

Leveraging Liquid Mode to Scale Access and Use of Digital Materials

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Executive Summary

Since 2019, the EdTech Center @ World Education has partnered with [Adobe](#) and [The Readability Consortium](#) to advance the field of digital text readability. Our work helps to mitigate the challenges faced by those who access information on their smartphone devices. In pursuit of this goal, we have been field-testing Adobe's free Acrobat Reader for mobile devices, specifically a feature called Liquid Mode, which reflows digital text in PDF documents, changing its presentation and making it possible for users to control how they view it. The personalization settings in Liquid Mode allow users to change line spacing, letter spacing, font size, and paragraph formatting.

World Education's EdTech Center and Bantwana teams field-tested Liquid Mode in Malawi in 2023-24 as part of the US-AID funded Ana Patsogolo Activity (APA), which supports thousands of parents and other caregivers of children and adolescents living with HIV in Malawi. The APA staff involved included 113 facility data clerks, who manage administrative duties at APA facilities, and 896 community case workers (CCWs) who share vital health information through home visits. Prior to our field test, the CCWs carried large binders of paper documents called "job aids," filled with the information CCWs needed to impart to families on topics like HIV management, abuse and neglect, finances, and education.

Because of the challenges maintaining and updating paper job aids, our task was to digitize them, making it possible for the CCWs to read them on their phones. Through the field test of these digitized job aids, we've learned that:

1. Being able to read job aids in Adobe Acrobat Reader with Liquid Mode eased the work of CCWs and allowed them to spend less time in each home.
2. Accessing information via digital text on phones increased confidentiality for the families that the CCWs supported.
3. Training to use these tools was critical to ensure ease of use and confidence.
4. A dedicated team of champions embracing new technologies was crucial.
5. Communication and collaboration with partners led to better tools.



We see Liquid Mode as a valuable tool to help adults with limited access to the internet engage with digital text in PDFs. Through this work, we've learned how optimizing reading for digital formats can increase both productivity and privacy for users. Critically, we realized that increased success hinged on training people to confidently use these tools. These trainees then became champions of the tool, advocated for its use, and encouraged buy-in from their colleagues.

Introduction

Community Case Workers (CCWs) employed through the USAID funded Ana Patsogolo Activity (APA) in Malawi support caregivers of children and adolescents living with HIV. CCWs rely on “job aids” to share critical information on topics like HIV suppression and nutrition, financial literacy, and education. Historically, the job aids have been paper documents bundled in large binders. In Malawi, these paper materials are costly to provide and easily damaged due to cyclones and torrential rains that occur over half of the year (Foster & Shkaratan, 2010). Additionally, the cost of reprinting and distributing paper prevents materials from being updated and reproduced.

World Education, together with [Adobe](#), worked to ease these challenges by providing digitized copies of the job aids. World Education’s role in this work involved providing CCWs opportunities 1) to strengthen their use of their company-provided mobile devices to access information and 2) provide digitized job aids as downloadable Portable Digital Format documents (PDFs).

Why PDFs?

The strategy of providing digitized job aids held much potential but was not straightforward. In Malawi, only 57.2% of the population have mobile devices and only 24.4% can access the internet (World Bank, 2022). Additionally, the cost to access the internet and mobile data in Malawi is one of the highest rates in the world. The International Telecommunications Union (ITU) found that for a 1GB data bundle, the cost is up to 121% of citizens’ monthly income in Malawi (ITU, 2018). On average, mobile phone owners pay more than \$12 a month for devices, which is more than half of a typical monthly salary. This means that CCWs needed to be able to download digital content when they could access the internet and then read it offline, which is possible with PDFs; however, doing so introduced a new barrier -- the challenge of reading PDFs on mobile devices. We addressed this by ensuring that the CCWs understood how to use a key feature called Liquid Mode, which makes PDF text manageable.

What Exactly Is Liquid Mode?

Liquid Mode is a feature on the free, mobile Adobe Acrobat Reader application. It draws on AI to reformat digital text in PDF documents, reflowing the text to make it easier to read on mobile devices. It helps in three ways, as illustrated in Figure 1.

1. Users do not have to manually manipulate PDFs by pinching, zooming, or moving the documents around on the screen in order to read the text.

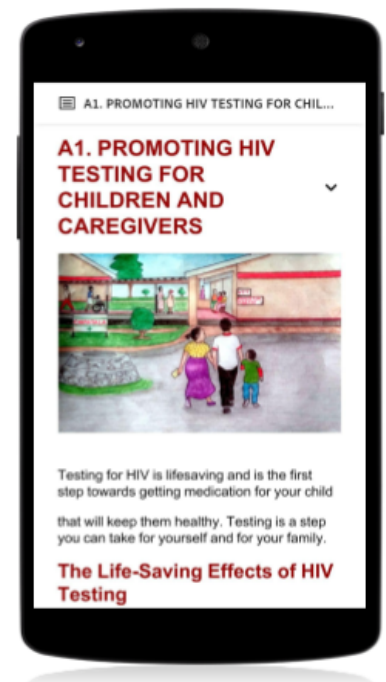


Figure 1. Screenshot of PDF on mobile device with Liquid Mode enabled.

2. For PDFs formatted with headings, Liquid Mode organizes text into expandable sections, which allows users to more easily navigate to selected sections of the document.
3. Liquid Mode gives readers control over font size, letter spacing, and line spacing to personalize the text.

We knew that a majority of the CCWs in our field test had relied on their phones to support their work -- whether to communicate with other staff and share reports regarding their site visits, or to look up information to share with caregivers. Given the previously described constraints of paper and access to internet infrastructure in Malawi, we saw the potential of Liquid Mode to help CCWs better access information via PDFs read on their phones. Understanding how it could be used to mitigate barriers that paper job aids created was the focus of our Liquid Mode field test.

Methodology

Our research employed a general qualitative approach to understand how Liquid Mode could support CCWs' use of digital job aids in their work.

Data Collection Activities

Our data collection was composed of three phases, beginning in the winter of 2023.

Phase 1: In January 2023, we began an exploratory phase to determine the needs of CCWs supporting caregivers in both urban and rural areas of Malawi. Research activities included an exploratory survey of CCWs to establish an understanding of their use of paper job aids and comfort using their 1G smartphones in their work. We held focus groups with 68 CCWs at seven different facilities to gather additional descriptive data. The findings from these activities helped us update the paper job aids that CCWs had used; we added new content and images and formatted the PDFs to facilitate easy reading on digital devices. We worked with Adobe to ensure that the PDFs were optimized for the phones the CCWs carried.

Phase 2: Following the digitization of the job aids, we led a pilot beginning in August 2023 with 37 CCWs at two facilities. The pilot studied the benefits and challenges of the CCWs' use of digitally formatted job aids and their experience using Liquid Mode as they read. We facilitated pulse checks via WhatsApp to receive ongoing feedback of their user experiences in addition to a final post-survey in November 2023.

Phase 3: Using the data collected from the pilot, we implemented a full rollout to all eight districts with 896 CCWs beginning in December 2023 and ending in February 2024. We again gathered data through WhatsApp pulse checks and a post-use questionnaire to determine the use and experiences of CCWs over a three-month period.

Participants

Our participants were CCWs to whom we had introduced Liquid Mode through on-site onboarding with the support of World Education Bantwana staff and APA facility data clerks. Across all eight districts, we engaged 113 data clerks and support staff and 896 CCWs.

These CCWs attended onboarding sessions and completed engagement activities (e.g., participation in focus groups, an exploratory survey, pulse checks, and post-questionnaires), used the digital job aids on site with caregivers, used the digital job aids at home or in the office for training, or used a combination of these activities. The role of the data clerks was to provide support to the CCWs.

In Malawi, Chichewa is the primary language. As such, all job aids, onboarding materials, questionnaires, and focus group materials were developed in English and translated to Chichewa to ensure language was not a barrier to implementation. The translation work was supported by World Education staff and APA data clerks in Malawi.

Analysis

To understand the experience of CCWs with Liquid Mode, we employed a general qualitative approach to analyze data. We recorded and carefully reviewed notes of focus group sessions and considered what we had learned from both questionnaires and WhatsApp pulse checks to inform our analysis. Focus group discussions were conducted in Chichewa; the interviewers and additional Bantwana staff translated responses to English to make it possible for non-bilingual staff to participate in data analysis.

These data collection and analysis procedures were repeated across several phases of the research beginning in the winter of 2023. Table 1 provides an overview of the data sources, participants, and methods we employed in the different contexts.

Table 1: Data Collection Sites and Activities

	Phase 1	Phase 2	Phase 3
Exploratory Survey	✓		
Focus Group	✓		
Post-Survey		✓	✓
WhatsApp Pulse Checks		✓	✓
Job Aid Development	✓	✓	

The sections that follow provide descriptions of the different phases of this work and what we learned through the different data collection activities in each.

Phase I

Beginning in January 2023, World Education conducted exploratory research with CCWs, including a questionnaire and targeted focus groups, as well as discussion with in-country World Education staff who were supporting CCWs' use of digitized job aids with Adobe's Liquid Mode.

We asked 82 CCWs to share their experiences via questionnaire to better understand how they could use technology to make reading digital text easier. The data collection activities gathered information about their use of the paper job aids, their opinions about the content of the job aids, and their beliefs and prior experience when reading digital text on their smartphones.

Following up from the results of the questionnaire, World Education Bantwana staff conducted seven focus groups with 68 CCWs from seven different facilities in Malawi. CCWs were informed that the purpose of these interviews was to understand how the job aids could be updated to make them easier to use in a digital format.

Findings

Overall, CCWs noted in the questionnaire the challenges they faced in their work while using the larger binder of paper job aids, including privacy concerns, difficulty finding information quickly to share with caregivers, and difficulty bringing so much paper with them, especially due to travel to remote sites and the damage caused to the materials by the rain. With respect to using their phones to access these materials, CCWs said they felt that digital job aids would benefit them as there would be less to carry. One CCW shared, "The idea [to have digital materials] is good because it will help us to carry fewer things when going for service provision and it will also help to maintain privacy for caregivers." Another similarly noted, "It is good to have the tools on the phone because in some places it is difficult to use job aids due to confidentiality issues."

Maintaining the privacy of people with HIV was a recurring theme and priority of CCWs. The caregivers of children and adolescents with HIV had not always disclosed their status to their community, or even within their own households. When paper job aids in binders were present, neighbors were curious about CCW visits to households. Some neighbors imagined that the CCWs were registering households for benefits that they, too, might want to seek. With no binder, they suggested there was less chance that curious onlookers would know there was a health and well-being visit in progress. It would also make looking over shoulders to view the contents of the job aids more difficult, affording more confidentiality for caregivers and the children.

In our focus group discussions, CCWs confirmed many of the observations gleaned from the questionnaire. They also described how the digital job aids would reduce the time spent at the office since they could access them anywhere, anytime. They further explained how cumbersome it was to flip through the papers while providing services at the households. According to CCWs, using Liquid Mode to access digital job aids would streamline their work because information would be easier to find.

However, CCWs were also concerned about having their work be dependent on their devices due to unreliable batteries and limited charging options, as well as data concerns. Some CCWs noted that though using phones to access information was a good idea, it presented new challenges; some phones ran slowly, quickly drained batteries, and did not have sufficient memory adequate to store the documents. Identifying solutions to address the device battery and storage concerns were implemented in our following phases.

Based on the observations gleaned from our focus group notes and questionnaire data, we aimed to optimize the job aids for reading with Liquid Mode and sought out strategies to address the concerns raised by CCWs regarding the capacity of their phones.

Phase 2

Based on the feedback received in our preliminary questionnaire and focus groups, the job aids were revised in three key ways: 1) they were formatted for digital navigability (i.e., adding headings and subheadings); 2) icons and images were added to better guide CCWs to caseworker notes and questions to ask caregivers as shown in Figure 2; and 3) the job aids were combined into a single document using an alphanumeric system to group content in four key areas (HIV management, violence and abuse, finance, and education).



Figure 2. Icons developed for the digital job aids to indicate a question or note to caseworkers.

In addition to the revision of the job aids, onboarding materials were developed in both English and Chichewa. These materials were used to onboard 37 CCW pilot study participants beginning in August 2023. The focus of the pilot involved exploring the benefits and challenges of the digitally formatted job aids and understanding the experience of CCWs using Liquid Mode to access and use them for their work. World Education staff in Malawi traveled to the two pilot site facilities and provided in-person training to both CCWs and data clerks at each facility.

The onboarding materials included an overview of the project and the basics of PDFs, a how-to on downloading the custom Adobe Acrobat application developed for this project because of the phone storage limitations,¹ a walkthrough on how to download the updated, digitized job aids, and a demonstration of Liquid Mode to navigate the job aids.

Following the onboarding of this group, we facilitated a pulse check via WhatsApp to receive ongoing feedback of their user experiences in addition to a post-survey in November 2023. The

¹ Due to the phone storage and processing constraints in the devices CCWs use (1GB RAM and 8GB phone storage), a custom app was developed by the Adobe team and the job aid PDF was specifically formatted by Adobe so that it would fully function on a device with these limited specifications. This custom application was developed to ensure the devices CCWs used could store both the app and job aids.

pulse check, completed midway through the pilot in late September, was used to understand the use of the digital job aids ahead of the post-questionnaire in two key areas:

- How many times have CCWs used the digital job aids? Where (at home, at the office, or on site) were the digital job aids accessed?
- What challenges have CCWs had using them?

These pulse checks were made possible with the support of APA data clerks, who connected with CCWs directly and collected responses to share with our team.

Findings

The WhatsApp pulse checks showed promising results, with 31 of the 37 CCWs using the digital job aids regularly in their work. Of the six CCWs who indicated they had not used the digital job aids, three had not had access to a phone, one was on maternity leave, and two had been on holiday. Of the 31 CCWs who were on site and had access to devices, 100% used the digital job aids and indicated that doing so had helped to reduce time spent at households during service provision. They expressed that it was easier to locate the information in a PDF compared to paper, and that the information was more easily at hand on their devices as opposed to carrying paper in a binder.

As anticipated, the challenges faced by CCWs in using the digital job aids centered around the quality of their devices, not the job aids themselves. Of the CCWs that used the digital job aids, 90% (28) reported that their phone would slow down or freeze when using the Adobe Acrobat app to access the PDF, but they also noted this was not unlike their experiences when using other applications like WhatsApp or Facebook.

In early November 2023, we followed up again using a modified version of our original survey. Again, this survey focused on the use of the digital job aids, benefits and challenges, and perceptions of the digital job aids from both CCW and caregiver perspectives. Twenty-nine CCWs responded and described the digital job aids as being easier to use given their portability and the speed with which they could access information by using Liquid Mode features such as search or collapsible headings. One CCW noted their ability to complete their work more quickly stating, “The digital job aids have reduced the time I spend at households, which has enabled me to visit more households. I can now visit five to six households per day from the three I used to visit when using the paper job aids.” This feedback highlighted the value that Adobe Liquid Mode brings to reading and navigating digital texts and the very real benefits to supporting the well-being of more families in Malawi.

Overall, the CCWs noted that using digital job aids was an easy and simple way to work. Eight CCWs indicated a continued use of the paper job aids was primarily due to phone issues. One CCW explained, “I take the paper job aids because the phone sometimes freezes, so to avoid delaying the caregiver, I use them.” As a whole, issues with the CCWs’ phones’ battery life was the biggest obstacle. Many of the CCWs did not have electricity in their homes, and the clinics where they worked either did not consistently or never had electricity.

Concerns of confidentiality were noted in Phase 1 and were also noted in this phase. We continued to hear how it is a challenge to ensure privacy when using paper job aids because neighbors, other household members, or community members are often interested in the documents the CCWs carried. Many CCWs expressed that digital job aids help “keep confidentiality for caregivers, especially from neighbors.” All of the CCWs echoed this sentiment.

Phase 3

Building on the positive momentum of our pilot data collection activities, we implemented a full rollout in our final phase. In December 2023, we onboarded 896 CCWs from eight facilities to support the use of Adobe Acrobat Reader and Liquid Mode for reading digital job aids. In addition to the CCWs, 113 data clerks, 75 child protection workers, and 40 community linkage facilitators were onboarded. The role of these professionals was to provide support to the CCWs throughout the pilot. Through February 2024, we collected feedback via a pulse check and questionnaire to determine the use, experience, and effectiveness of this intervention for CCWs. To ensure accurate representation of responses, APA data clerks supported the translation of CCW responses into English for analysis.

During this phase, we made minor adjustments to materials to improve navigability and shared an updated version of the custom Adobe Acrobat application for CCWs, which improved storage and battery concerns. As in Phase 2, CCWs were onboarded at their local facility with the support of World Education staff and on-site data clerks. To reduce the burden of travel and optimize training opportunities, World Education staff in Malawi alongside data clerks onboarded CCWs as part of their existing scheduled visits to the facilities.

In addition to onboarding for the digital job aids, to address concerns of battery life and charging, Adobe funded the purchase of 60 solar chargers, which were distributed amongst 60 sites in eight districts that had little or no electricity. Onboarding materials for use, storage, and maintenance of the solar chargers were developed to support data and facility clerks responsible for managing the chargers.

Findings

The findings from this phase mirrored those of earlier phases. First, we saw that CCWs preferred the digital job aids for their convenience, their ability to maintain greater confidentiality for the families they support, and their ability to reduce time spent at households during service provision. CCWs began to rely on the PDF; one explained, “I took paper tools on the first day that I started using the digital job aids at a household, but now, I don’t take them anymore because I am used to the digital tools.”

In the three months of data collection for this phase, CCWs reported using the digital job aids more than 23,000 times. CCWs noted reading the digital job aids during service provisions on site but also at home or in the office to ensure they were prepared. One CCW explained, “I read at home to prepare for work so that I shouldn’t have any difficulties when I go to a caregiver’s

household. When I get to the office, I use it when I am writing important stuff to put into folders.” Another noted, “I have used the digital job aids countless times because it’s easy to understand and it’s also time efficient in case a caregiver has limited time.” As a whole, CCWs described the digital job aids as being easier to use for these purposes. As shown in Figure 3, CCWs indicated they felt more confident and comfortable, and had greater convenience and confidentiality with caregivers using the digital job aids rather than paper job aids.

The functionality that Liquid Mode provided to support CCWs in their work was indicated as a key reason for adoption. CCWs noted, “The digital job aids have Liquid Mode which makes it easy to enlarge the words for us to read properly” and that “the tools on the phone are easy to use. You can search topics without wasting a lot of time.”

These affordances made it possible for CCWs to spend less time during service provision, expanding their capacity to serve more households. With this expedition of services, more households no longer need service visits from CCWs. More families are able to “graduate” from the program because they have met all of the benchmarks for their case plan, such as all family members are using medication to suppress their HIV viral load. With the support of Liquid Mode to make reading faster, easier, and more confidential, graduations occurred more quickly. The obvious benefit is that children can stay healthy and families feel empowered to sustain their good health.



Figure 3. Percentage of CCWs who agree with the noted statements in relation to use of digital job aids over paper.

Important Takeaways

“This makes our work more comfortable, and the caregivers feel more comfortable when we use the digital job aids.”

- Community Case Worker in the Mangochi district of Malawi

Throughout this research, we heard from CCWs that they felt more comfortable, read more quickly when they could control digital text, and could ensure greater confidentiality on their site visits with caregivers. Specifically, we learned that:

- Liquid Mode made reading PDFs on smartphones easier and enabled CCWs to read texts in various settings (e.g., at home, in the office, during service provision).
- When using Liquid Mode, CCWs appreciated the ability to enlarge the font size to better read on mobile devices, especially during service provision with caregivers.
- CCWs in particular relied on the search capabilities within Liquid Mode, which allowed for faster dissemination of information to caregivers.

- The initial task of downloading the application and getting used to opening it to read the digital job aids took training and support, but once CCWs gained fluency with that process, it became easier to read and use the digital job aids.

The most important contribution Liquid Mode made for this audience was the ability to search for key information within the documents. With 63 pages of content to navigate, being able to quickly search or jump to expandable heading sections was critical. It is important to note that this contribution hinged on adequate buy-in across the levels of staff in Malawi. The APA staff became champions of the tool. They advocated for its use, encouraging buy-in from their colleagues. They supported and facilitated onboarding sessions and ensured the feedback of CCWs was accurately represented to develop better materials.

Looking Ahead

The success of the field testing has created momentum to sustain the use of digital job aids beyond the APA initiative. World Education's direct coordination of the CCWs ended in March 2024, but transitioned to providing technical assistance to local agencies who took over the work and directly supported the work in health clinics run by the Ministry of Gender. Though the transition is not complete at the time of writing, plans are in process to continue the work in this manner. The potential for such localization of the innovative approach to leveraging mobile technologies to support community case work is a tremendous success for the World Education team and for Adobe.

We see great promise in Adobe's Liquid Mode as a tool to help various users engage with digital text in PDFs. Its adoption in this community health setting indicates that users can leverage this tool to provide services to improve access to digital health materials. As such, it has potential as a tool to support both digital and health equity in communities who need it most.

The offline functionality of the Adobe Acrobat Reader app supports communities with unstable, limited and/or no connectivity. Our team is expanding research and field-testing to coastal India to learn more about the use of the app and Liquid Mode in new contexts. We look forward to continued opportunities to support the use of Liquid Mode in settings where the use of PDFs is required and readers might benefit from taking control of the digital text they read.

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