Mobile usability on household survey on Blaise 5
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This paper discusses the experiences gained from the designing and testing the Blaise 5 household questionnaire on the EU Survey on Income and Living Conditions. Statistics Finland is implementing web mode as a one mode in mixed-mode survey designs and especially mobile first principles is followed on survey design.

In 2017-2018 we have been developing mobile-layout and re-thinking ways to present grid questions in questionnaires. Our aim is to improve user experience and usability of web-questionnaires regardless of what type of device the respondent uses. Responsive web design is an ongoing trend that guides our Blaise-development heavily. One of our goals is to make a fully responsive layout for Blaise web-surveys and get rid of multiple different layouts for multiple devices.

During the design process several new design features of Blaise 5 was learned and tested. The main task done so far is the scalability of Blaise 5-layout for the different size of screens. Also we have examined ways to break down grid questions to single questions without increasing response burden and using dynamic response buttons as much as possible instead of response fields that require typing.

The usability testing was also done through cognitive interviews with the concurrent think-aloud method and screen-recording of all the test interviews. This video material and usability guidelines gave the path for design choices during the re-design work of the web questionnaire.

The most challenging part has been to adapt for the implementation of the Blaise 5 version changes. On the other hand the thorough expertise of Blaise has developed during this process. And at the same time the new processes has been developed to optimally utilize Blaise 5 in the whole organization, especially in the mixed-mode design. The solutions designed for the formation of household can also be used in other questionnaires in future.

1. Implementing web mode in mixed mode survey design

Mixed-mode is one big strategic goal in all social and household survey development areas at the moment in many organizations and the same is in Statistics Finland. This includes finding ways to fight the growing nonresponse rates and creating possibilities to save data collection costs and at the same time to offer better customer service for respondents. This means also big efforts to develop tools for managing mixed mode surveys.

Current situation in our social surveys is more or less multicolored and every survey has its own tailored data collection process. At the moment using CAWI means two separate processes added questionnaires with two different tools (Blaise 4 and 5). Interviewer work is managed in two different systems (field and CATT) which means challenges in organization and division of work. In addition the whole interviewing system and Blaise 4 are approaching the end of their life cycle. In addition we are still tailoring our mixed-mode data collection software system to manage mixed-mode data collection in Blaise 5 more smoothly.
1.1 Mobile first principle

There is a big growth in ownership and use of smartphones for many different kind of online activity. People expects that surveys, in addition to other services, are accessible by smartphones and other mobile devices. The use of mobile devices means challenges on many ways in survey production. This has been noticed and mobile respondents are taken into account in a survey process and this is a strategic goal on designing self-administered surveys. Mobile first principle is a new way to design questionnaires and raises a range of new design issues. Also this means ongoing analysis of survey data collected on different devices to research impact on data quality.

1.2 Respondent first & usability

Respondent first approach is a principle which is followed in a development of mixed-mode survey questionnaires and other aspects of survey communication with respondents. This includes rounds of usability testing of the questionnaires. Especially in mobile design there is a need to carefully consider the length of questions, response options and response guideline/help texts. The target is to make questions more clear and to design in a way that respondents can manage the response process themselves compared to interview mode there an interviewer can help the response process. In our design, the lay out also defines quite a lot how questions are asked. The mobile layout sets certain conditions to question formulation, e.g. there is no space for long help texts, and the respondent is not guided by an interviewer. In order to minimize the need for extra clarifications, the aim is to simplify the questions as explicit as possible.

A responsive web survey design means an adaptation to screen size and devices and a new look for questionnaire. It is expected that questionnaire elements appear with appropriate sized for the device on which they are viewing the page on hand. In mobile approach this often means different design solutions compared to PC and laptop. For example grid form in PC could mean drop-down grid or a series of multiple-choice questions on smartphones and tablets.

In addition our design goals are to design the questionnaires mobile and respondent friendly, functional and still ensure high-quality of questions. This has implications to survey substance and the co-operation is needed among many experts on statistics production. Substance, data collection, questionnaire design and testing, usability and IT are all included.

1.3 Roadmap of implementation in Statistics Finland

Overall goal is going to towards digital data collection. This means different measures in survey communication starting from contacting respondents and reliable identification to the response process itself with questionnaires and ending to feedback and rewarding. There are four main areas where the change management is essential. The whole data collection process is being reorganized, the new data collection system is in development phase, and also mixed mode questionnaire development and testing process is taking a new shape. And also statistical methods is developed to answer the emerging analysis and quality issues.

In mixed mode administered surveys a flexible work division between interviewers is important and the tools for effective management and monitoring surveys is needed. Developing this is also important area then moving to Blaise 5 as a whole. In a first phase in our development process field interviewers and CATI
Interviewers use the same user interface in organizing their work. And later on a feasibility of Blaise CATI management will be considered.

In our road map there will be some pilot surveys and the first survey will be in a production in the new production system year 2019.

**Implementation schedule of mixed-mode data collection in social surveys 2017-2020**

2. **Mobile usability on Blaise**

As a part of Statistics Finland's transition to use Blaise 5 in mixed-mode surveys, the aim is to harmonize the device-independent user experience for respondents. We currently develop Blaise 5 environment to be as responsive as possible and suitable for most common devices and browsers such as Android or IOS-based smartphones and tablets. The layout development we made during past year included not only re-designing our customized Blaise Resource Database layout (.blrd) but also re-thinking new methods to replace grid-type-questions that would not fit most of the smaller screen sizes.

We have done usability testing to the formats described below. The feedback of the layout is good. Layout work is made jointly by Blaise experts and questionnaire design experts from the cognitive laboratory of Statistics Finland. The process is iterative with cognitive and usability tests and re-design work.

2.1 **Re-designing matrix questions and grids**

Large grids and matrix questions/table format are very hard to scale for small screen sizes and the usability is weakened if the respondent have to scroll horizontally. In our solution the tables are dismantled into individual questions and the structure of the questionnaire order is changed, if necessary. The options that are in old format in the columns are placed as response options (response button) and the change on subject matter in question is demonstrated on bold fonts. This way it is possible to present grids in which the answer categories are down in response buttons and the (repetitive) question is above and the changing element in the question is highlighted.
Our design principle has been that there are no grid questions in a sense that we could present one grid per page. The grid formats have to be different because of the mobile layout format. This work has lead us to redesign and rethink many parts of the questionnaires which includes grid structured questions. We have changed the question order and simplified the structure of questions to make the survey structure to work better with touch screen devices. Since there will automatically be some changes in timelines when shifting modes, we have decided to take very broad-minded approach to questionnaire changes and designing of questionnaires to make functional mobile and respondent friendly design without compromising on high-quality. This approach meant, that Blaise 4 designed questionnaires which included a grid structure couldn't be transferred into web and mobile friendly questionnaires without acknowledging there had to be done some major design changes.

2.2 Blaise Resource Database development

In our Blaise Resource Database development we have taken a different kind of approach of using Resource Sets for different screen sizes or devices. In general we have only one master page-layout which is used in every Resource Set without unique settings needed per set. We have also started to use more Template Parts for maintaining the layout structure more easily.

In current solution we are interpreting client’s screen width to determine which settings are used in that particular device or browser. In practice, we defined a maximum size for large resolutions and a scalable size for smaller resolutions. For example if client browser width is greater than the defined maximum value then there is extra margin around the page area which is filling the rest of the page while the actual content area is centered to the middle of the page view. And correspondingly with smaller resolutions there will be no extra-margin. The buttons will also use all available space for width with smaller resolutions. This enables the respondents to touch the answer buttons more easily with thumbs.

Our web and mobile layout is designed to allow more dynamic approach to grids. In web and mobile we have brought into use a dynamic response button (for enumeration or set of type questions). That means that we don't have traditional radio buttons in the radio button questions but response buttons and by pressing the response button the auto enter is performed and question skips to the next question. While in set of type questions we have also included check box inside the button to help the respondent see the difference between answer types. First we tested radio button and check box type questions without any visual clues about different type of questions inside the response button. That however interrupted the response “flow” when check box type of question appeared. After that we have developed visual radio button/check box inside the button and are hopeful that this will make the answering experience more convenient. This solution is being tested when writing this paper.

Our main goal is to have easily maintained layout which is also standard for every survey. If needed, this approach will ease replacing old Blaise Resource Database with updated one even on ongoing production surveys.

3. Household survey as a test case

The EU Survey on Income and Living Conditions (SILC) is one of the household data collections in which the implementation of mixed-mode method is in progress. In 2017-2018, a mobile-friendly FI-
SILC questionnaire was designed (Blaise 5.2.5 and 5.3.0). Development of a solution to mobile household formation was part of questionnaire design.

In Finland SILC income and wealth data is possible to gather from the administrative registers. This means that the questionnaire is somewhat lighter compared to countries where this is not possible. Also, our policy on statistics gives us permission to use prefilled questions which make a response process smoother.

In this test case we are presenting our results by demonstrating mobile friendly household survey.

3.1 Basic concept for household formation

Instead of a grid layout to collect household data from respondents, the household grid has been turned into a question by question proceeding in which the concept of household is delivered to respondent, and the respondent can add/remove household members. With this method it is possible to add new or remove existing or modify existing members to the household. For example, when adding a new member to the household multiple question sets are asked in a loop-formation regarding the member added.

In our model collecting basic information such as name or birthday is defined as one set of questions (block) and add/remove/modify questions sets as their own blocks. These blocks are asked inside the loop-formation. After confirming added or removed member from the household a confirmation page is presented and respondent can check the member information and decide whether to continue the survey or edit the member data. In addition, in Finland some postal address based register data can be prefilled to the questionnaire to help the respondent. For example, the persons living in the same postal address are prefilled so if there are no changes needed the respondent can accept prefilled information as her/his household as is and move on to the next part of the questionnaire.

We have programmed the household formation to be easily implemented to other surveys need. The possible data needed from the household part to the other parts of the survey is passed via parameters to ensure independent programming between different sections of the questionnaire.

4. Conclusions and future plans

The development is still a work in progress in Statistics Finland and we are constantly improving our layout and questionnaire structure for better usability. The results of usability tests indicate that the designed solution of grid questions and household formation on mobile devices works, and are promising and showing the way for future development. In addition, dynamic response buttons make mobile responding pleasant and fast.

We have discovered some layout and usability problems to tackle on. For example, there are still ways to improve the respondent flow such as slowing down page change after auto-enter movement from question to next question. When respondent moves to the next question without clear visual implication it can disturb the flow. Especially this problem is showing on group of questions where the question text is same for all questions while actual question text changes according to the question variable. We are currently going around this problem by bolding the actual question text but some additional design solutions has to be invented to ensure better response quality. On the long run this matter could be solved
for example by slowing down the auto-enter command so the activated button would first activate (change color) and after that the page would change. This would require work from Blaise team in CBS.

In future we as survey practitioners need to ensure that a survey instrument meets respondents’ expectations for how an electronic survey should operate on different devices. With Blaise we are confident that this will happen, while at the same time we are aware that the operating environment will change very quickly.