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Appendix: Methodology

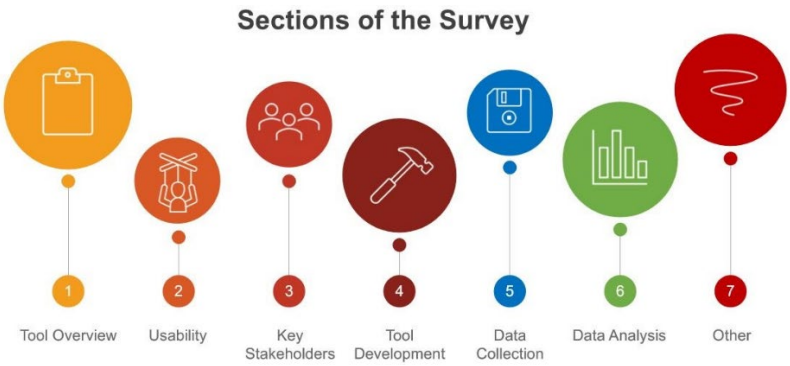
In the first phase, the team conducted over 60 consultations between June 2018 and October 2019 with education technology developers, education service providers, donor organizations, and researchers. We focused on individuals and organizations working on real-time tools for data-informed decisionmaking in education, particularly in low- and middle-income countries. Within these early unstructured interviews, we discussed the landscape of data collection within education—the tools currently being used, and the key challenges for collecting, analyzing, and feeding data back into the hands of education decisionmakers—whether at the classroom, school, service provider, or policymaker level. These conversations allowed us to begin to build out a database of digital tools used for data informed decisionmaking in education, and to begin the process of deciding the information we needed to know about the different tools in order to analyze the current landscape. The consultations also helped to shape the research questions and often led to additional contacts, who were also interviewed, and further digital data analysis tools. In parallel to this, the team reviewed a range of available literature, including on the use of performance management and data-informed decisionmaking and the use of technology in education.

Survey description

Through the survey, we aimed to better understand the landscape of digital tools for real-time data collection and analysis in education.

It includes 67 questions across eight categories. See Figure 5 for all of the different sections included. Questions are in the formats of short- and long-answer text boxes, and multiple-choice responses. We designed the different sections to get a comprehensive overview of a tool's characteristics.

Figure 5



The first part of the survey, **Tool Overview**, is the longest with 22 questions. In this section, we aim to succinctly capture the features of the tool. It covers questions on the tool's purpose, its description, current stage in development, and number of years the tool has been in existence. To understand the tool's context, we ask about the settings where it is used and the intervention types that best fit its usage. We document the tool's current reach from further questions on the details of the beneficiaries it serves, information on countries and languages it covers, and its linkage to government systems. Later questions in the section ask about the subjects the tool is specifically designed for, the evaluation methods used to measure its effectiveness, and future scaling operations planned.

After getting a basic understanding of the tool, we proceed to understand its **Usability**. This next section focuses on the logistics required for tool usage. We ask about the hardware and software requirements of the tool. We seek information about the internet and power connectivity needs for the full functioning of the tool. Finally, the section explores the availability of training materials to use the tool meaningfully and the cost associated with tool usage, if available.

The **Key Stakeholders** section aims to get details about those involved in tool development and application. We ask questions about the number and names of organizations already using the tool. We are also interested in the names of organizations that are funding the tool's development and operation.

The section on **Tool Development** explores the technical side of the tool. There are questions on the codebase used to develop the tool, integration functionalities with other tools, and the nature of development (custom, adaptive, or already existing). We also collect information on the tool acquisition, adaptation, and development costs.

This is followed by sections on **Data Collection and Data Analysis**. The former asks about the methods of data collection employed by the tool, the people responsible for inputting data, and the type and frequency of the data collected. The latter seeks details about the data users, availability of data visualizations, and frequency of data provision. Data Analysis also tries to understand how the design of the tool enables its users to take action, and whether the tool automatically makes recommendations based on collected data.

The last section titled "**Other**" is devoted to all the questions related to the impact of COVID-19 on the tool's design, usage, and demand. We also ask the respondents if they are aware of any other digital tools used in education that are relevant for our research purposes to broaden the scope of our research.

Response

We reached out to 55 organizations and received responses from 25, a response rate of 45 percent. On average, respondents took 37 minutes to complete the survey.

Database

To see all of the tools surveyed, please see the Tool Finder.