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Challenges and best practices when designing a mobile application for the ELIPSS panel

CSDI workshop 18–20 March Warsaw
Institute of Philosophy and Sociology, Polish Academy of Sciences

[Quentin Agren](#), [Geneviève Michaud](#), [CDSP Sciences Po Paris](#)

Presentation outline

1. ELIPSS Study

a probability-based internet panel

2. ELIPSS Infrastructure

3. Challenges

- a. [challenge #0 getting the timing right](#)
- b. [challenge #1 providing a connected device](#)
- c. [challenge #2 choosing a device model](#)
- d. [challenge #3 managing a mobile fleet](#)
- e. [challenge #4 designing a mobile app](#)
- f. [challenge #5 developing for interactive surveys](#)

Longitudinal Internet Studies for Social Sciences

- 9-year grant from the French National Research Agency (ANR-10-EQPX-19-01) [DIME-SHS](#)
- probability-based sample (from 18 to 83 years old)
- sample size:
 - pilot study: 2012 - 2016 +1000 panellists
 - main study: 2016-2019 +3200 panellists
- 2 full-time staff members dedicated to support and follow-up respondents
- panellists unconditionally equipped with a 4G-enabled touchscreen tablet



a software infrastructure backing a mobile fleet

A mobile fleet:

- one single device model at a time
- managed in-house from stock management to troubleshooting

Incrementally built software suite, including :

- sample management interfacing with
- survey platform
- fleet management
- monitoring dashboard
- native mobile application



Self-hosted infrastructure

a survey platform and a mobile application

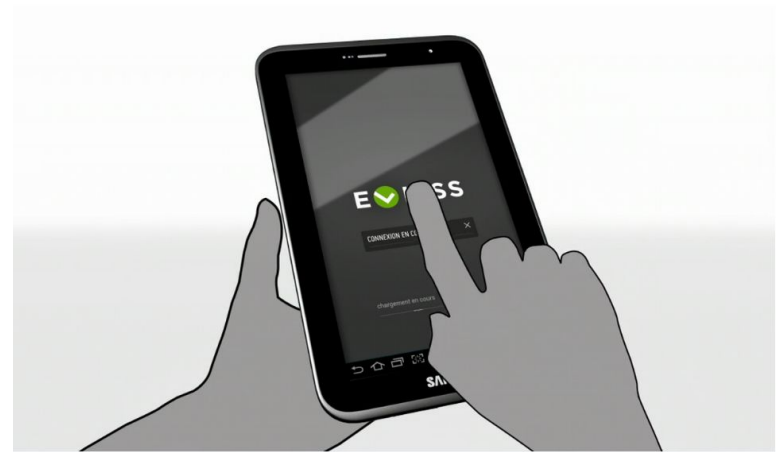
early choice of a survey platform: [Blaise©](#)

assets: complete set of social sciences survey methods

shortcomings: basic web rendering, not mobile-friendly



Best of two worlds: a mobile app to enhance survey rendering while leveraging the proficient survey backend for development



challenge #0 getting the timing right

- **Synchronise** project planning and manufacturer's schedule.
- Ensure hardware **quality** guarantees a study-long **lifespan**.
- Anticipate losses and maintain model homogeneity by ordering **spare stock**.

challenge #1 offering a durable incentive

attractive device + mobile subscription = **timeproof incentive**

- at **recruitment** time: appealing device
- to control **attrition**: data subscription is a stable incentive, whereas device attractiveness may quickly drop in a fast evolving market

challenge #2 choosing a device model

pilot study (Samsung GTP3100)	main study (Archos 80b Helium)
good hardware quality	limited hardware quality
no technical support from constructor	support from constructor's R&D enabled customisations simplifying management

The choice of a model affects **device management capabilities**.

challenge #3 managing a mobile fleet

hardware inventory

real-time fleet **inventory**

software update control

ELIPSS application and software dependencies must always be installed and match a specific version

remote control

remote **support** demands a tool to take remote control of devices

```

/ARUM ( 4040): Got ARUM ALARM 1
/ARUM ( 4040): Start the download of apks
/ARUM ( 4040): Already updated recently
/ARUM ( 4040): Creating com.archos.arum.ImplicitApkRefresh
/ARUM ( 4040): Start Implicit APK Refresh
/ARUM ( 4040): Creating com.archos.arum.CheckForApkUpdate
/ARUM ( 4040): Done APK check
/ARUM ( 4040): Checking if there is a new apk version
/ARUM ( 4040): <xml>
/ARUM ( 4040):   <app uri="https://elipss.fr/apk-updater/apks/Elipss-5.1.1.apk" version="21" name="fr.sciencepo.odsp.elipss.prod"/>
/ARUM ( 4040):   <app uri="https://elipss.fr/apk-updater/apks/webview67.apk" version="339608700" name="com.google.android.webview"/>
/ARUM ( 4040): </xml>
/ARUM ( 4040): Installed app has version code: 21
/ARUM ( 4040): to-be-downloaded app has version code: 21
/ARUM ( 4040): apk fr.sciencepo.odsp.elipss.prod exists (no need to DL)
/ARUM ( 4040): installed app has version code: 339608700
/ARUM ( 4040): to-be-downloaded app has version code: 339608700
/ARUM ( 4040): apk com.google.android.webview exists (no need to DL)
/ARUM ( 4040): Custom Apks updates available
/ARUM ( 4040): No APK to update
/ARUM ( 4040): Done checking if there is a new version of custom apks

```

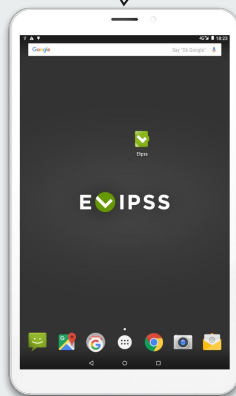
2. on boot and recurring requirements checking

ELIPSS mandatory applications requirements list (online <XML>)



ELIPSS application repository

3. application download (if missing or out of date)



4. hardware and software inventory data pushed by application

GÉNÉRAL	GROUPE	TICKETS	FLEET MANAGER	RELANCES	EDITION	MESSAGES	BOARD
<p>Geneviève Michaud</p> <p> Pas de message non-lu.</p> <p>Rechercher un panéliste</p> <p>Name Chercher par nom...</p> <p>Prénom Chercher par prénom...</p> <p>Identifiant Chercher par identifiant...</p> <p>Email Chercher par email...</p>							
<p>IMEI : 354438070000000 - IMEI2 : 354438070000000</p> <p>Status: Utilisable</p> <p>Line number: 077777777</p> <p>Last network: WIFI (11/03/2019 15:07)</p> <p>Android version: 5.1</p>				<p>ELIPSS APP</p> <p></p> <p>version: 5.1.1-prod</p>			

real-time inventory information available for support staff

1. production (or pre-production) firmware installation

challenge #4 designing a mobile app

a minimal app to serve the needs of research

- staff-editable welcome message
- native pop-up messages
- offline features
 - FAQ and staff contact
- online features
 - change password and edit profile information
 - available survey(s)
 - closed surveys with global statistics

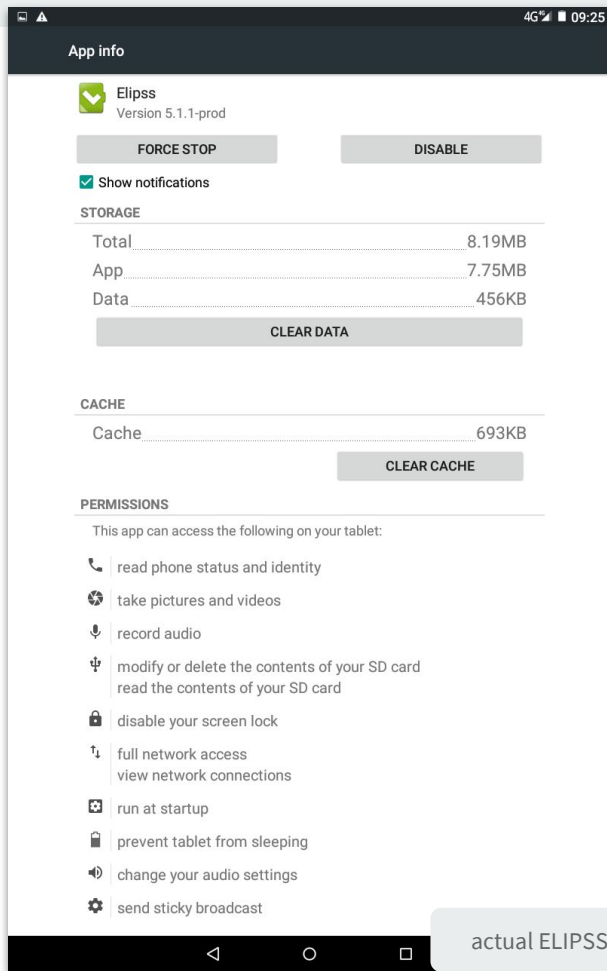


collecting paradata frugally

Developing a custom Android application allows **passive and comprehensive** paradata collection.

But without prior panellist consent, paradata collection must be kept:

- frugal
- device-management oriented



actual ELIPSS app permissions

permissions

Permissions requested by ELIPSS application are a combination that must allow for:

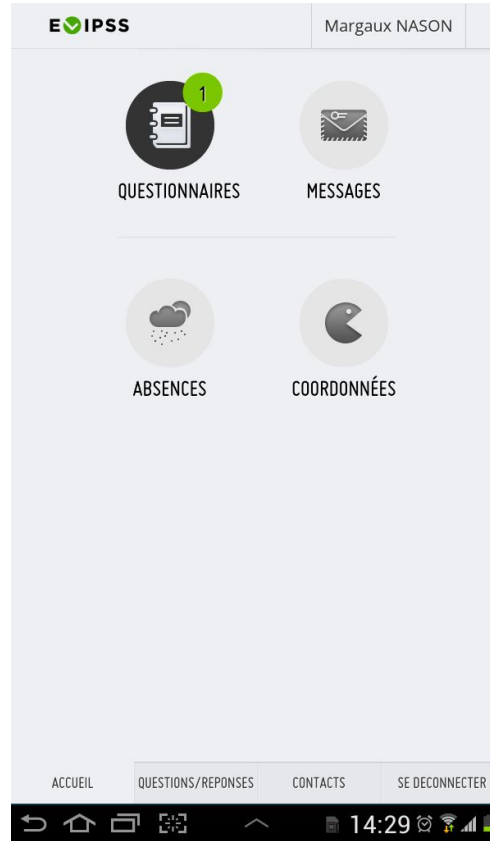
- limited paradata collection
- survey data collection

Permission Group	Permissions
CALENDAR	<ul style="list-style-type: none">• READ_CALENDAR• WRITE_CALENDAR
CALL_LOG	<ul style="list-style-type: none">• READ_CALL_LOG• WRITE_CALL_LOG• PROCESS_OUTGOING_CALLS
CAMERA	<ul style="list-style-type: none">• CAMERA
CONTACTS	<ul style="list-style-type: none">• READ_CONTACTS• WRITE_CONTACTS• GET_ACCOUNTS
LOCATION	<ul style="list-style-type: none">• ACCESS_FINE_LOCATION• ACCESS_COARSE_LOCATION
MICROPHONE	<ul style="list-style-type: none">• RECORD_AUDIO
PHONE	<ul style="list-style-type: none">• READ_PHONE_STATE• READ_PHONE_NUMBERS• CALL_PHONE• ANSWER_PHONE_CALLS• ADD_VOICEMAIL• USE_SIP
SENSORS	<ul style="list-style-type: none">• BODY_SENSORS
SMS	<ul style="list-style-type: none">• SEND_SMS• RECEIVE_SMS• READ_SMS• RECEIVE_WAP_PUSH• RECEIVE_MMS
STORAGE	<ul style="list-style-type: none">• READ_EXTERNAL_STORAGE• WRITE_EXTERNAL_STORAGE

"dangerous android permissions"

user interface

Designing a straightforward,
accessible interface



same but different: pilot study (7") and main study (8") application homepage

challenge #5 developing for interactive surveys

Over time, growing library of survey questions interactions.

- fine-tuning non response options
- auto-complete, ordered items list
- experimenting with rich interactions and multimedia content (video, maps)
- use of device sensors (voice recording, camera)

4G 17:25

EIPSS

La réponse à cette question est importante pour notre étude. Si les propositions de réponse ne vous conviennent pas, vous avez la possibilité de choisir "Je ne sais pas" ou "Je refuse de répondre".

Avec E, âgée de 3 ans, quand la télévision parle d'un attentat qui vient de se produire, vous auriez plutôt tendance à...

☐ Laisser E regarder la TV autant qu'elle veut

☐ Laisser E voir un peu ce qui passe à la TV

☐ Exposer le moins possible E à ce qui passe à la TV

☐ Ne pas exposer du tout E à ce qui se passe à la TV

Je ne sais pas Je refuse de répondre

PAGE PRÉCÉDENTE PAGE SUIVANTE

4G 17:25

EIPSS

Quel est votre département de résidence actuelle ?

Tapez au choix le code du département (ex. 75) ou bien ses trois premières lettres (ex. PAR) puis validez la proposition (ex. 75 - Paris)

Mar

06 - Alpes-Maritimes

17 - Charente-Maritime

51 - Marne

52 - Haute-Marne

76 - Seine-Maritime

SUIVANTE

Mar March Mary

q w e r t y u i o p

a s d f g h j k l

z x c v b n m ! ?

123 , 123

4G 17:22

EIPSS

Habituellement, pour vous informer sur l'actualité, quel(s) moyen(s) utilisez-vous de préférence ? (Trois réponses possibles)

Classez les réponses par ordre d'importance, en commençant par le moyen le plus important (1 pour le plus important, 3 pour le moins important).

3 ☒ La télévision

☐ La radio

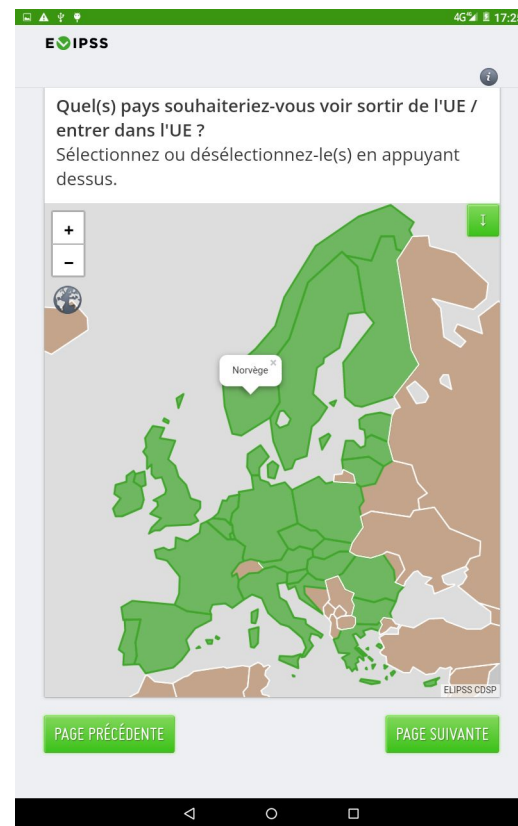
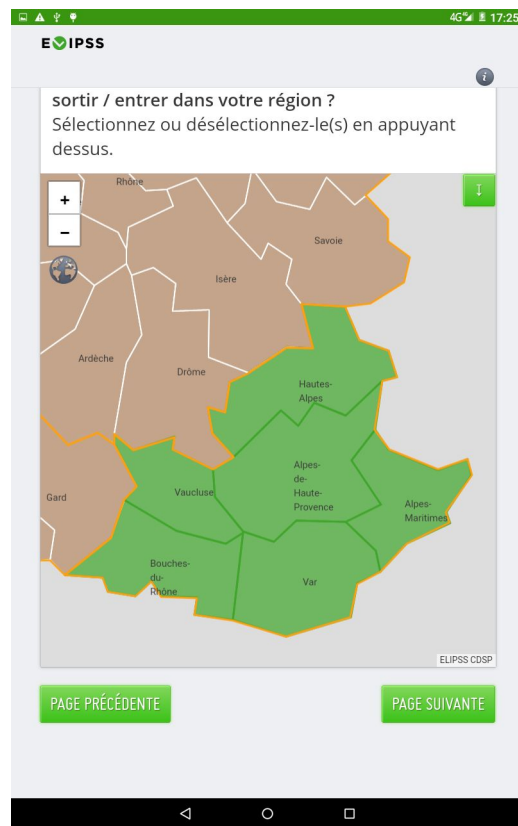
2 ☒ La presse écrite imprimée

☐ Les sites de médias sur Internet ou leur compte Twitter

1 ☒ D'autres sites Internet

☐ Les réseaux sociaux (Facebook, Twitter, etc.)

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feedback

thank you!

SciencesPo-CDSP IT team throughout the ages:

Adam Schaal, Daniele Guido, Adrien Ferreira, Alexandre Chevallier, Raphaël Paoloni, Anthony Jacques,
[Jérémy Richard, Romain Mougin, Baptiste Rouxel, Quentin Agren, Simon Dellac](#)



Sample & Survey Management system Factsheet



SciencesPo
CENTRE DE DONNÉES SOCIO-POLITIQUES

Differentiated samples and groups

- Distinction between pilot sample and final sample
- Response status groups allowing targeted outreach
- Faceted search engine (by sub-sample, group, panelist name, email or phone number)

Panelist accounts

- Allows questionnaire access, communication with help-desk, profile updates and password recovery
- Accessed through responsive web application or native mobile application

Privacy compliance

- Distinct sets of identifiers for survey data and panel management
- Secure network protocols



Fine-grained user privileges

- Granted through user management back office
- **Panelists** can access and update their personal data
- **Survey managers** can handle survey enrollment and retrieve response data for post-production.
- **Panel managers** (help desk and follow-up) can view panelist profiles and device information, response statuses and aggregate statistics.
- **Scientific project managers** have access to response rates, attrition trends and other global indicators
- **Recruitment team** can perform batch imports of panelist data through file upload

Rich para-data recording

- Question-level time tracking (ELIPSS Android app)
- Interruptions and context switching (ELIPSS Android app)
- Recording of ad hoc events for rich multimedia questions (video controls, engagement with interactive maps...)

Multi-channel communication

- Email
- SMS
- In-app messages
- Native mobile notifications (ELIPSS Android app)
- Direct follow-up phone calls, made in a collaborative workflow
- Traditional mail (integrated through national postal service API)

Web technologies

- Languages : Python, JavaScript
- Web framework : Django
- Libraries: Tornado, Bokeh, Pandas

Mobile technologies

- ELIPSS Android application (available on ELIPSS Android repository).
- Mobile fleet management service integration (MDM API)

Development team contact :

itcdsp-scpolist@sciencespo.fr



Survey platform integration

- Blaise™ software handles survey engineering, basic web rendering of questionnaires and answer recording.
- Survey management platform handles user authentication, survey publication and questionnaire access.
- Seamless integration through standard web protocols.

Tailor-made question enhancement

- Leverage web technologies to enhance answering experience
- Allow questions with rich interactions, going beyond ink and paper transposition

pilot study and main study equipment: comparison

	Samsung GTP3100	Archos 80b Helium
Size	7.0 inches, (~58.2% screen-to-body ratio)	8.0 inches, (~72.46 % screen-to-body ratio)
Resolution	600 x 1024 pixels, (~170 ppi density)	768 x 1024 pixels, (~160 ppi density)



Samsung GALAXY Tab 2 (7.0)
193.7 x 122.4 x 10.5 mm | 344 g



ARCHOS 80b Helium 4G
210 x 122 x 9.3 mm | 320 g