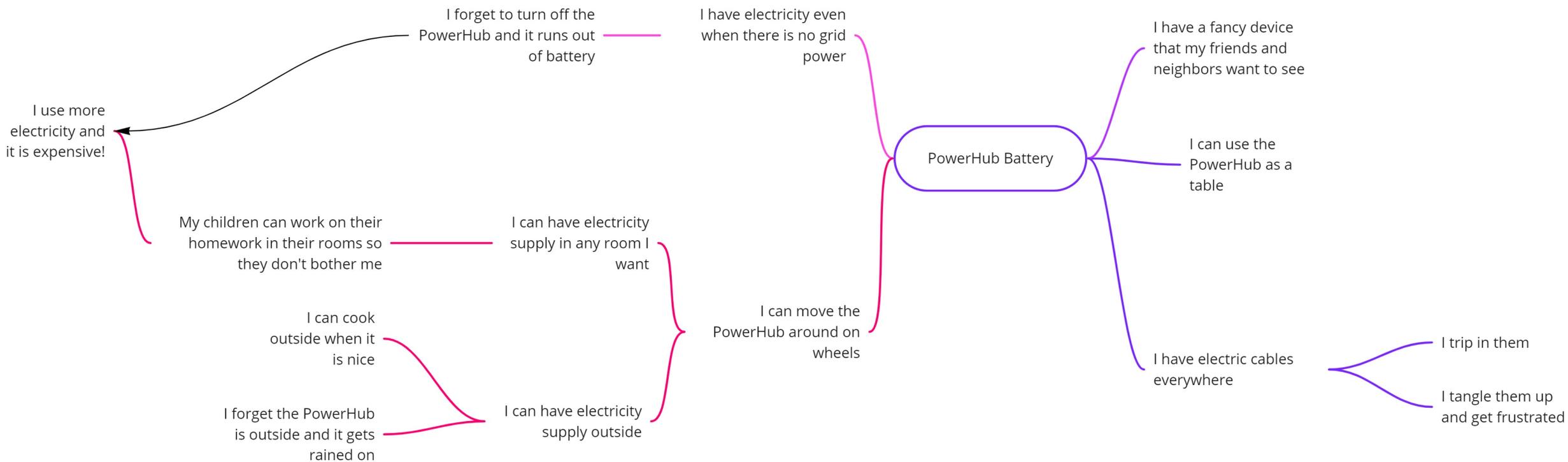


Benefits of battery storage (urban) (30 min)

- Participants collaboratively create a mind-map (example provided) of all the things they experience with battery storage
 - First step: describe the PowerHub
 - Next step:
 - Participants can write and draw on the mind-map
- Participants then indicate what are their favorite parts of having a battery and what their least favorite parts are, explaining why (the enumerators take notes).

Benefits of provision of solar electricity (rural) (30 min)

- Participants collaboratively create a mind-map of all the things they can do with solar electricity + battery system
 - Participants can write and draw on the mind-map
- Participants then indicate what are their favorite parts of having solar electricity and what their least favorite parts are
- For gamification, participants with the most beautiful mind-map can get a prize (at this point, you can try to make sure each enumerator group has gotten a small prize)



Spouses: how have you been affected by the trial?

This activity can be run in parallel to one of the other activities so only spouses participate or sequentially so everyone can participate.

- How have you been affected by the trial activities (good and bad):
 - New phone with WhatsApp conversations (mobile research)
 - Enumerators visiting your house
 - Workshops
 - Interviews
 - Cooking diaries
 - People coming to install things in your house (technicians)
- How have you been affected by the PowerHub + EPC?
 - Cooking experience
 - Taste of food
 - Household norms and habits

Workshop 3

Outline

- Ice-breaker competition
- MECS pop-up kitchen
- Recording studio
- Poster studio
- Checking image-use authorizations

Icebreaker challenge:

Reflect on your study participation

- Each cooking group answers the following questions for 15 minutes
 - What did you like about participating in the study?
 - What did you dislike about participating?
- The group that puts up the most answers wins a small prize
- The group that has the most honest answers wins a small prize

MECS pop-up kitchen

- In groups of 2-3, cook a dish you like using an EPC. As you are cooking, feel free to exchange tips and talk about your experiences with e-cooking. You are also free to walk around to see what and how other people are cooking.
- Once all groups have finished cooking, everyone shares the food.



Recording studio

While the cooking has started, each enumerator group will take turns spending some time in the studio to record their pitches.

Various scenarios are proposed:

- Record a TV ad to sell the EPC and/or battery
- Create a tiktok video to promote the EPC and/or battery
- Interview another participant about their experience in the trial
- Record a video for your mother / for your neighbor: explain how the EPC and battery work
- Record a pitch video to share to your community on WhatsApp
- Pitch different services: what would you invent as a service with the battery & EPC? (example: sell pre-cooked beans, sell usage of the battery when there are power cuts)
- Record a tip for mistakes to avoid or good ideas for what to do with the EPC / battery



Poster studio (optional)

- Each person can take pictures or choose pictures they shared on WhatsApp and print them
- Each person can then create a poster collage: adding stickers, writing key messages on the poster, etc.
- Participants then display their poster during the event and can share back what the poster represents for them
- Participants can take the poster home if they want, but we should keep a trace of them before they do!

Checking photo authorizations with participants

- This activity should ideally happen before the last workshop, if it hasn't yet, it should happen during the workshop
- The enumerator should take the time to go through all the pictures and videos the participant has shared via WhatsApp and check that we can use any and all of them.
- Remove any images or videos the participant doesn't want us to have and use.



Notes

Week	Notable events		Theme title	Theme question 1	Theme question 2
0	Onboarding	Survey + Interview + Cooking diary training + Air quality monitoring	Introductions	<p>Create WhatsApp groups with 5 participants + 1 enumerator + mobile research manager at SCODE</p> <p>Remind participants of the code of engagement for the WhatsApp groups</p> <p>Explain that participants will have two prompts per week, but during weeks where other things are happening (such as a workshop, interview, or cooking diaries), they will only have one prompt to answer.</p>	<p>"Could everyone in the group post a short introduction? Let's start with name, where you are from, where you live, what do you generally do during the day (e.g., job / occupation / activities), what fuels and appliances you use to cook, and what you usually eat for breakfast. Send a picture of your breakfast food if you can! Or better yet, of you eating your breakfast!"</p> <p>Enumerator: introduce yourself first & introduce the people in the group that are part of the TaTEDO team, using the same prompts.</p>
1	Baseline	Cooking diaries baseline	Feedback on the onboarding	"By now, most of you must have completed the onboarding (Cooking diary registration survey, first interview), we'd like to hear your feedback on the onboarding process. What did you like about it? What was something you didn't like so much? Do you have a suggestion to make it better, what could we change?"	// None // (because cooking diaries at the same time)
2			Feedback on the cooking diary	"You've now been filling in the cooking diary for a few days, we'd like to hear your feedback. Do you have any questions about the cooking diary? What do you like about it? What do you think we should change?"	// None // (because cooking diaries at the same time)
3			Dishes that I like & dislike cooking	"Since we're here to discuss cooking, it might be nice to know a little more about how each person here cooks. What is a dish you like making? How do you make it? Why do you like making it?"	"Now on the contrary, what is a dish you don't like making? How do you make it? Why don't you like making it?"
4		Workshop 1	Cooking dishes with different fuels	"What is one dish that you've cooked with two different appliances (for example, cooking rice with LPG versus firewood)? Describe how each experience went, the likes and dislikes of each method."	<p>Ask follow up questions based on responses. For example: Based on that experience, how do you choose how to cook that dish now?</p> <p>Have you found a solution to the issues you experienced?</p>
5	PowerHub intro	Training on the PowerStation + Installation of PowerStation	Feedback on the workshop	// None // (because workshop + PowerHub install at the same time)	"You participated in the workshop last week, we'd like to hear your feedback about how it went. What did you like about it? What did you not like? What do you think we should change?"

6	Second Interview + Mobile research reflection session	PowerStation first thoughts	<p>"You've all just received the PowerStations, what are your first impressions of it? Have you tried using it? What did you do and how did it go? Do you have any questions about it?"</p> <p>If you have any questions, suggestions, or want to share experiences about using the PowerStations, you are encouraged to share them on this WhatsApp group, no matter what the prompt is for that week, and no matter what else is happening during the trial. This group is meant for you to learn from each other and help each other have the best experience with the PowerStations."</p>	
7	Cooking diaries	Re-organizing the cooking space to accommodate the EPC	"Now that you've had the PowerStation for some time, could you take a few pictures / videos and show us where you've put it in your house? How you've organized your kitchen space to accommodate the new devices? What do you still struggle within the organization of your cooking space?"	// None // (because cooking diaries at the same time)
8		Undercooking and overcooking	"Have you had any accidents with the EPC so far? For example, have you burned any food, have you undercooked food... If so, tell us about what happened. What have you tried doing to prevent these things from happening again? What do you still need help with?"	// None // (because cooking diaries at the same time)
9		Learning about other's experiences	"Based on your experience so far using the new appliances, what are a few tips you would give to our next group of participants? What would have helped you as you learn to use the devices?"	"We're about to start conducting mid-point interviews, what are some questions you'd like to ask other participants? what are you curious to know about how other people are experiencing the trial & e-cooking?"
10	Workshop	Cooking a particular food - ugali	"Have you cooked Ugali in the EPC yet? If so, please tell us about that experience, the pros and cons. If you haven't, please try this week and tell us what you think!"	// None // (because cooking interviews at the same time)
11	Mobile research reflection session	Tutorials	<p>"When you don't know how to cook something using the new appliance, where have you looked for guidance and advice? (e.g., online, asked friends, asked this group, read the provided documents...)"</p> <p>Your task for this week, if you are up for it, is to film a recipe tutorial using one of the new appliances!"</p>	Ask participants to share their videos.
12	Possible intervention	Feedback on intervention	Ask for feedback on the intervention	Ask for feedback on the intervention
13		Cleaning and handling	"What do you think about cleaning and handling the EPC? Have you developed a technique for how best to clean & store the EPC?"	
14	Possible intervention	Feedback on intervention	Ask for feedback on the intervention	Ask for feedback on the intervention

15		Third interview	Hacking the kitchen	"What are a few things you have been able to do with the EPC that you couldn't do without it? This week, try cooking something in the EPC that you had not cooked before, or try using the EPC for something new (e.g., yogurt, baking, popcorn), and tell us about it."	<i>Ask participants to tell you about a new thing they tried this week.</i>
16	Endline	Cooking diary	Cooking a particular food - pilau	"Have you cooked Pilau in the EPC yet? If so, please tell us about that experience, the pros and cons. If you haven't, please try this week and tell us what you think!"	<i>// None // (because cooking diaries at the same time)</i>
17					<i>// None // (because cooking diaries at the same time)</i>
18		Endline survey + cooking competition + Workshop 3	Feedback on the mobile research	"This week is the last week of this WhatsApp group, we'd like to hear your feedback on your experience being part of this WhatsApp group. What did you like about it? What was something you didn't like so much? Do you have a suggestion to make it better, what could we change?"	<i>// None // ending</i>
19	Reflection session with enumerators Reflection session with country partners			<i>// None //</i>	<i>// None //</i>

CODE OF ENGAGEMENT FOR WHATSAPP GROUPS

Please kindly take note of the following:

Participation is expected. As this group has been set up as part of a research project, please take note that participation is not only encouraged, but expected on a weekly basis. If at any point you cannot continue participating, please do get in touch with your enumerator.

Keep chat relevant. The purpose of the group chat is to understand user experiences of Power Stations and electric cooking appliances. Please do not share racially, culturally, or ethnically offensive comments, or other inappropriate materials.

Be respectful. This is not a personal group, but a professional one that is made up of people who you may not normally be in touch with. Please keep in mind that any differences are to be respected. Please do not use a group to criticise someone else or air grievances.

Tone of messages. Please take note that sometimes tone and meaning can be misunderstood over message.

Give each other the benefit of the doubt, but also be aware of the tone and language you use in your messages.

Muting the group. The enumerator will mute the group each evening from 21:00-7:00 (9pm to 7am) and the enumerator will not respond to questions/comments during this time. This is intended to give everyone a break from messaging. Whilst you are welcome to post in the group at any time, please consider that the group won't be "live" between 21:00 and 07:00. You are further welcome to mute the group to your convenience, as long as you consistently engage with the group several times a week.

Creating a sub-group. You are encouraged to create sub-groups if you feel it is best to separate discussion on different topics. Please inform the enumerator, as we would be very interested in knowing what you are discussing so we can best support you in your trial experience and design a better product that responds to your needs and wants.

Questions. Sometimes questions may come in from other participants around the EPC and its use. All questions are valid and encouraged. So please do feel free to post them!

If you know the answer: Please feel free to engage and respond! You do not have to wait for the enumerator – we would love to see your response. Your input is highly valued!

If you do not know the answer: Don't worry – that's why the group is here! Please do add any further information or questions, that will add to the discussion. Hopefully we can clear up any uncertainty for everyone in this way!

If someone has asked for advice: Please feel free to reply. If you see that someone else has already answered with the same advice you would give, then you do not need to. However, do feel free to add further suggestions if you have any!

Leaving. As previously mentioned, you have agreed to take part in this study. If you need to leave prior to its end, please inform your enumerator by sending a private message to them. As the study comes to an end, please do not leave the group until the enumerator has officially concluded the study by thanking participants and confirming that the study is over and that the group will be closed.

Enumerator training

INSTRUCTIONS

- The following slides are for the enumerator training.
- We recommend you bring the enumerators together and do this training over a day and a half. ½ day: Introduction to Living Lab Methods & Journey Maps. ½ day: interviews. ½ day mobile research. You might be able to conduct all training in the same day.
- Several print outs will be necessary during the training and are listed at the start of each section. You will also need to give enumerators their study phones with WhatsApp.
- We suggest you **print these slides** for each enumerator so they can take notes, add information, and keep as reference as needed.

INTRODUCTION TO LIVING LAB METHODS & JOURNEY MAPS

INSTRUCTIONS

- The goal of the following slides is for enumerators to understand why we are using qualitative methods of interview, mobile research, and workshops with participants. This section covers:
 - Slide 5: What are the Living Lab methods? How do they fit in with the other methods of the study.
 - Slide 6: What are the goals of the Living Lab?
 - Slide 7-15: Journey Maps are a tool to help us analyze and synthesize the information we collect through the Living Lab methods.
- For this section, you will need to **print out the template of a journey map for enumerators** to fill out.

MECS methods

Living Lab

- Interviews (intake, middle, exit)
- Mobile Research (weekly)
 - Workshops (x3)

Cooking diaries

- Intake survey
- Monitoring of cooking habits
 - Exit survey

Quantitative monitoring

- Automatic data monitoring of usage of the Power Stations with the DAQ system



THE MECS LIVING LAB AIMS TO:

- 1. ENSURE A POSITIVE AND MEANINGFUL TRIAL EXPERIENCE, IN WHICH PARTICIPANTS FEEL HEARD, ABLE TO LEARN, AND EMPOWERED TO INFLUENCE THE TRIAL AND TRIAL OUTCOMES.**
- 2. MAKE VISIBLE THE COMMUNITY'S SHARED STRENGTHS, BARRIERS, AND PROCESSES FOR CHANGE RELATED TO E-COOKING.**
- 3. ENGAGE USERS AS CO-CREATORS OF AFFORDABLE, RELIABLE AND MODERN ENERGY COOKING SERVICES.**

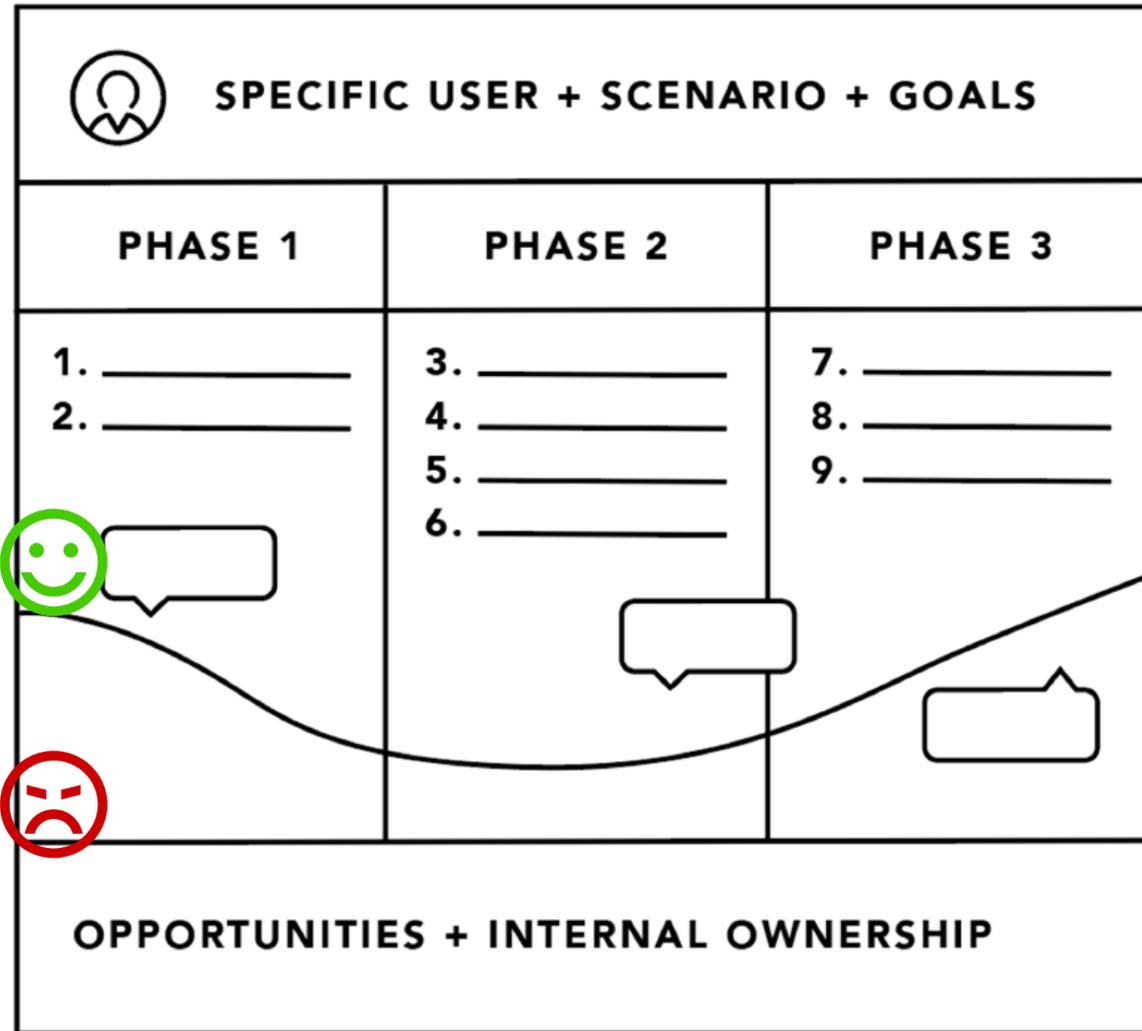


**LIVING LAB ACTIVITIES
WILL HELP US
UNDERSTAND THE
EXPERIENCES OF
EVERYDAY COOKS.**

**JOURNEY MAPS
ARE A KEY METHOD
TO HELP US DO
THIS.**

CUSTOMER/USER JOURNEY MAP

**JOURNEY MAPS
REPRESENT
EXPERIENCES AS THEY
UNFOLD OVER TIME.**





Mercy is the main cook for her household, she lives with her 4-year old child. Mercy is very busy with work and needs to be able to cook a healthy meal in 20-30min on most weekdays. She can spend a little more time cooking on weekends.

Her goal is for cooking to be convenient, meaning fast and for her to be able to multitask while cooking.

Planning and shopping

1. Mercy plans her meals on Sunday, it helps her budget and be more efficient during the week.
2. Mercy buys groceries on the way home from work. She stops by the market to buy food for supper.
3. Once home, Mercy doesn't start cooking right away, she gets her child a snack and does some work around the house first.
4. Once a month, Mercy buys a 6kg cylinder of gas from her workplace: SCODE, and brings it home.

Cooking

1. Mercy starts by washing the utensils, and she starts cooking when the sun goes down.
2. She usually uses her LPG stove to cook in the evenings because it is fast, she can cook inside (vs firewood), and she doesn't have to worry about the battery running out (vs EPC).
3. Mercy cooks meals that take her 20-30 min to make, and makes enough for supper and next day's breakfast. She usually cooks while watching tv.

Eating and Clean Up

1. Mercy and her child eat their dinner.
2. Then Mercy stores the leftovers in the cooking pot, to be eaten the next day at breakfast.
3. Mercy then washes the dishes.



Even though I don't care for cooking so much, I like having control over the quality of the ingredients and the portion size.

I really like stopping at the market on the way home, I'm a social person and I like talking to people!

I like that my kitchen space is in my living room, so that I can watch TV at the same time.

I wish I could use the EPC more often because it is so convenient to use, but now that I use a solar battery system, I can't risk using it at night, I only use it during sunny days.

For breakfast, I usually heat up the leftover food and make some hot tea.

I don't like washing dishes. That's why I don't wash the utensils right away.

Opportunities ...

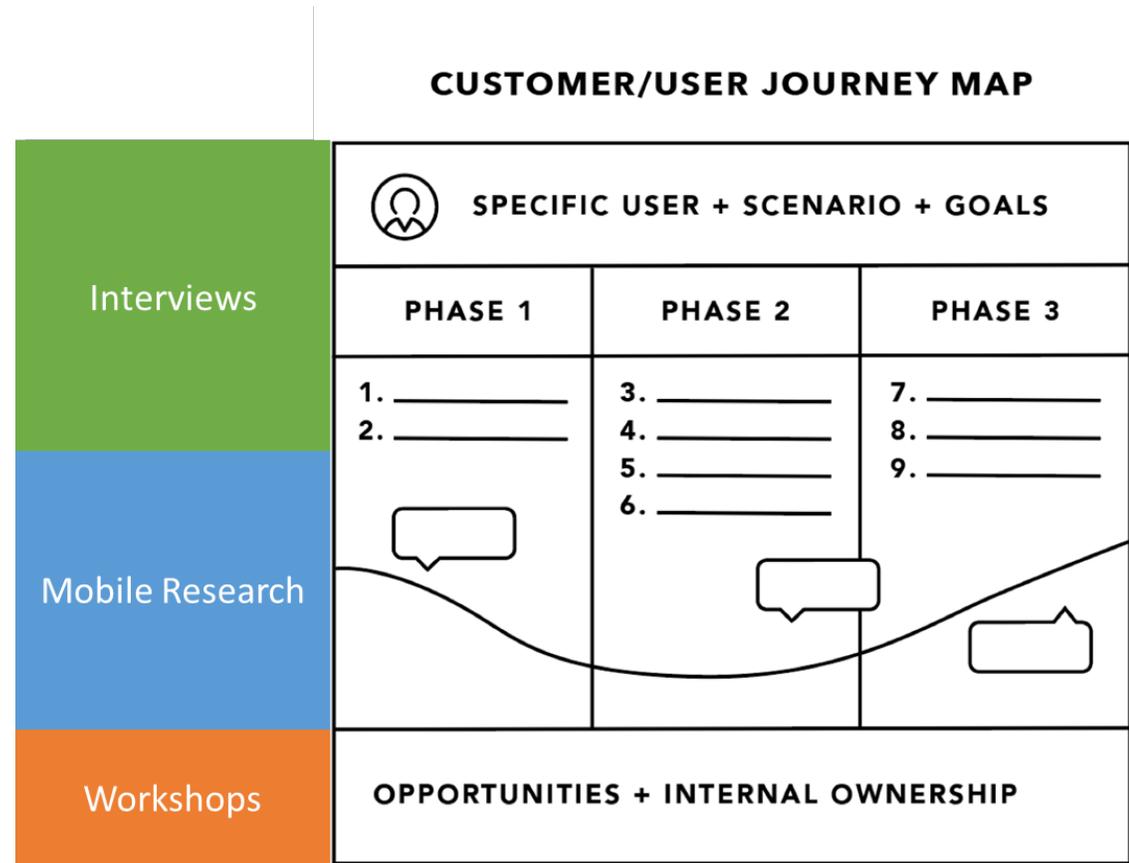
We will use journey mapping to understand and represent ...

...**the current cooking experience** – what people enjoy about the current cooking experience and what frustrates them? (Interview 1 + Workshop 1)

...**the study experience** – how was it for participants to transition to using the PowerHubs? (Interview 2 + Workshop 2)

...**the potential transition to electricity-based cooking** more widely – what services could help people transition? (Interview 3 + Workshop 3)

How to use the Living Labs activities to build user journey maps?



A close-up photograph of a pink pushpin stuck into a map. The map shows various colored lines representing roads and geographical features. In the background, several other pushpins in blue and yellow are visible, but they are out of focus. The text is overlaid on the right side of the image.

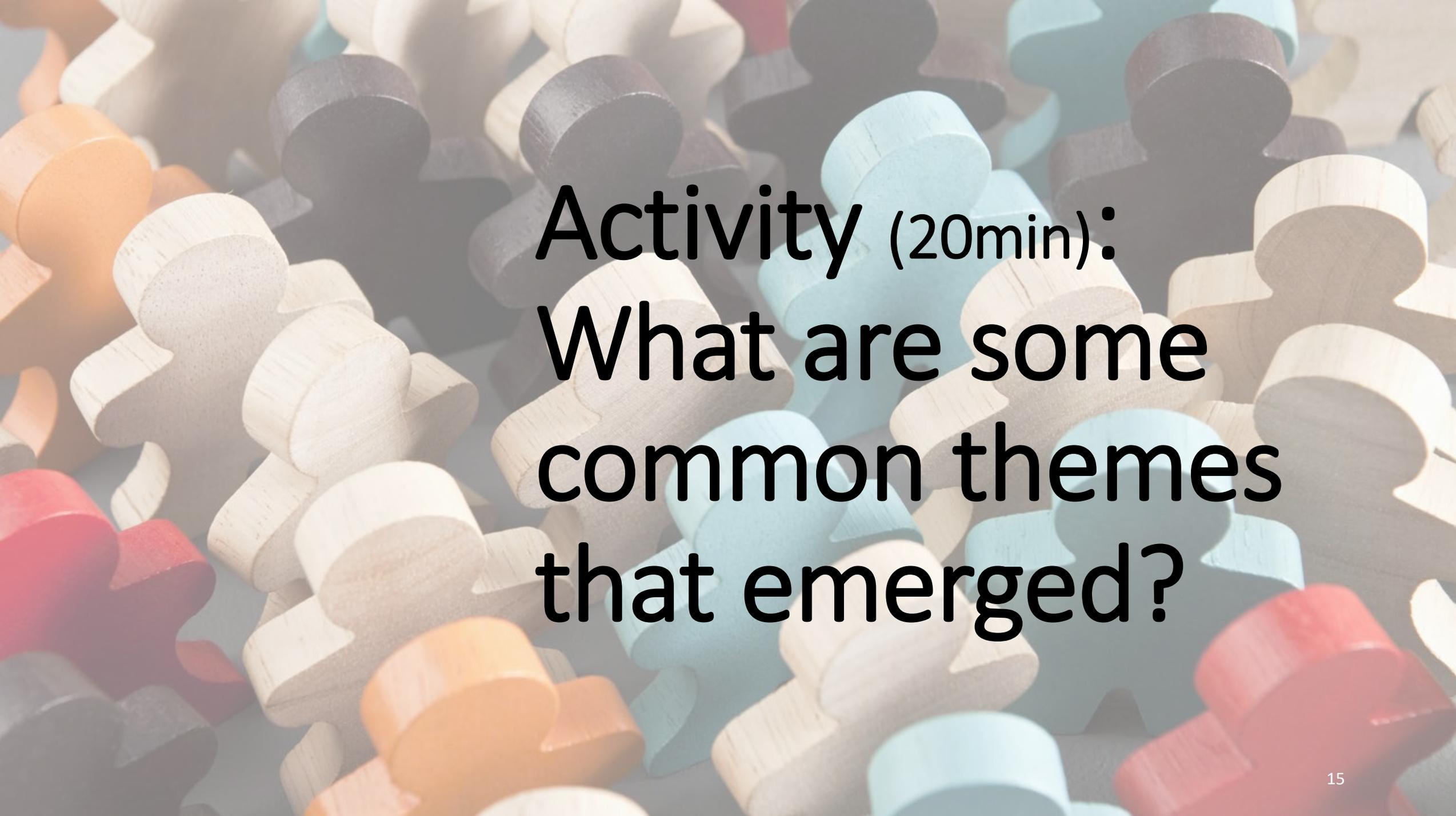
**Activity (15min):
Map your own
cooking journey!**

- **Name**
- **Cooking scenario** (who do I cook for, what do I use to cook...)
- **My goals** (what are my top motivating factors chosen at the start of the workshop)

Before (planning, shopping, storing, finding time...)	During (preparing ingredients, using appliances, waiting, accidents, burning...)	After (washing, storing, serving, eating, leftovers...)
Actions	Actions	Actions
Likes / positive emotions	Likes / positive emotions	Likes / positive emotions
Dislikes / problems	Dislikes / problems	Dislikes / problems

A close-up photograph of a pink pushpin stuck into a map. The map shows various colored lines representing roads and geographical features. In the background, several other pushpins in blue and yellow are visible, but they are out of focus. The text is overlaid on the right side of the image.

Activity (3min each):
**Present your
cooking journey
map!**



Activity (20min):
What are some common themes that emerged?



INTERVIEW TRAINING

Minimum 2 hours

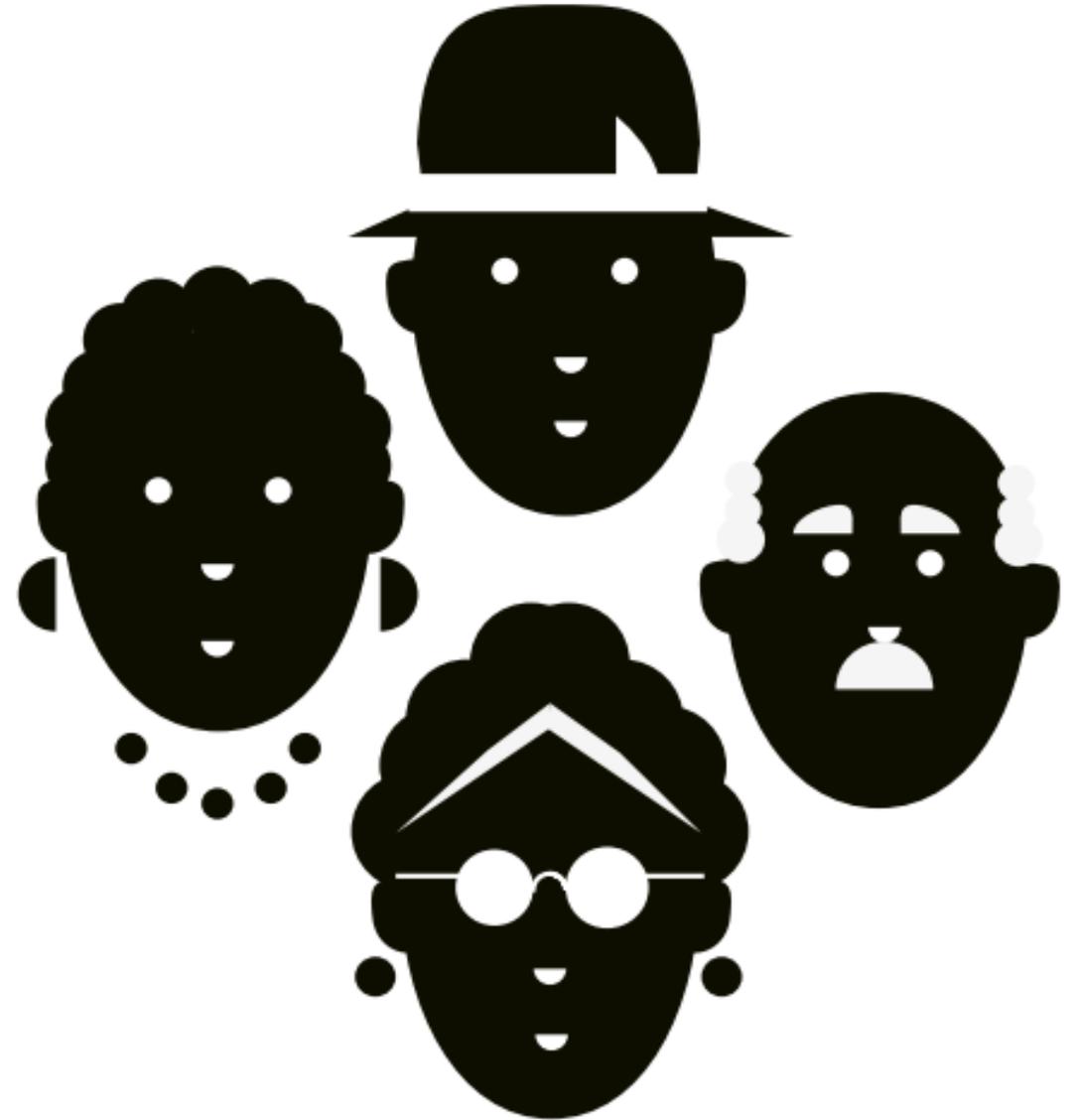
INSTRUCTIONS

- The following slides are for interview training.
- You will need to **print out an interview guide** for each enumerator.
- You will need to create the 'interviews' **WhatsApp group** where enumerators can confirm the interviews they have done and share their reflections.
- You will need to create a **shared online folder** where enumerators are tasked to put the audio recordings.
- You will need **audio recorders** so the enumerators can practice using them.
- The **training includes an audio clip of an interview**, make sure you can play it loud enough for all enumerators to hear.
- Print the '**tips on conducting interviews**' for each enumerator (slide 25).



Definition and Goals

- Qualitative interviews are a more personal form of research where you can ask follow-up questions to better understand the needs, wants, and motivations of participants. As part of iteration one of the Living Lab, participants will partake in three interviews: (1) an intake interview, (2) a midway interview, and (3) an exit interview.
- Qualitative interviews predominantly ask open ended questions (i.e., questions that cannot be answered by 'yes' or 'no' and require a detailed response). You are encouraged to ask follow-up questions that are not scripted, if participants share a new or surprising piece or information. Asking probing questions about *why* participants act or feel a certain way can be very informative.





**It can take time to get comfortable with interview techniques.
You should learn from one another and throughout the study as you
conduct more and more interviews with participants.**

Start by listening to a few extracts from this practice interview:





Logistics

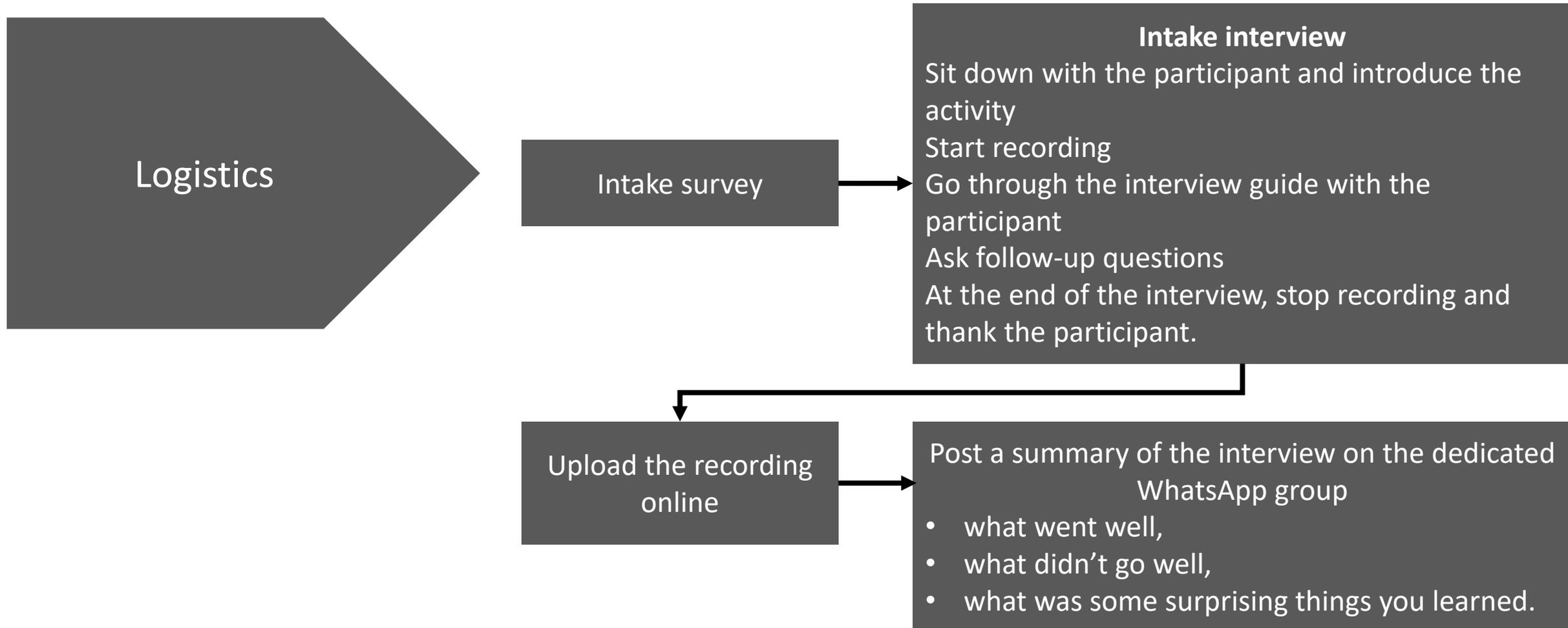
	Logistics	Proposed topic	Goal
Intake interview	One-on-one in-depth discussion, approx. 60min, should be conducted after the intake survey.	Participants' motivations when cooking, the tools they use to cook, the steps taken to cook, likes and dislikes.	To understand participants' current cooking journey, likes and dislikes.
Midway interview	One-on-one in-depth discussion, approx. 60min; can be conducted anytime between the second and third workshop.	Experience, benefits, and pains of cooking with electricity, feedback on trial experience.	To reflect upon participant's experience with both the new technology and the trial itself.
Exit interview	One-on-one in-depth discussion, approx. 60min; can be conducted during the last two weeks of the trial period or during exiting activities.	Ideal cooking futures, e-cooking services, feedback on trial experience.	To reflect upon participant's experience with both the new technology and the trial itself.

Who? You interview the study participant.

Where? At the participant's home, in a comfortable location for them.

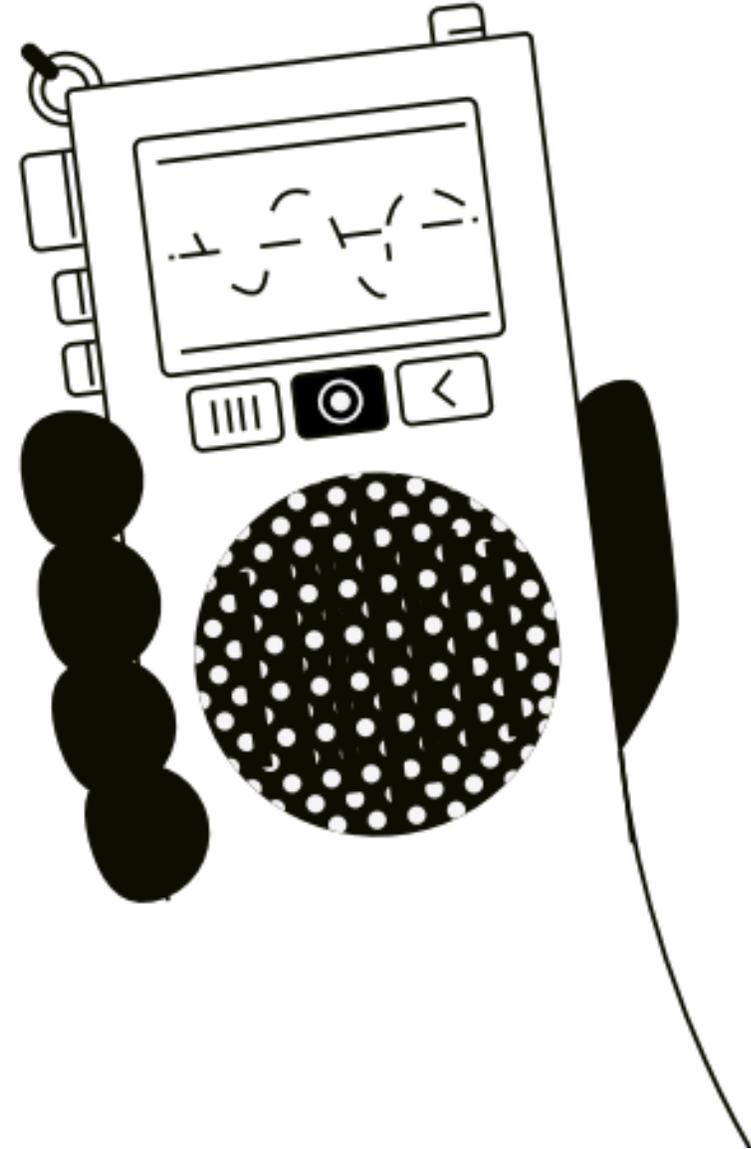
When? During the onboarding process, ideally right after doing the intake survey.

Why? To understand their cooking journey map.



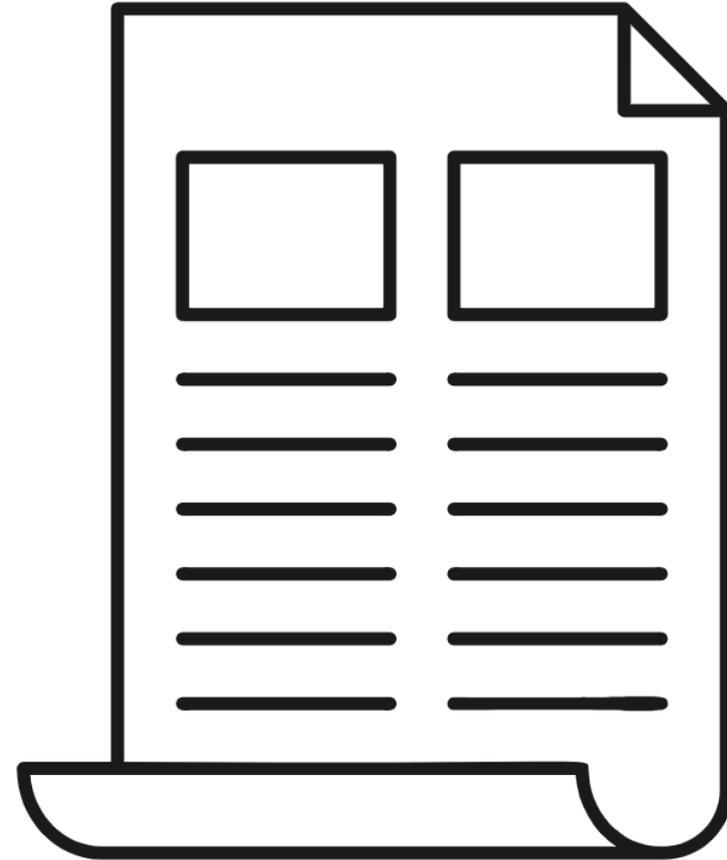
Data Collection

- Qualitative interviews typically generate rich data which is difficult to capture via notetaking. Therefore, you will need to use audio recording devices to record each interview for later transcription. It is always useful to have 2 recording devices in case one malfunctions (e.g., use a smartphone with a voice recording app as a backup to your primary voice recorder).
- PRACTICE RECORDING CONVERSATIONS, THEN EXPORTING THEM TO A SHARED ONLINE FOLDER.



Interview protocol

- Each enumerator receives a copy of the interview protocol
- Everyone studies the interview protocol
- Enumerators ask any questions they have
- Enumerators pair up with another enumerator and practice part of the interview with them, then switch roles
- Come back all together and reflect on what was easy/hard, what went well, what could be improved





How did the training go?

What went well for you?

What could have been improved?

What suggestions do you have for future trainings?



Tips on conducting interviews (print and give to enumerators)

Tips for interviewing, based on the results from interview 1

Thank you to all enumerators who contributed to the creation of this document by providing feedback about how the first interviews with participants went.



1. **Try starting with open-ended questions as much as possible**, even if the participant answers something unexpected. Closed questions bias the response. Use closed questions as follow-ups.

Example of an open-ended question

Interviewer: How do you decide what to cook?

Example of a closed question

Interviewer: Do you normally plan what to cook? Or it just comes accidentally?



2. **If participants are shy and not very talkative**, you can try asking them to describe how they cook as if it were a movie. You could also give examples of your own life to help participants understand the type of answers you are looking for. It can also help to think of a scenario, for example: if you were to move, that are three things you would take with you / want your new kitchen space to have? What are three things that you would not want to take with you / would not want your new kitchen space to have?



3. **Questions that have a moral judgement, are emotional, or are about abstract ideas are harder for participants to answer, but those are the questions with the most important information!** Asking for factual information is easier so you can use factual questions as a warm up.

Example of a factual question

Interviewer: How often do you cook in a day?



Abstract question (notice the interviewer repeats back previous answers to help the participant)

Interviewer: Okay, thank you for the detailed explanation about your favorite food, your choices and important things you consider when cooking your favorite food. What other important things do you consider when it comes to daily cooking?

Tips on conducting interviews (print and give to enumerators)



4. **Asking “why?” can help us understand the reasons behind answers.** For example, cleanliness of the kitchen could be important because of health reasons or because having a clean kitchen is a sign of status, or having specific cooking utensils could be important because of efficiency and speed of cooking, because of cost of cooking, or because they make the food taste a certain way according to the participant.

Interviewer: Why are you prepare in the afternoon and then eat for the evening?

Interviewer: Why don't you prefer LPG?



5. **It is possible to both like and dislike something at the same time:** I like having a clean kitchen but I don't like washing dishes; I like fulfilling my duty but parts of my duty are a bit boring. Making it okay for the participant to feel both ways about something can help them discuss the nuances of what they like and dislike in cooking.



6. **There are no right or wrong answers.** Never make the participant feel like what they said was wrong, or make them feel like they didn't understand correctly. It is your job to be clearer and ask follow up questions to find information.



7. **Give participants time to think:** if a participant has never thought about a question before, it might take them some time to come up with the answer. That's fine! It's very good to give participants space to think, and time to sit silently when they are thinking.



8. **Bringing up past responses makes the interviewee feel heard.**

Interviewer: Well, I remember you said at the beginning of the study that there are two cooks in your house, that is you and your sister. Who now decides what to cook?

9. **If a question feels repetitive, you can skip it!**



Add any additional tips you may have here:



MOBILE RESEARCH TRAINING

2 hours

INSTRUCTIONS

- The following slides are for the mobile research enumerator training.
- Create a WhatsApp group to run a **practice mobile research** with enumerators.
- Create a **WhatsApp group for a weekly summary of mobile research** (which includes all enumerators, TaTEDO mobile research point person, link researcher, & SD4MECS team).
- Print the **'tips on getting feedback'** for each enumerator.
- Print the **WhatsApp conversation from the TaTEDO mobile research test**, print several copies for enumerators to flip through.

Definition and Goals

Mobile-based research is a method that uses technology such as smartphones to conduct research. This method is used by researchers to observe and interact with people in their environment to understand their behavior, values, and beliefs. Because of our increasingly connected world, mobile research allows us to observe and interact with participants through smartphones.



Example mobile research

- Read a print-out of the mobiles research test that was done with TaTEDO team. Find it [here](#).



Logistics

- **WhatsApp groups for mobile research.** We are proposing to use WhatsApp groups, consisting of an enumerator and the participants the enumerator is responsible for (around 5 participants). Each participant must receive a phone and be trained, if needed, in how to use WhatsApp to send messages, pictures, videos, and audio messages, both to groups and to individuals.
- *Weekly themes.* Mobile research has significant flexibility. Each week will have a theme. A prepared list of themes will include questions for participants about the theme. We would also like to encourage country partners and enumerators to propose topics each week. For example, if a particular celebration is upcoming, which involves traditional dishes, that week's topic might be around how e-cooking is used to cook these traditional dishes and what challenges arise.
- *Daily interactions.* The weekly theme and questions will be shared at fixed times and days (for example, each Monday at 10AM and Thursday at 3PM), so that participants can anticipate when they might need and want to respond. Participants will be encouraged to answer questions posed by enumerators, to discuss and comment on others' answers (e.g., if they agree or have experienced the same thing as someone else, if they have found a work around to a problem, etc.), and to share pictures and videos relevant to the theme. Participants are also encouraged to ask any questions they have to the group or propose suggestions.

Brainstorming themes

What could be a mobile research weekly theme?



In pairs, come up with 3 potential themes, and a few questions for each theme:

- 1 theme about how people currently cook.
For example: a weekly theme around breakfast. We could ask people to take a picture of their breakfast and share their breakfast recipes with others. Then we could ask participants to try someone else's breakfast for one day.
- 1 theme about how people like / use the Power Stations.
- 1 theme about ideal electricity-based cooking services.

What to do when no one / some people don't answer the prompts?

7/22/2021

Hi everyone! Could @Shukuru Meena Tatedo and @Anande TaTEDO respond to the last prompt? Here it is as a reminder: what is one dish that you've cooked (or just eaten, for those that don't cook) with two different appliances (for example, cooking or having rice from a pot versus an EPC)? Describe how each experience went, the likes and dislikes of each method.
Thank you! 1:51 AM ✓

Anande TaTEDO
I have cooked beans using CHARCOAL STOVE,GAS AND EPC
a)charcoal stove
Cooking beans using charcoal requires attentions both in beans and charcoal you use, it requires close supervision in cooking so that the water does not dry out and lead to burns and it takes a long time to cook may take two to three hours, so when you want to cook using charcoal you need to stick it early or soak it early so reduce boiling times may be by Half
But the food is very tasty and smells good
B)using Gas
use gas for cooking beans ..
It helps to cook very quickly but the required concentration is much closer and more gas is used but it cooks food better. so far sometimes ,when the eletrcity is off i use charcoal stove to heat beans and gas for Kuunga onions and carrots a... [Read more](#)
7:32 PM

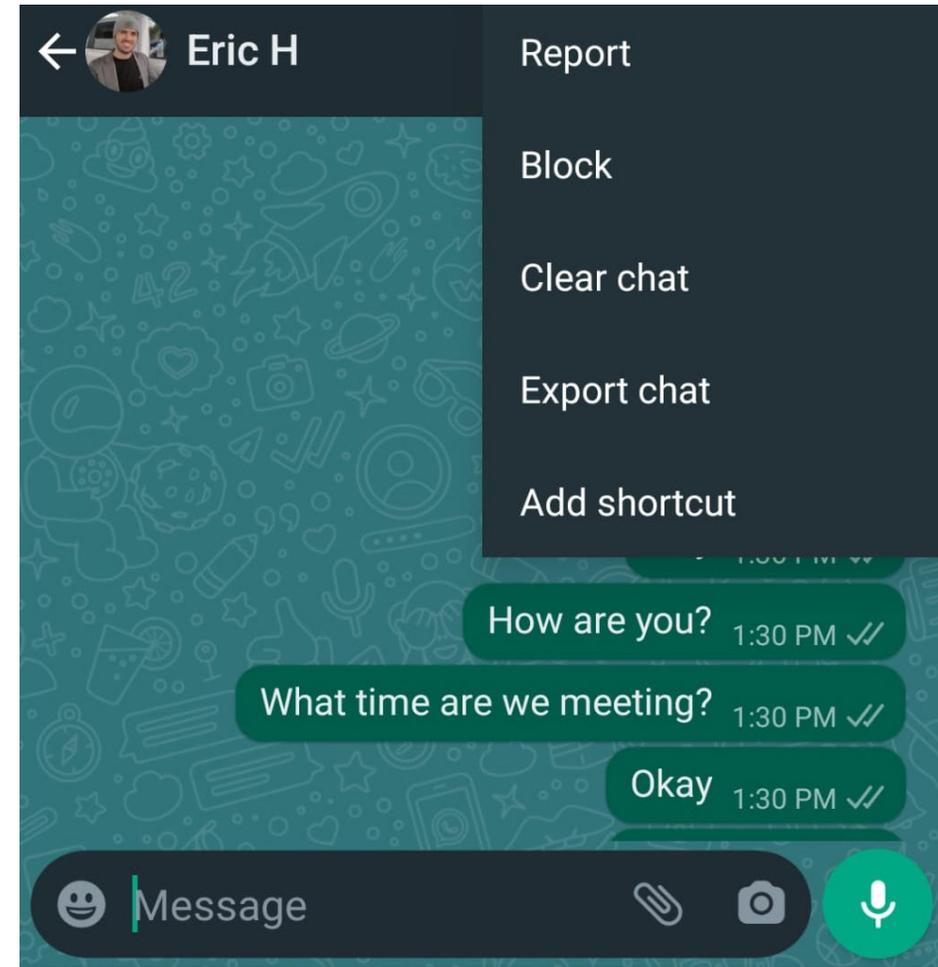
Shukuru Meena Tatedo
Dear Team, thanks for sharing your experience, this is mine as well on cooking "Kongoro". Kongoro is cow foot soup. Its preparation is not complex, rather you ensure the cow foot is well cleaned, cut into pieces and put into a clean pot. Naturally the cow foot meat is hard to cook and it takes a lot of time.
Using charcoal stoves, it is indeed tedious as I had to go through a lot, first buying charcoal, setting the fire on, waiting fire to catch up for almost 10minutes. In my rural areas, this is not cooked in the normal metal pot rather in clay pots and using firewood, but here in town we use clay pot in the charcoal stoves. When boiling this, I had to be close to the stove checking the cooking process, water level and sometimes if the fire has gone ou... [Read more](#)
8:00 PM

Discuss how to keep everyone engaged and encourage participation.

Data Collection

At the end of each week, enumerators will extract a couple of highlights from their conversations with participants, which they will share in a group conversation with all enumerators, country partners, and Loughborough research team. The group conversations will also be exported weekly and sent to the TaTEDO team who will then send it on to the Loughborough team.

Each month, enumerators will be invited to propose new themes to explore based on their intuition and interactions with participants.



Mobile Research Test

- TaTEDO Mobile Research point person organizes a Mobile Research Test run where enumerators are participants. Use the Mobile Research [themes](#) (in work).



Tips on getting feedback

(print and give to enumerators)

Feedback



→ How to get feedback

Silence is good.

Just hand the person your product and watch how they figure out everything for themselves.

Encourage stories.

Let them tell you how they figure things out.

It's about the user, not you.

Ask "why" and "how do you feel about this"

Emotions and reasoning help you see how the person sees the world around them.

Ask for specific instances.

Use open body language, eye contact and smile.

Do not interrupt.

→ How NOT to get feedback

"Do you like this"

People usually want to validate other people. They'll just say yes, and not give their actual opinion.

"Would you use this"

Humans tend to agree with people and avoid interpersonal conflict. They will just say yes again, and you won't know whether they mean it.

NO yes/no questions

Keep everything open. Yes/No tells you nothing. It's very hard to verify whether people actually mean the yes. Yes/no doesn't tell you what exactly the person likes/doesn't like. It asks for an overall summation. Even if the user says "No" all you've gotten is a no. There's nothing there that's going to help you.

"I worked really hard on this part, what do you think?" - You're priming the user to agree with you. If you show any kind of attachment to your product, then people will not tell you their real opinion.

"How much would you buy this for?"

"Do you USUALLY do this or that"

"How often do you"

"Is it because ..."

You are giving the respondent an answer.

Sources

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Pictures

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LIVING LAB REFLECTION GUIDE

READ ME

The goal of this reflection guide is to think back to the preparation and implementation of the CREST Living Lab so far, and to look forward to a successful implementation in the months to come.

Please answer each of the 5 prompts as honestly as you can. Please do not hesitate to be detailed. Your responses will be kept anonymous, and no information collected will be published without your explicit approval.

All examples provided are from Marianna's point of view. *Please delete them in the version you send back.*

You can communicate your responses via voice message on WhatsApp, writing on this presentation, a hand-written note, or any other way in which you enjoy reflecting.

If you have any questions, ask Marianna (M.Coulentianos@lboro.ac.uk, +17342726770). Please submit your answers by end of day Friday Dec 10th, 2021.

IN YOUR OPINION, WHO IS PART OF THE LIVING LAB? WHAT DO THEY CONTRIBUTE, WHY DO THEY DO IT?

Person/ group	What do they contribute?	Why do they do it?

IN YOUR OPINION, HOW ARE DECISIONS MADE?

Strategic Decisions

How are they made?

Who is involved?

Operational Decisions

How are they made?

Who is involved?

IN YOUR OPINION, HOW DOES COMMUNICATION WORK IN THE LIVING LAB?

Within your close team

Add information here

Within the LL team

Add information here

Externally

Add information here

HOW DO YOU FEEL?

Associate the following emojis with the different answers you've given.

For example, if you've written answers in this document, please feel free to put emojis next to your answers.

If you've recorded voice message, feel free to describe how some of these emojis relate to some of the things you've talked about.

If you've written reflections with pen and paper, feel free to draw in some emojis.



Happy



Content



Affectionate



Hopeful



Proud



Celebrating



Loved



Confident



Surprised



Confused



Excited



Fearful



Worried



Anxious



Insecure



Disappointed



Bad



Stressed



Upset



Tired



Bored



Angry



Annoyed



Frustrated



Sad



Lonely



Guilty



Hurt



Embarrassed



Bottom of the barrel



Perplexed



Unheard



Sick



Quiet



Smart



Mind Blown



Funny



Disgusted



Silly



Overwhelmed

DESCRIBE 3 HIGHLIGHTS AND 3 HURDLES OF THE LIVING LAB PLANNING AND IMPLEMENTATION

Use emojis to illustrate each point.

Highlights

Add information here.

Hurdles

Add information here.

IN YOUR OPINION, WHO IS PART OF THE LIVING LAB? WHAT DO THEY CONTRIBUTE, WHY DO THEY DO IT?

Person/ group	What do they contribute?	Why do they do it?
Example: Marianna and the SD4MECS team	Strategic vision for the Living Lab (LL), specific method tools and implementation guidance, training and training materials on LL methods (interview, workshop, mobile research), feedback on the methods.	Gain experience in setting up a LL and in working in cross-cultural settings on a development project; encourage grassroots innovations; and ensure ethical study implementation. Get paid, publish academic literature, advance career.
Example: SCODE		
Example: Jon		
Example: Chinese manufacturers of DC EPCs		
Example: Enumerators		

IN YOUR OPINION, HOW ARE DECISIONS MADE?

Strategic Decisions

How are they made?

Who is involved?

Example: Strategic decisions are made during meetings that are called for on WhatsApp by the CREST RAs (Anna, Jon, Meron, Marianna). Often it feels like a lot of decisions cannot be taken in the meetings because we are missing information, so it feels like we're going nowhere, but we do discuss different options for moving forward and share information to the whole group so everyone is aware of the blockages of the study which helps us make quicker decisions later on.



Operational Decisions

How are they made?

Who is involved?

Example: Study documents are shared with the country partners main contact person (Mercy, Anastacia, and Francis for SCODE; Katarina for TaTEDO; Agnes for CREEC). It feels important that we create these documents so the research team at Loughborough is on the same page and so we have a place to go to look for answers to questions we don't remember the answer to because it was decided in the past. However, these documents don't seem like a great way of communicating across teams: specifically between Loughborough and the Country Partners. It feels like maybe too much information often delivered at the wrong time.



IN YOUR OPINION, HOW DOES COMMUNICATION WORK IN THE LIVING LAB?

Within your close team

Add information here

Example: Marianna communicates with her advisors on the SD4MECS team via Teams chat, Email, and face to face during meetings that occur on average every two-weeks. It's a 'as needed' system, but sometimes I don't know when I need help. I also feel stressed because I think I need to have everything nicely prepared for the meeting and have an agenda and all that.



Within the LL team

Add information here

Example: Marianna communicates with the SCODE team and Jon about LL on a dedicated WhatsApp group. It's a great way to get information fast to keep things moving, now that the study has started. I wish we got more daily updates of what is happening in country but I also understand that's a big burden to put on country partners. On my side, it feels like the study is a void that we can only see parts of! I also feel guilty for not being 'more on top of things'.



Externally

Add information here

Example: Marianna will write a summary of what a Living Lab is and how to implement one in the context of MECS to be published as a report on the MECS website. I'd like to know about the engagement metrics for different avenues of external publication so I don't spend huge amounts of time on making materials accessible if no one will read them! Less is more, I guess.



DESCRIBE 3 HIGHLIGHTS AND 3 HURDLES OF THE LIVING LAB PLANNING AND IMPLEMENTATION

Use emojis to illustrate each point.

Highlights

Example: A highlight was conducting the mock workshop 1 with the TaTEDO team and seeing them engage actively in the activities, share their experiences of cooking, and then understand that we were going to ask participants what they wanted to learn from the trial so they could actively decide how they would benefit from it beyond what we had planned, thereby flipping 'normal' research on its head. Everyone seemed onboard and I hope we can still achieve that!



Hurdles

Example: It was hard feeling useful over the summer since the study kept getting pushed and I didn't feel like I could contribute anything.



Refined research questions for SD4MECS

Results of an exercise performed during a meeting in April 2021 with Anna Clements (Guest), John Barton, Jon Leary, Marianna Couleantianos, Martin Bliss, Nigel Monk, Nigel Scott (Guest), Nigel Scott, Richard Blanchard, Simon Batchelor (Guest), Simon Batchelor.

To fulfill the three aims of the SD4MECS project, we need to understand the human impact of the research activities and their purpose.

This exercise is meant to map research questions to the data to be collected, to make sure we are collecting the right data & are streamlining data collection so as not to overburden study participants and country partners.

As a reminder, all research activities are expected to contribute towards co-creating commercially viable user-centric designs of modern energy cooking services.

MECS partner	High level research questions	What data are we currently planning on collecting to answer these questions? (ideally)
Lboro Geo & Design?	How do everyday cooks respond to using the technology (user experience of battery-augmented electric cooking equipment)? How do they adopt the technology over time?	
	To what extent is e-cooking compatible with traditional cooking practices? <ul style="list-style-type: none"> • <i>How does cooking behaviour change after the introduction of the EPC?</i> • <i>What foods participants are able / prefer to cook using electric devices?</i> • <i>Why do people use X device to cook Y?</i> • <i>Is the battery big enough/too big?</i> • <i>Do people cook when power is available?</i> • <i>What are people struggling to cook on the new devices?</i> 	Cooking diaries showing what components of typical cooking routines participants choose to carry out on the new electric devices. Open ended questions about what has changed? And about the whys. (Differentiating factors: Nakuru (peri-urban, rural) and battery supported vs on-grid).
Lboro Geo	How might we make battery augmented electric cooking desirable? <ul style="list-style-type: none"> • <i>What are energy and costs savings associated with displacing traditional fuels?</i> • <i>What are reasons why people do/don't use the new devices?</i> 	Explore what is most desirable to participants about experience of cooking with these new devices and what is undesirable. Co-creation workshops can explore different marketing techniques that showcase the desirable elements and mitigate the undesirable.
	How might we facilitate the sustained adoption of battery-supported electric cooking? <ul style="list-style-type: none"> • <i>How does seasonality affect cooking habits? How does e-cooking impact seasonality effects?</i> 	Seasonality has a major impact on technical design for sizing of components – basically, battery is the major single cost so should be minimised but needs to cover cooking needs on as many days in a year as possible and preferably all of them. There needs to be carry-through to cover dark days between sunny days, as well as sufficient generation capacity to charge the battery on dark days. That implies size of solar array, current capability of other components, etc.
	Sub-question of ‘HMW make battery augmented E-cooking desirable?’ How might we encourage households to move towards a clean fuel stack?	Trialling different interventions during the trial informed by learnings from the Living Labs, with impacts measured by the cooking diaries.

Lboro Design	How might we create a Living Lab experience where participants are engaged as co-creators, designing commercially viable services for e-cooking?	Devising methods for collecting some data from the participants (directly and/or preferably(?)indirectly) about their experiences of the trial <u>as well as</u> the cooking equipment itself... e.g., was our onboarding any good? did they understand the informed consent forms etc. Current plan: Mobile ethnography – tiers of WhatsApp? Exit interviews? Future ideas: Could the enumerators operate as flies on the wall and reflect on the participant’s experiences of the trial too?
	What human-centred design methods can best help us understand the community’s shared e-cooking strengths, problems, solutions, and processes for change?	Mobile ethnography – tiers of WhatsApp groups etc. Enumerator feedback/observations Series of interviews (onboarding/exit) Cooking diaries – latest iterations (smartphone app) or any augmentations SDCA team may propose... Come up with some others, try them, see if they are any good?
SCODE/ACTS*, CREEC*, TATEDO*	Is battery augmented electric cooking socially acceptable, technically, and financially viable in Kenya, Uganda, Tanzania?	Didn’t involve the country partners at the stage of consulting for research questions / data collection. Could be an exercise to do in the future. Would country partners conduct their own analysis / own data collection? Resource constrained. -- ask if they would like anything to be added? Data logging will be put on a server accessible to everybody (technical data).
Lboro Geo?	What are the gender implications of cooking with such systems?	
Lboro CREST	To test the technical performance of the pilot design under working conditions: what technical changes are needed? <ul style="list-style-type: none">What are capacity limits of the system (energy stored in the battery and current drawn will affect how much food can be cooked, and what cooking processes can be used)What is the lifetime performance of battery components under real-use conditions?	DAQ system: Current and voltages of the outlet (only one) & usb sockets Current and voltage of what’s going in from source (mains or solar) Current and voltage into and out of the battery Feed from air quality monitor(?)
Liverpool	What is the impact of transitioning to electric cooking on household air pollution levels, and on risk of ill health? Liverpool: health impacts, impact of fuel stacking, race to health	Air quality monitors
Strathclyde	Is the battery used during network outages? Is the load profile different?	DAQ system
	Is the grid battery if available in the rural case called up during high loading periods and to what extent does cooking load contribute to this?	No grid expected in DC power hub, it is stand alone
	What are the power quality issues during normal and ‘faulted’ operation on the network?	DAQ system

	What is the load diversification across each pilot in relation to cooking across a typical day? Can this be used to forecast usage and support the development of suitable control system?	DAQ system
Birmingham	How do batteries physically degrade in use? What other battery types could be more suitable, or cost-effective?	Measure the battery capacity over time - technician task at each rotation
Modellers	How will the introduction of the MECS cooking systems affect the performance of the existing infrastructure (and what solutions exist)?	Need to know the current situation at the location and then ascertain what changes. It could be difficult to ascertain a direct cause and effect.
?	?	?

Some data to be collected:

Qualitative data

1. Where did participants learn how to cook
2. Exit survey:
 - a. Changes in cooking habits throughout life
 - b. Opinions about ingredient quality
 - c. Questions about cooking habits & techniques
 - d. Energy saving techniques
 - e. Recipes
 - f. Comments about how easy it is to cook each food on the eCookers
 - g. Comments on how the eCooker suit the way participants cook in their homes
 - h. Questions about flavor
 - i. Recommended cooking settings for EPC for various dishes
 - j. Best/worst things about cooking with various fuels
 - k. Behavior changes & reasoning
 - l. Affordability
 - m. Barriers to cooking with electricity (e.g., grid unstable)
 - n. Safety
 - o. Learning curves & training needs
 - p. motivation to switch to e-cooking
 - q. design suggestions
 - r. predicted future behavior
 - s. Willingness to pay
 - t. missing/additional data/comments
 - u. Feedback about the trial design, critics and improvements

Measured quantitative data

1. Sensors on baseline cooking appliances record heating events at 1 second intervals.
2. Battery condition monitoring data.
3. List of appliances and utensils in participant's kitchen (& models), including size of appliances and power ratings.
4. Number of black outs and brown outs.
5. Location, type of area (urban, peri-urban, rural), number of rooms, type of dwelling, construction details (walls, roof, floor), kitchen location
6. Cooking competition: detailed observation notes about energy efficiency.
7. Electrical load profiles, energy consumptions.

Self-reported quantitative data

1. Cooking diaries (at the dish level): meal cooked, purpose (e.g., lunch, dinner), ingredients used, cook (name and gender), start time, end time, fuel use (weight or kWh/voltage/current), cooking utensils, cooking appliances, cooking method (e.g., boil or fry), putting a lid on it, quantity, fresh/reheated, uncooked food

served in tangent, leftovers, who is being cooked for, preparation of the food (beans soaked), how easy was it to cook that dish and how tasty was the finished dish.

2. Cooking diaries light version: what type of heating event (e.g. lunch, snack etc.), what is cooked, for how many people, what time the heating event started (to help match up with monitoring data).

3. Baseline:

- a. Cooking practices: 5 most commonly cooked dishes.
- b. Demographics: household composition, ages, gender, work, education level
- c. Socioeconomic status: PPI index .
- d. Baseline cooking: cooking devices, fuels, fuel consumption and associated costs, main cook, shares of cooking responsibility, who cooks what meals, country/region specific questions.
- e. Baseline for each appliance: brand/local name, number, when is it used, what is it usually used for, number of hotplates/burners & diameter, power rating, photograph.
- f. Baseline for each utensil: type, number, diameter & height or volume, photograph
- g. Baseline fuel measurements: how often each fuel is used, what quantities are purchased, how much it costs, regular reporting of expenditures.

4. Exit survey

- a. past cooking experience with different fuels & appliances
- b. how did the eCooker suit the way you cook in your home? (ratings 1-5 of various usability aspects, e.g. easy to clean, fast)
- c. how easy is it to cook each food on the eCookers? (ratings 1-5 for various staple dishes & appliances)
- d. different tastes of food based on cooking fuel (ratings 1-5 for various fuels)
- e. recommended cooking settings for EPCs (various staple dishes)
- f. number of hobs needed for cooking