Using participatory design to develop a smartphone data collection app with doctorate recipients

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Background: smartphone apps in survey research

- Motivation: explore ways to reduce respondent burden in NCSES longitudinal surveys (e.g., Survey of Doctorate Recipients (SDR)).
- Smartphone apps are a feasible way of collecting frequent responses in a long period of time among respondents who own smartphones (Bahr et al., 2020; Miller et al., 2018)
  - Used to administer brief surveys and conduct ecological momentary assessments (Kreuter et al., 2020)
  - Respondents tend to stay engaged in the study once they downloaded and started using the app (Jackle et al., 2019)
  - However, low willingness to download the survey app in the first place (Jacobsen et al., 2021, Wenz et al., 2019)

Background: modular survey design

- Modular survey design separates a survey into several modules to be taken over time by the same respondent
  - Response rate: lower than single module condition (Peytchev et al., 2020; Andreadis and Kartsounidou, 2020); higher initial response rate and overall similar response rate (Toepoel and Lugtig, 2018)
  - Data quality: comparable to single module condition (Peytchev et al., 2020; Toepoel and Lugtig, 2018) or better in eliciting sensitive responses (West et al., 2015)
  - Satisfaction: better experience and easier to respond to modular surveys (Toepoel and Lugtig, 2018; West et al., 2015)

Research Questions

- This study investigated participants' reactions to and suggestions for using a smartphone app for the Survey of Doctorate Recipients (SDR)
- Questions:
  - What factors would motivate respondents to download the app and keep engaged in responding to survey requests in the app?
  - How do respondents like the idea of completing modular surveys? What do they think would be the optimal length and timing of survey modules?
  - What design elements or features would respondents like to see in the app?

Method: participatory design workshops

- Three 90-minute virtual workshops with doctorate recipients via Zoom
  - Part I/**focus group**: participants discuss their experience with web surveys, using mobile devices and apps for surveys, and reactions to modular survey design and SDR.
  - Part II/**participatory design (PD) session**: participants (divided into small groups) work together to generate ideas for how to design the app with Google Jamboard.
    - Participatory design activities can engage end-users (respondents) and designers in the development of a product (smartphone app). It can challenge the assumptions made by designers and generate new insights and plans for a product's design (Greenbaum and Kyng, 1991; Muller and Kuhn, 1993; Schuler and Namioka, 1993)
  - Debriefing on the design and overall methodology of the workshop (e.g., workshop format, technical difficulties)

Example screenshot: tasks listed on Google Jamboard

Task 1. Dividing the Questionnaire into Modules

Imagine that you are invited to complete the Survey of Doctorate Recipients (SDR) using a smartphone app. The SDR has approximately 61 questions and takes 18 minutes to complete on average.

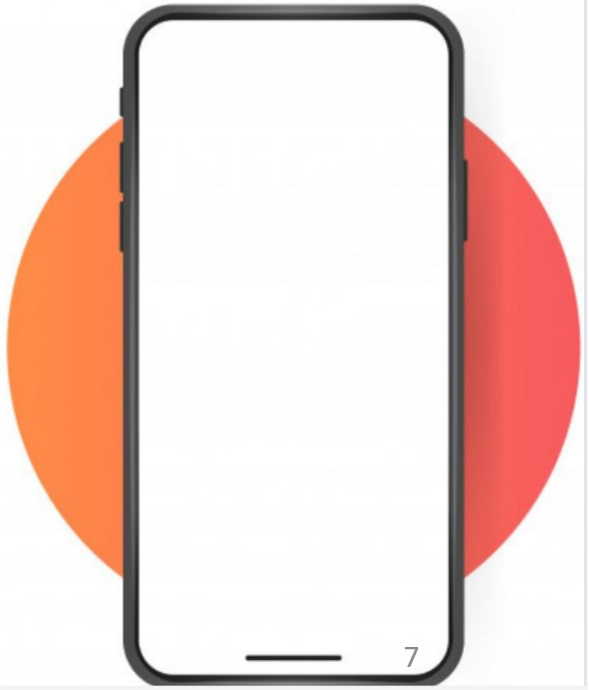
Imagining that you are an SDR survey respondent, would you like to divide the survey into shorter parts (or "modules")? If so, how long would you want each part to take in minutes? If not, why wouldn't you want to split the survey?

Task 4. Designing the Smartphone App: Home Screen

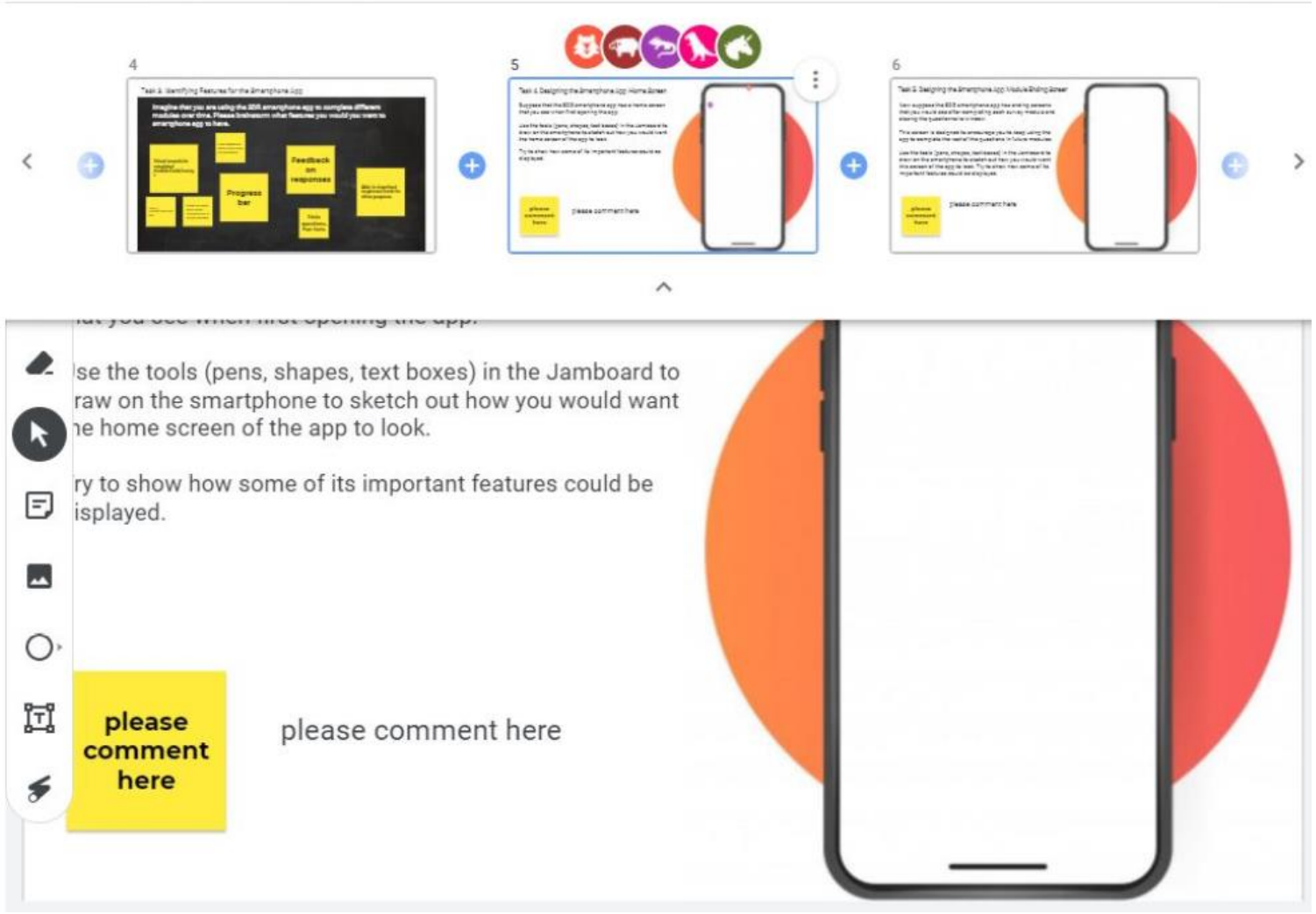
Imagine that you are an SDR survey respondent. Suppose that the SDR smartphone app has a home screen that you see when first opening the app.

Use the tools (pens, shapes, text boxes) in the Jamboard to draw on the smartphone to sketch out how you would want the home screen of the app to look.

Try to show how some of its important features could be displayed.



Example screenshot: participants working through the tasks on Google Jamboard



Data and analysis

- 19 participants/doctorate recipients were recruited from a previous NCSES survey based on a stratified random sample, equally balanced by sex, race/ethnicity, age, and PhD field.
- Three 90-minute workshops
  - Qualitative data provided in the focus group, participatory design, and debriefing sections
  - Information and sketches captured on six Google Jamboards

Focus group discussion: web survey experience

- The type of survey most often respond to: student and faculty research surveys
- What motivates them: help other researchers, trust in the survey organization, understanding the purpose of the request
- What discourages them: lengthy surveys, privacy concerns, repeated reminders

"Now we are bombarded with all types of surveys. I think it's important at the outset that the **request be made clear** and that I know what **the purpose of the survey** is."

"We want to be very careful with any survey request now. I want to see, is this **legitimate**? Do I **trust** that person?"

"If **5-10 minutes** no problem. I had experience of **not finishing surveys**, if it ended up being a lot more involved than I expected, and then judging from the questions I don't think the information is ultimately going to be that helpful, I'll just stop unfortunately."

Focus group discussion: smartphone apps for survey

- Participants liked the idea of using an app for surveys and they expect it to be well-designed, fun, multi-purposed, and from a trusted source.
- Some pointed out that they would not download an app just to complete surveys or just for one-time use.

"If the app would really facilitate answering survey questions with functions, like you can **record instead of typing**, you can also **send images** perhaps, that would really be nice."

"I wouldn't download an app just to complete surveys, but the fact that it's **packaged with other useful things** makes a big difference."

"If I could **link it with my other NSF accounts** that would be useful, if I could check the status of my grant application, that would be useful. If it's an NSF app that I would use all the time and it has my **NSF dashboard**."

Focus group discussion: modular survey design

- What they liked about the design: helpful notifications, flexibility of schedule
- What they disliked: may be interruptive to receive survey requests for each module
- Whether participants would opt for this approach is dependent on the task
- Mixed findings on whether incentive would be effective

"Using an app that gives new questions from time to time would facilitate tremendously to respond every time. If I get a request in mail, I may leave it behind and I will just lose the follow up of the survey. The **app will notify me** like you have a new part of the survey to complete, and it is **small and easy to respond to**."

"I don't think an incentive could be big enough, and it's not like it's a huge hassle, but it's **enough of a hassle**, so it's like offering me 99 cents probably wouldn't do it (download the app)."

PD activity: split up the questionnaire and determine timing between modules

- No consensus in terms of how participants would prefer to split the questionnaire. Some preferred not to split at all, and some would like modules to be based on topics.
- Participants would want more control on how to respond to modules (e.g., out of order, go back anytime, move at their own pace)

"Personally, I wouldn't split it up. I would make it so that you can **save and come back** if you don't have time."

"I like modules to **direct your thoughts** of what you should be thinking about and what to expect."

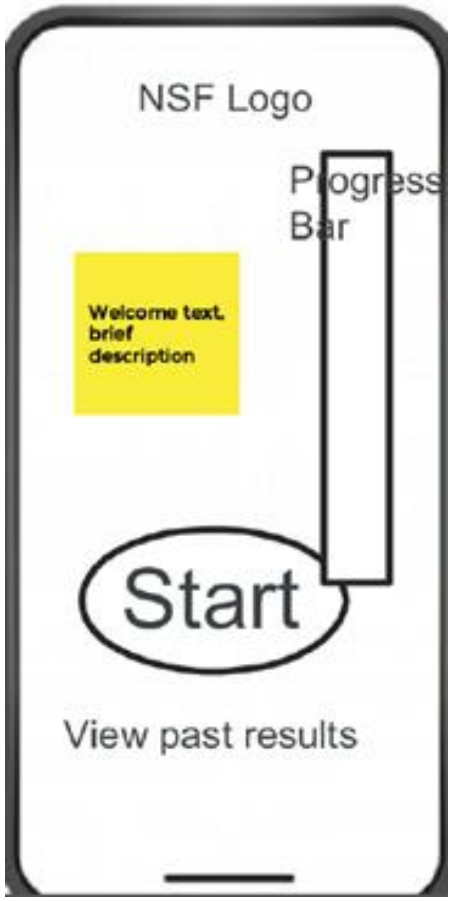
"I wouldn't want to wait. I **just want the flexibility** to move through them."

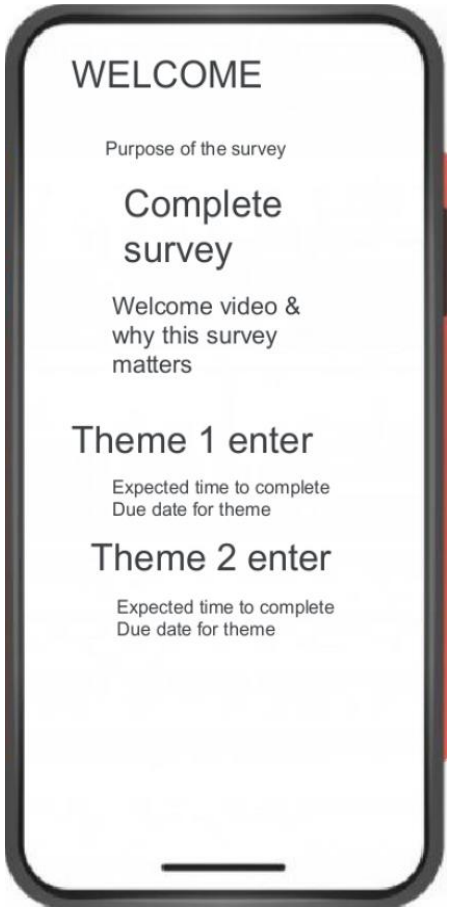
"Each section should only take a few minutes, and if the **questions are related** that would be good […] saving progress should be a necessity.

PD activity: brainstorm features for the modular survey app

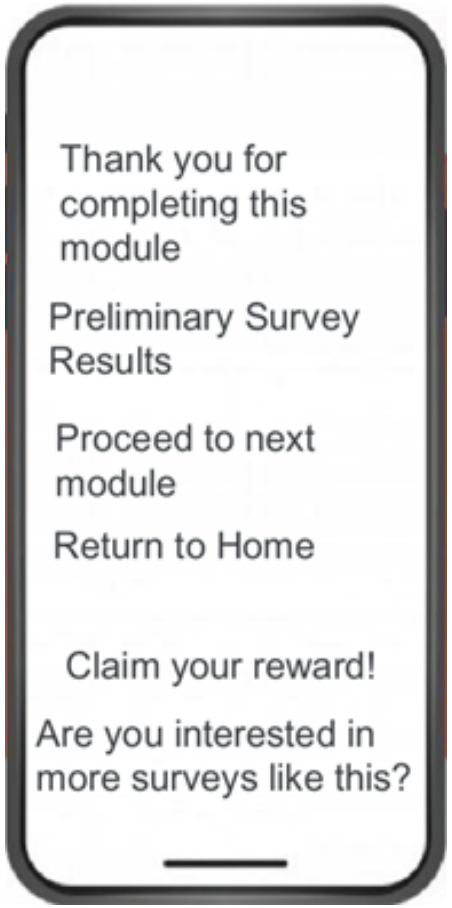
Theme	Examples
Accessibility	Font size, text-to-voice, **voice-to-text**
User experience	Easy **navigation**; voice dictation to avoid texting; well-designed **user guide**; ability to move back and forward between different sections
Security	A “Data Privacy” button on the landing page that navigates to a separate page with information about **privacy and confidentiality**
User incentives	Link to the **NSF dashboard**; a snapshot of preliminary **survey results**; comparing responses to past responses or other respondents
Extra features	Have a survey management portal; **customized reminders**; give **feedback or comments** for the app in case there are concerns or questions
Information on the survey	An **estimated time range** for each module; clearly describe **question types** (e.g., open-ended question) and the **number of questions** contained in each module; all modules presented **simultaneously** (allowing respondents to choose when to work on which one)

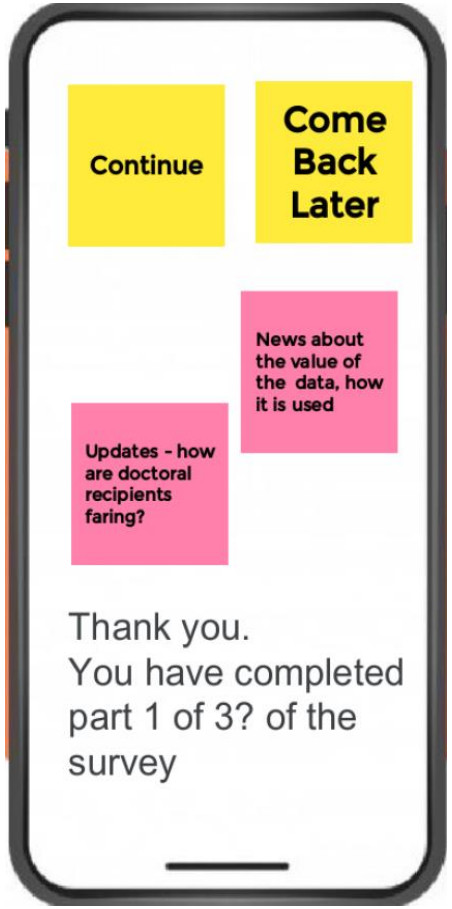
PD activity: sketch out app landing page

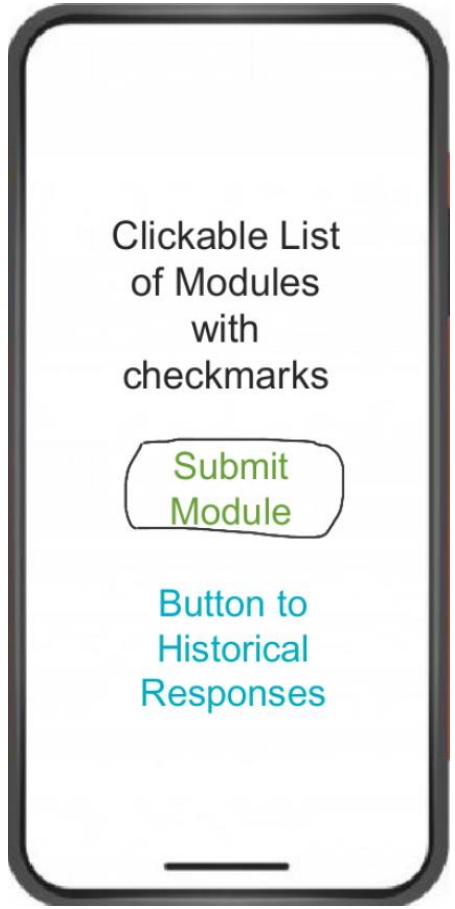




PD activity: sketch out app ending page







Debriefing on the methodology

- Vibrant discussion in the workshop
  - Small PD groups range from two to four participants in size – group of two works equally well
- Participants found it a smooth experience to work with others on the design tasks using Google Jamboard
  - No issues reported (brief demo provided prior to breaking up participants into small groups)
  - Researchers should try to only observe and not interrupt the discussion in the PD session

Discussion

- Overall, participants liked the idea of using a modular survey app for SDR
  - Well designed, intuitive navigation, multi-purpose, show preliminary survey results
  - Clearly describes survey requests and the purpose of data collection
  - Different ways of implementing modular design, needs experimentation
- Method-wise, participants found it a smooth experience working with others on the design tasks virtually using Google Jamboard
- Next steps:
  - Program a smartphone app considering various design elements brought up by the participants
  - Conduct prototype testing with participants
  - Experiment with different modular design options, incentives, and reminders

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Thank you!

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