Digital data collection methods in ecology

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Notebook data

+ Flexible, create tables easily
+ Easy to record non textual data like diagrams
+ Doesn't require electricity
+ Doesn't require expensive equipment
+ Data transcription can help identify errors

− Manual data transcription required
− Easy to record "messy" data
− Printed datasheets are bulky
− Inconsistent data validation in the field

± Less chance of data loss?
± Quicker data entry in the field?
± Scribe requires less training?
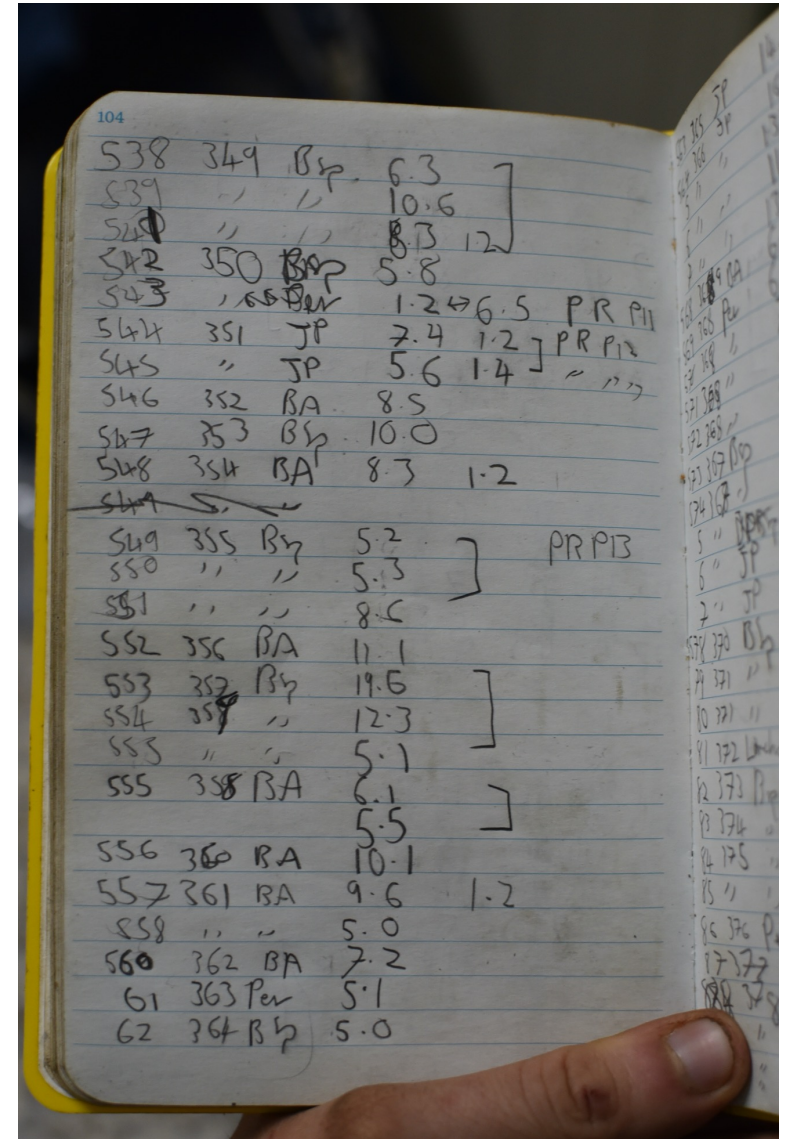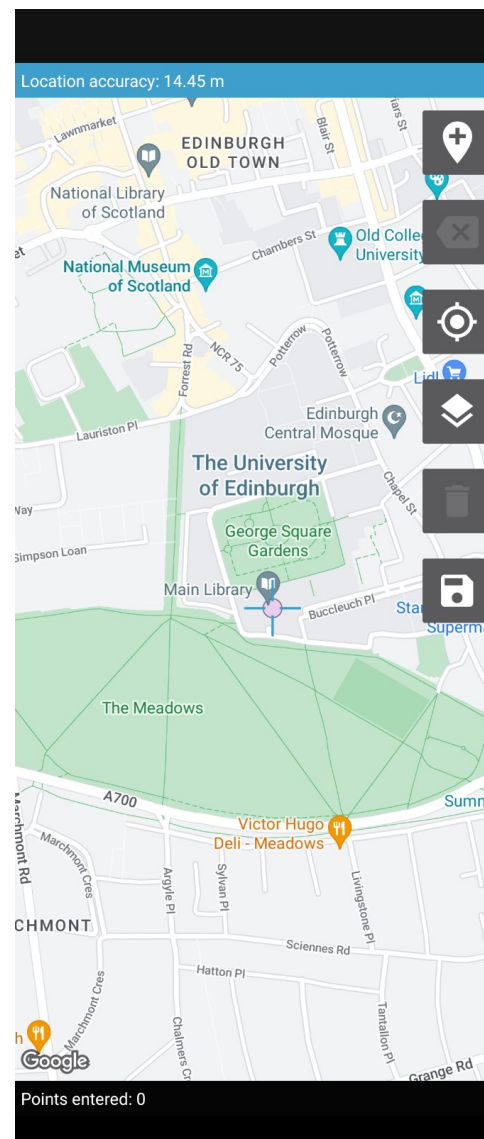
Digital forms: The ODK ecosystem

- **XForms** – XML standard for authoring web-forms

- **ODK (Open Data Kit)** – Project, maintains software for mobile data collection.

- **KoboToolbox** – Project "competing" with ODK with its own tools for mobile data collection. See also **ONA**.

- **XLSForms** – A form authoring standard which uses .xls files.

- **Enketo** – A web-app which can render ODK Xforms on the web and collect form submissions.

Digital forms: Features of ODK XForms

- Various question types:
  - numeric, text, date, photo/audio/video, GPS points/walks/shapes, checkboxes, radio buttons.

- Skip logic.

- Repeating groups.

- Data validation.

- Mandatory and optional questions.

- Load external data from CSV or JSON.

Digital forms: ODK XForms with XLSForms

- Each row is a question.

- Named columns define question attributes.

	type	name	label	hint	required	relevant	appearance	media::image	calculation
31	select_one opt_boolean	subplots	Are there subplots?		yes			subplot.png	
32	begin_group	subplot_group	Subplots			${subplots} = "TRUE"			
33	integer	subplot_n	How many subplots?		yes				
34	select_one opt_plot_shape	subplot_shape	Subplot shape		yes				
35	decimal	subplot_length	Subplot length	10 cm, e.g. 10.2	yes	${subplot_shape} = "rectangle"			
36	decimal	subplot_width	Subplot width	10 cm, e.g. 50.0	yes	${subplot_shape} = "rectangle"			
37	decimal	subplot_diameter	Subplot diameter	10 cm, e.g. 5.0	yes	${subplot_shape} = "circle"			
38	end_group								
39	select_one opt_nested	nested	How many levels of nesting are there?		yes			nested.png	
40	begin_group	nested_1_group	First-level nesting information			${nested} = "1" or ${nested} = "2" or ${nested} = "3"			
41	decimal	n1_min_diam_thresh	N1 minimum diameter thresl	cm, e.g. 5					
42	decimal	n1_min_height_thresh	N1 minimum height threshol	10 cm, e.g. 2.5					
43	select_one opt_plot_shape	n1_plot_shape	N1 Plot shape		yes				
44	decimal	n1_plot_length	N1 Plot length	10 cm, e.g. 10.5	yes	${n1_plot_shape} = "rectangle"			
45	decimal	n1_plot_width	N1 Plot width	10 cm, e.g. 40.0	yes	${n1_plot_shape} = "rectangle"			
46	decimal	n1_plot_diameter	N1 Plot diameter	10 cm, e.g. 15.5	yes	${n1_plot_shape} = "circle"			
47	end_group								
48	begin_group	nested_2_group	Second-level nesting information			${nested} = "2" or ${nested} = "3"			
49	decimal	n2_min_diam_thresh	N2 minimum diameter thresl	cm, e.g. 5					
50	decimal	n2_min_height_thresh	N2 minimum height threshol	10 cm, e.g. 2.5					
51	select_one opt_plot_shape	n2_plot_shape	N2 Plot shape		yes				
52	decimal	n2_plot_length	N2 Plot length	10 cm, e.g. 10.5	yes	${n2_plot_shape} = "rectangle"			
53	decimal	n2_plot_width	N2 Plot width	10 cm, e.g. 40.0	yes	${n2_plot_shape} = "rectangle"			
54	decimal	n2_plot_diameter	N2 Plot diameter	10 cm, e.g. 15.5	yes	${n2_plot_shape} = "circle"			
55	end_group								
56	begin_group	nested_3_group	Third-level nesting information			${nested} = "3"			
57	decimal	n3_min_diam_thresh	N3 minimum diameter thresl	cm, e.g. 5					
58	decimal	n3_min_height_thresh	N3 minimum height threshol	10 cm, e.g. 2.5					
59	select_one opt_plot_shape	n3_plot_shape	N3 Plot shape		yes				

Digital forms: Workflow using KoboToolbox

1. Create form in Excel using XLSForm standard.

2. Validate form using XLSForm Online
    https://getodk.org/xlsform/

3. Upload to KoboToolbox and deploy.

4. Download form using KoboCollect on Android device.

5. Collect form submissions using KoboCollect.

6. Download form submissions from KoboToolbox as a CSV.

7. Analyse data in R.

XLSForm Online v2.x

Convert an XLSForm into a validated ODK XForm.

Still converting XLSForms manually? ODK Cloud has built-in XLSForm support and other features designed for professionals. Request a demo to learn more.

File: Choose file No file chosen

Submit

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Digital tables

- Many options
- Most popular are:
  - Numbers (iOS)
  - Google Sheets (iOS, Android)
  - Microsoft Excel (iOS, Android)

- Auto-fill
- Data validation
- Reduce transcription errors
- Faster in the field??

Digital mapping

Locus maps *classic* (£8.99)

- Custom map tiles
- GPS points/tracks with text annotation

- Has gone downhill since Locus Maps 4 released

- Useful for site locations, routes

- **Does anybody know alternatives?**
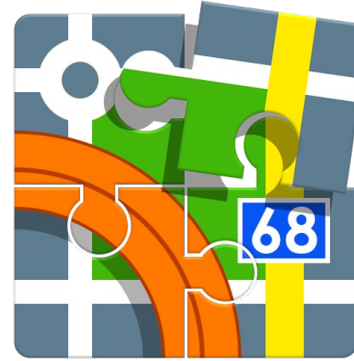
Dictation?

- Still requires transcription.

- Much quicker in the field.

- Smaller field team?

- Everybody else in the team must be quiet.

- Works best with only one person.

- May require paper sheet to remind which measurements to take.
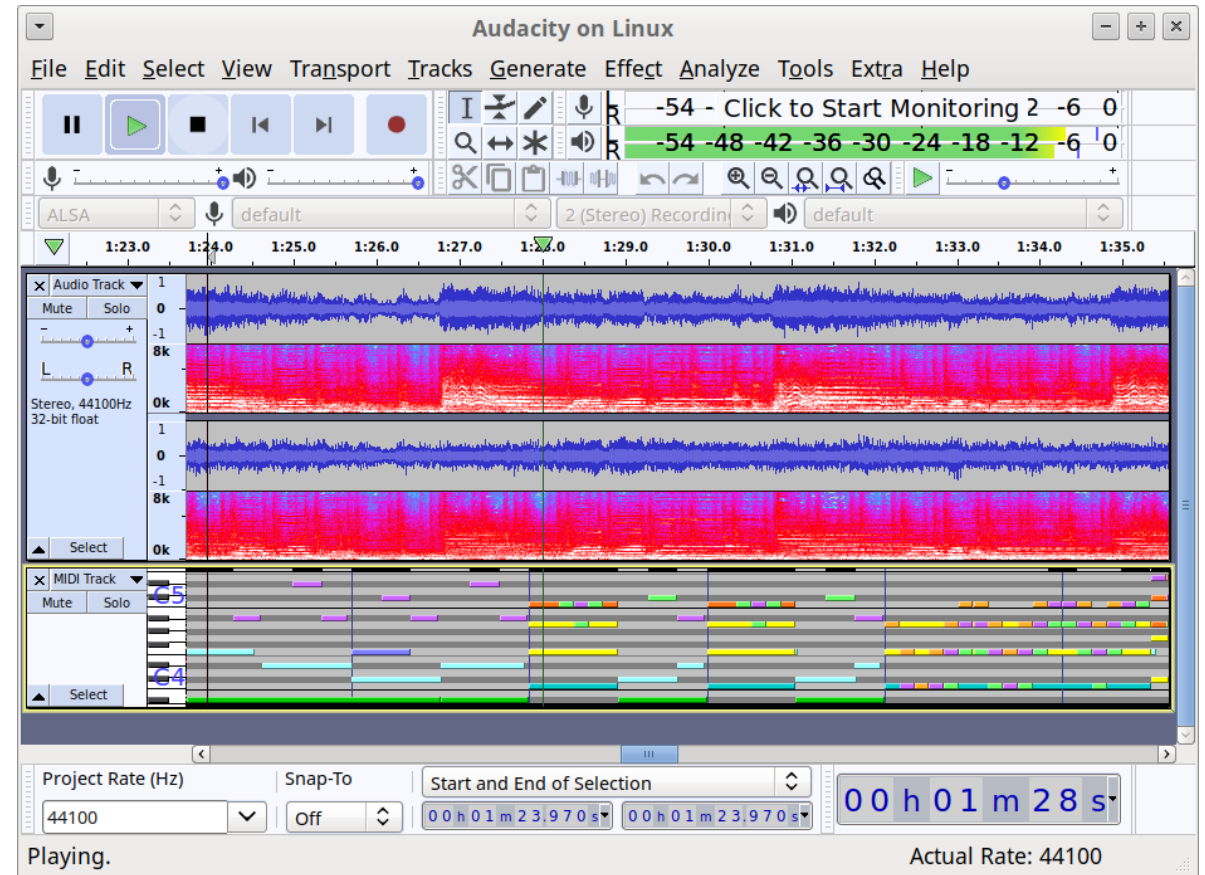
Logistics: backups and electricity

- Backup every day, if possible.

- Keep digital backups in separate locations (e.g. one in the car, one at camp).

- Take photos of any paper (before "taking boots off").

- Don't throw away any paper.

- Try to transcribe paper data soon after collection.

- Generator - inverter generators provide cleaner power waveform. Less likely to damage electronics

- Solar charger – requires planning.