

MEDICAL DEVICE MANUFACTURER

– APPLAUSE CASE STUDY –

CUSTOMER

For decades, this healthcare company's mission has been to help people with diabetes all over the world think less about their daily diabetes routines and get true relief, day and night. The organization is a pioneer in the development of blood glucose monitoring systems and a global leader for diabetes management systems and services.

One of the company's brands helps enable people with diabetes to live as normally and actively as possible and it empowers healthcare professionals to optimally manage a patient's condition. The suite of products aims to quantify glucose in the bloodstream as an aid in monitoring the effectiveness of glucose control.

The organization's diabetes manager mobile apps enable people with diabetes to better manage their conditions. The app serves tens of thousands of diabetes patients. The mobile apps bring together several major functionalities for personalized diabetes management, including a carbohydrate calculator with visualization of portions on the plate, a self-monitoring glycemic logbook and a graphic visualization of glycemic results.

CHALLENGE

When a person with diabetes receives a glucose meter they expect the meter will work for a long time. It's integral to the customer's confidence in the company's products that the meter's battery has a long-lasting lifespan.

When the company's team discovered that the batteries in the glucose meters were draining quickly around the globe, it was a major point of concern since it would impact the long-term usefulness of the meters. The team needed to determine if the batteries were the source of the issue — whether the battery was included with the meter or bought off the shelf — or if it was a problem with the meters themselves.

INDUSTRY

Healthcare

TESTING TYPES

Functional, Localization

APP TYPES

Hardware, Mobile, iOS, Android

CHALLENGES

- Needed to identify whether batteries in the glucose meters were draining due to an issue with specific batteries or the meters themselves
- Lacked the ability to test the meters with real users in a real-world setting

RESULTS

- Applause sourced dozens of unique testers from its global community of QA professionals who each performed 250 tests on each meter, including with different batteries
- Applause's testers conducted approximately 41,500 tests. The meters returned an E-9 error message on 0.001% of the tests, increasing confidence in battery life and providing valuable information on which off-the-shelf batteries were most compatible with the meters

Knowing they could control the meter, though not the batteries, the team modified the meter's hardware and firmware. The hardware modifications related to capacitor components, while the firmware improvements included updating component operation electrical thresholds, error handling, saving additional information during event logging and updating the battery passivation algorithm.

The company conducted internal testing on the meter batteries in a lab, which included testing at a predetermined temperature. These tests helped establish a baseline; across more than 20,000 tests, the team found that 0.004% of the tests returned an 'E-9' error that indicated a battery issue.

However, the organization lacked the ability to test the meters with real users in a real-world setting. The company needed a large group of testers who could each conduct hundreds of tests on the meters, using different batteries over a significant length of time. This manufacturer needed to test the lifespan of both the batteries provided with the meter and those purchased off the shelf.

Given the scope of testing, the company needed a team to recruit testers, work directly with them to answer questions, triage and vet the findings, and then turn them into actionable results.

In addition, the company needed functional and localization testing for its diabetes manager mobile apps. The team lacked the in-house resources to test across all relevant devices and locations. The US-based organization needed external help to ensure that app content functioned properly across dozens of devices and operating systems, and that it was localized for the appropriate region and language.

SOLUTION

The company already worked with Applause for other testing needs. When the glucose meter battery issue arose, Applause quickly shifted its attention to focus there.

For battery life testing, Applause sourced dozens of unique testers from its global community of QA professionals who matched the glucose meter manufacturer's customer demographics. Applause shipped devices, meters, strip vials and boxes, kit boxes and batteries to the testers — all to perform routine blood glucose measurements and assess the battery performance of the meters.

Testers performed a daily procedure of tests, which included pairing meters, testing with the provided glucose solutions, replacing batteries after defined test execution intervals and recording unexpected observations.

Each tester conducted a total of 250 tests on each meter — 50 tests with out-of-the-box batteries, and 100 each with two sets of retail batteries. Testers made sure to note which battery they used for each test. Testers were asked to verify that:

- the meter powered on successfully;
- an error message was not present upon a successful power-on;
- a low battery icon was not present upon a successful power-on;
- and a result displayed several seconds after applying a drop of test solution.

Applause's fully managed service, including a delivery manager, test engineer, test architect and test team leads, ensured that the testers received all the necessary materials, understood the requirements and that the results were vetted and triaged.

Separately, Applause conducted functional and localization testing for the diabetes manager mobile apps. In addition to exploratory testing, Applause's testers validated specifically for exercise meter connectivity, data transfer, food

library search functionality/accuracy, and incremental app improvements based on observations discovered during testing and development.

Overall, across the meter and mobile app testing, Applause provided testing teams sourced from 25 countries, including Brazil, Canada, France, India, Indonesia, Mexico, Turkey, United Kingdom and the United States. These testing teams matched the desired demographics and enabled the company to test against its device matrix. Applause's testers completed testing on 224 device combinations in North America alone, including 160 distinct device/OS combinations. That includes 83 distinct Android configurations, 62 distinct iOS configurations and 15 distinct iPad configurations.

RESULTS

For the meter battery testing, Applause testers conducted approximately 41,500 tests. The meters returned an E-9 error message on 0.001% of the tests — a validating result.

These test results indicated that the hardware and firmware improvements helped increase the battery life of the meters. With testing performed by real-world testers who replicated real customers, the company's team felt increased confidence that it addressed the battery life issues that its customers faced. In addition, with the information the company now had on the performance of off-the-shelf batteries in real-world situations, its customer support team could make recommendations to customers on which batteries to purchase.

For the testing on diabetes manager mobile apps, Applause identified 56 issues that the in-house team deemed very or exceptionally valuable. A few notable bugs that Applause testers found included:

- the app crashed repeatedly after uninstalling and reinstalling on an Android 9.0. The tester provided a screen recording and device log to help engineers better identify and address the cause of this issue.
- the app crashed on an iPhone 11 after the user entered blood glucose and insulin dose data.
- the French version used the incorrect wording for liquid measurement and an unsuitable English acronym that French users would not understand.

With these test results, the team understood what was happening with its mobile app in the wild across hundreds of devices.

As the company continues to release new updates, it leverages Applause's SaaS platform on a daily basis. The company also meets with Applause twice a week to discuss results and how to improve testing strategies.

ABOUT APPLAUSE

Applause is the worldwide leader in enabling digital quality. Customers are no longer satisfied with digital experiences that are good enough; they demand the exceptional. The Applause Product Excellence Platform provides the world's leading brands with the comprehensive approach to digital quality needed to deliver uncommonly great digital experiences across the globe — with **highly vetted testers available on demand**, a complete and enterprise-class technology infrastructure, multi-point digital quality solutions and SaaS products, and expertise across industries and use cases. This harmonized approach drastically improves testing coverage, reduces costs and speeds time-to-market for websites, mobile apps, IoT and in-store experiences.

Thousands of leading companies — including Ford, Google, Western Union and Dow Jones — rely on Applause as a best practice to deliver the exceptional products and digital experiences their customers love.

Learn more at: www.applause.com