



# Practical view on data collection using electronic equipment\*

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# Objective

- Growing interest in using technology to collect data in developing countries
- This talk discusses possibilities for the use of electronic devices, mainly PDAs, in data collection
- Share the IFS/Mai Mwana experience in using PDAs to conduct a large household survey in rural Malawi

# Structure of Talk

- What are the possibilities
- Considerations to make
- Comparisons with paper-based survey
- IFS/Mai Mwana Experience in Malawi

# Important Caveat

Neither one of us is an expert on this. This presentation shares the considerations we made and our experience using electronic equipment in data collection in rural Malawi.

# The Possibilities

- Use electronic questionnaires rather than paper-based questionnaires
- Collect information that cannot be collected using a paper-based survey only (e.g. using videos, recordings, etc)
- Allow for extra in-built field interviewer checks
- Hopefully improved data quality

# Device Considerations

- Possible devices include:
  - Personal Data Assistant (PDA)
  - Small laptops (e.g. Asus Eee PC)
  - Tablet PC
  - Mobile phone

# PDA



- It is small and light (7.5 x 1.7 x 13) cm and 200 grams
- Screen is 3.5 or 4 inches
- Touch Screen
- Allows for 1 question on the screen at a time

# Small laptop



- 22 cm x 12 cm x 4 cm (larger than PDA)
- 1.1 Kg (heavier than a PDA but still very light)
- Screen 9 inches
- Operated through keyboard only
- More computing power and memory than PDA
- It consumes more battery but the battery is larger
- Allows for a series of questions on the screen at a time



# Tablet PC



- 22 x 18 x 2.7 cm & 4.3 kgs
- Screen 8.1-14 inches
- Computer power and memory of a laptop, with a touch screen
- The most expensive
- Allows for a series of questions on the screen at any one time

# Mobile phone

- There is software that would run in advance mobile phones (offline)
- For instance: (SODA software from [www.techneos.com](http://www.techneos.com) is available in beta form)
- Surveys can be downloaded onto a mobile phone via the internet and be completed off-line

# Device Choice

- Device choice depends on:
  - Types of questions (open-ended, sensitive data, etc)
  - Cost
  - Portability
  - Battery life
  - Field Conditions (e.g. heat, dust, electricity availability)
  - Screen size
  - Data storage and backup possibilities
  - Safety and security
  - In-built functions (e.g. GPS receiver, etc)

# Some Available Software

- Epihandy
  - Programme is free
  - Documentation was not up to date when we wanted to start
  - It is being updated now
- Entryware – this is what we used
  - Easy to use and programme
- Pendragon
  - Similar to Entryware
- CSPro
  - More complicated to programme, but allows for more customisation than packages such as Entryware and Pendragon

# Software Considerations

- Available support – Very Important
- Data Collection Structure & Setup
- User friendly vs. flexibility
- Complexity of the routing. Some simple software only allows you to jump forward but not to make a question depend on previous answers
- Types of questions you can programme – scaled responses, open-ended responses, etc
- Some software allow you to consult a database available in the PDA and use the data of the database for the survey. Could be very useful for longitudinal research
- Automatic capture of GPS information
- Format you want data in – Excel, SPSS, etc

# Comparison with paper-based questionnaire

- **No data entry needed**
- No need to print so many questionnaires (environmentally + budget friendly)
- Avoid problems arising due to non-legible writing
- Automatic routing (faster interviews!)
- Only valid answers allowed (consistency checks)
- Built in clock (useful for supervision)
- Can use media (videos...)

BUT

- All collected data is in soft format – No hard copy available if any problems.

# Data Transmission

- Laptops
  - Data uploaded on the field and then manually collected together on a centralised server
  - Ideal in large geographic areas & in remote areas
- Mobile phone network
- Automatic transmission of data from PDA to centralised online data server (via internet connection) – This will probably not work in remote areas

# Consider a Kiosk software

Leave active only the applications the interviewers need to use





# Consider a Kiosk software

- It facilitates use as the interviewer cannot get lost in un-necessary applications
- User must know the password to put the PDA in the usual mode
- Interviewers will not be able to play games with the PDA or install other programs – can save battery
- Make it less attractive if stolen
- Some software companies charge per PDA others only charge per Desktop (and you can use it in as many PDAs as you want). We used [www.askarya.com](http://www.askarya.com) that only charges per Desktop

## Other Considerations – Charging the Equipment

- Important, particularly in remote areas
- Power sources are widely available (a side product of the popularity of mobile phones)
- Options include solar panels, dynamos attached to bicycles and car batteries
- Shops where one pays to charge a device widely available in rural Africa
- Can take a couple of hours daily to charge

## Other Considerations – Data Handling

- All the data is in soft format, so CRUCIAL to back up!
- With PDAs, data can be backed up on memory cards (choose a PDA with a memory card slot)
- More choices available for small laptops (e.g. USB sticks)
- Ensure that software used allows for response data to be backed up
- Keep multiple back ups if possible
- Train field staff on the importance of backing up the data!

# Why we chose PDAs

- Cost effective
- Available software – Could create a questionnaire without requiring any programming skills
- Software also allowed for useful functionalities – various question types, constraints on responses, automated routing
- Easy to carry around
- Ease of use by interviewers (who had no IT knowledge)
- Battery size – lasts long enough, but no need to be charged for very extended periods
- No need for data entry – a plus when you need the data quickly and are under a tight budget

# Experience in Malawi

- Large household survey conducted in Mchinji district from Nov 2008-March 2009 by the IFS and the Mai Mwana Project
- Data collected from 3300 households using PDAs
- Mchinji is in Central Malawi, on the border with Zambia and Mozambique
- Poor infrastructure – handful of tarmac roads in district and only 2% of population has access to electricity



## Experience in Malawi

- Data collection set up as follows:
  - 24 interviewers, each with a PDA
  - 3 supervisors, each covering 1/3 of the district, and each had a Laptop
  - A Co-ordinator, who managed the central data server (amongst other things)
  - The Mai Mwana Project handled all the fieldwork and related logistics (including training)

## Experience in Malawi

- Collected detailed information on education, labour, health, adverse events, household rosters, consumption, transfers and networks, along with anthropometric data
- Used a range of open-ended quantitative and qualitative questions, categorical questions and multiple response questions
- Easy to programme the routing on software used
- Automatic routing worked well in practice, though, test extensively to ensure no errors *before* survey goes live



# Equipment and Software Used

- HP iPAQ 214 PDAs used (no mobile phone capability, large battery size, good screen size)
- Entryware Designer (to design questionnaire and manage data) and Entryware Mobile (on PDAs)
- Askarya Kioskbuilder – to allow access to certain programmes only
- BlueNext GPS (External GPS)
- Portable solar panel + battery provided





# Pre-survey concerns

- Charging the PDAs – portable solar panels
- Safety (against theft) – (kiosk software, made it look as unattractive as possible)
- Field staff proficiency – almost impossible to find interviewers with any IT knowledge (but most use mobile phones)
- Equipment troubleshooting and repairs – backup equipment available
- Field conditions (dust, heat) – screen protectors
- Data handling concerns – robust protocols
- Interview length

# PDA in Action



# Experience

- We had an excellent local partner – the Mai Mwana Project, who provided us with invaluable advice and local knowledge in hiring and training interviewers, setting up the fieldwork logistics and shared their experience
- Interviewers hired had completed secondary school and limited survey experience
- Interviewers had no IT knowledge, but most used mobiles – they picked up use of the PDA without too many problems
- Co-ordinator was highly competent and computer literate
- **Training was very important** – 2 weeks intensive training + 1 week extensive piloting
- Initial teething problems – had a very capable RA on the ground to resolve these
- Portable solar panels did not work very well – mobile charging shops were used instead

# Experience

- Data collection set up worked well (after initial hiccup)
- Far fewer technical issues with equipment than anticipated (but equipment was new)
- No thefts (luckily)
- Using an external GPS receiver connected to the PDA did not work well – recommend use of stand alone GPS units
- Data arrived very quickly once the interviews were done (once a month from Dec 2008)
- Able to correct for errors in questionnaires, without having to re-print them (much quicker)

# Interviewer Feedback

- Interviewers were very happy
- Interviews took less time than a paper-based interview would have taken (noticed by interviewers)
- Respondents were more interested and not threatened because of the PDAs
- Most interviewers did not feel threatened (physical safety)
- Appreciated learning a new technology
- No need to carry around a large number of papers



# Data

- Data is of generally good quality, with few invalid responses
- Interview length seems reasonable (median = 3820sec)
- But, there are a few issues to be aware of:
  - Using the in-built touch keypad can be difficult, therefore, a need to be careful in entering numbers
  - For some important variables, e.g. identifiers, it is worth doing double entry
  - Automatic routing can lead to series of questions being wrongly asked or not asked due to errors – useful to give interviewers a paper version of the questionnaire to follow at the start
  - With roster questions, it can be difficult for interviewers to keep track of whose info has been recorded – giving sheets with tick boxes can help

# Conclusion

- Plenty of scope for using electronic devices in data collection in developing countries
- It is possible to use them even in areas with poor infrastructure and electricity and low levels of IT usage
- Data quality seems to be good