

Electronic Data Capture in a Rural African Setting: Evaluating Experiences with Different Systems

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Background and Purpose: Electronic data collection (EDC) has been used in Africa for more than 10 years. There are many potential benefits of EDC e.g. in-questionnaire data validation. However challenges such as data protection issues and lack of mobile network coverage in some areas remain. As hardware such as smart phones become cheaper and more widely available, it is a realistic option to use them as field research tools. We aimed to evaluate the pros and cons of four systems being used simultaneously in rural Malawi: two platform applications for Android systems (CommCare and ODK Collect) and one for PALM and Windows OS (Pendragon) and a custom-built application for Android (MIVA).

Methods: We evaluated the four EDC systems in terms of: ease of development, ease of use for end-users, technical support, features available, ease of data transfer and access, and cost. Data was assimilated from project managers, local tool developers and field staff, using structured questions.

Results: Development of the stand-alone ‘app’ required specialist skills; however development of tools using the remaining three systems was possible by non-specialists. ODK Collect and CommCare both have user-friendly web-interfaces, with CommCare providing excellent technical support. In both instances more complex logic and displays require the use of Xform programming. Pendragon requires all logic properties to be programmed using Xform, although question entry uses a simple user-interface.

For all systems, two to three days training was found to be sufficient for the end-user to competently capture data in the field. One of the main features we deemed important to evaluate the suitability was how data could be assimilated following collection and data security. CommCare relies on an Internet connection or phone network, something that could cause issues but so far has been successful in rural Malawi. The data stored on the phone is encrypted and the app password protected, therefore CommCare provides several in-built security features. ODK Collect also uses this system as the default although you can transfer data through a USB connection to a computer. Data from Pendragon is also downloaded using a USB connection, however if multiple PDAs are used it is necessary to manually combine the data post-transfer. Finally, data from the stand-alone app could be texted, a system with cost and network coverage implications, manually downloaded by USB connection or uploaded wirelessly.

Features of note in the different systems included the “case” feature in CommCare, which allows data to be locally stored for use in subsequent interviews, a useful feature in studies with follow-up interviews. The standalone app has the ability to process and analyse data, as well as being tailored specifically for the data collection at hand and is thus standardized.

The only system which is truly ‘free’ is ODK Collect, an open source software. CommCare has a nominal user-fee if you have more than 20 users, therefore at scale there are budgetary implications. Pendragon requires a user license fee and building an app can incur skilled labour costs.

Conclusions: EDC offers many opportunities for efficient data collection, but brings some issues requiring consideration when designing a study; the decision of which hardware and software to use should be informed by the aim of data collection, budget and local circumstances.

Keywords: Electronic Data Capture, Application, Africa

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