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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 in 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

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Mobile phone

- There is software that would run in advance mobile phones (offline)
- For instance: (SODA software from 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

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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 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

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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

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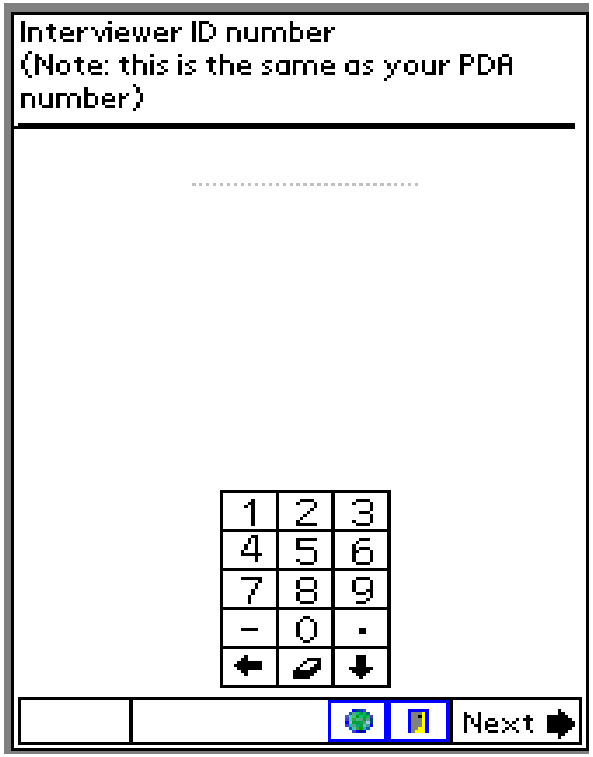
Interviewer ID number
(Note: this is the same as your PDA number)
1 2 3
4 5 6
7 8 9
- 0 .
Next

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

PDAs in Action

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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