

Using tablet computers for data collection

Professional Data Analysts, Inc. and the
Hawaii Tobacco Prevention and Control Trust Fund

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HAWAII TOBACCO PREVENTION & CONTROL TRUST FUND



Professional Data Analysts (PDA) is a Minneapolis-based evaluation consulting firm that specializes in evaluations of public health programs.

The Hawaii Tobacco Prevention and Control Trust Fund is a non-profit entity whose purpose is to reduce cigarette smoking and tobacco use among youth and adults through education and enforcement activities.

This presentation will cover...

- 1 Why we used tablet computers
- 2 How we used tablet computers
- 3 What we learned
- 4 What you should consider

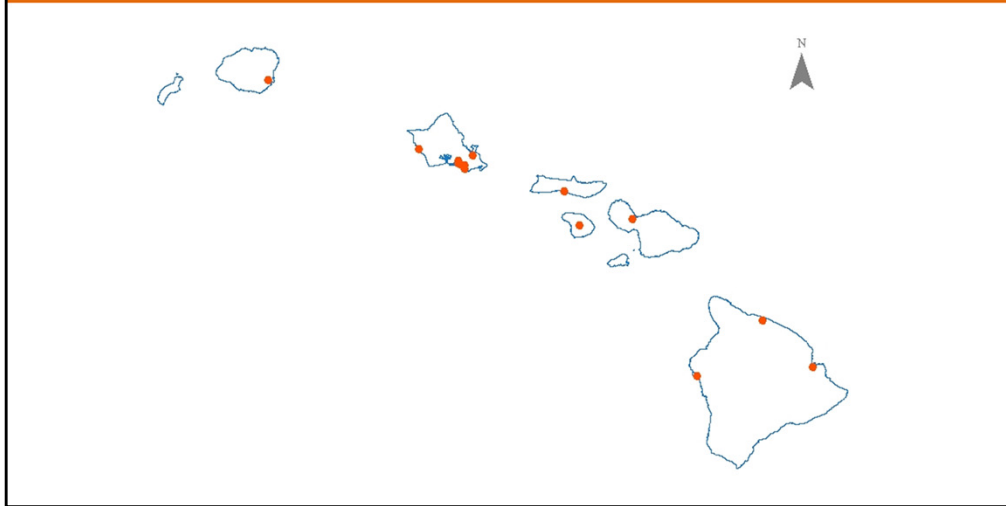


Why we used tablet computers



First to provide you with a brief background. The program we'll be referring to today is a community grant cessation program that is intended to serve priority populations. The program is just one component of an overall comprehensive effort funded by the Hawaii Tobacco Prevention and Control Trust Fund. The program provides grant dollars to organizations to provide in-person cessation counseling to tobacco users in Hawaii.

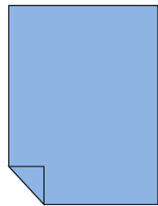
The funded programs are spread out across **multiple islands.**



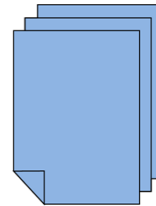
Currently there are two grant cycles involving 17 different programs spread across all of the main islands of Hawaii. The setting for each site varies – some are in the clinic setting, some are in homeless shelters, some take place at local organizations in the community. So you can imagine that with these various settings there is a varying level of access to technology. And of course there is also a varying level of technological skill.

There are several **evaluation forms** for staff to complete for each participant.

Enrollment form via
participant interview



Utilization forms for each
counseling session



For the evaluation component of this program, there is an enrollment form to complete for each participant that gathers demographic and tobacco use information. In most cases the counselor is completing this enrollment form using an interview style with the participant. There is another form that is completed by the counselor at the end of every counseling session that collects data about what was discussed or provided during the counseling session.



So the first time we did this evaluation we used paper forms. We printed and mailed the forms to the grantees as needed. And then the grantees mailed in their completed forms to be scanned / data entered.

An important part of the evaluation was tying participant demographics to the services they received, so we had ID numbers printed on labels that grantees put on the intake form and all corresponding forms about program use.

As you might guess, this was a cumbersome process.



We ended up with just too much paper! This was a problem for many reasons.

- It was not in line with our company's green policies. The grantees also expressed wanting a greener solution.
- It was simple in that it didn't involve fancy technology, but it was complicated in terms of having many forms, labels, and mailing procedures.
- It was cheap in the sense that it didn't involve fancy technology, but coordinating the printing of forms for multiple sites and doing all of the data entry was very time intensive. And of course scanning and data entry added another step, taking more time and making it more difficult to provide timely feedback. It occurred to us that in the end it might not cost much more to move towards an electronic solution.
- Data collection errors are inevitable when data is collected on paper; there were many errors also associated with scanning and manual data entry.
- Also many of the programs we work with are HIPAA covered entities, so we had to be really careful with the security of the paper forms – always keeping them locked up and making sure the grantees understood the importance of this as well.
- Finally, as I said the grantees wanted a greener solution, and they also made comments about how electronic solutions would be more efficient for them. Addressing grantee feedback would likely increase their buy-in to the evaluation, hopefully increasing compliance and data quality.

Choosing the right **electronic device**



All of these devices eliminate issues with having so much paper, reduce data security risks, and result in a more efficient data collection process. So why did we choose a tablet computer out of all of these devices?

Well, a desktop or laptop computer work too, but some of the sites are in settings that don't have access to a computer, like in a homeless shelter. In these situations, someone also might not have access to the internet. Also, each site has it's own computer system which raises the issue of compatibility with our data entry system that we created, which I will touch on in a bit. So those using a computer in their clinic may not have access to certain websites, like our data entry website. Creating a desktop or laptop system that was compatible with everyone seemed like it might not be possible. So since we wanted everyone to have the same, quick running system with internet access, that eliminated the idea of just relying on or using a desktop or laptop computer.

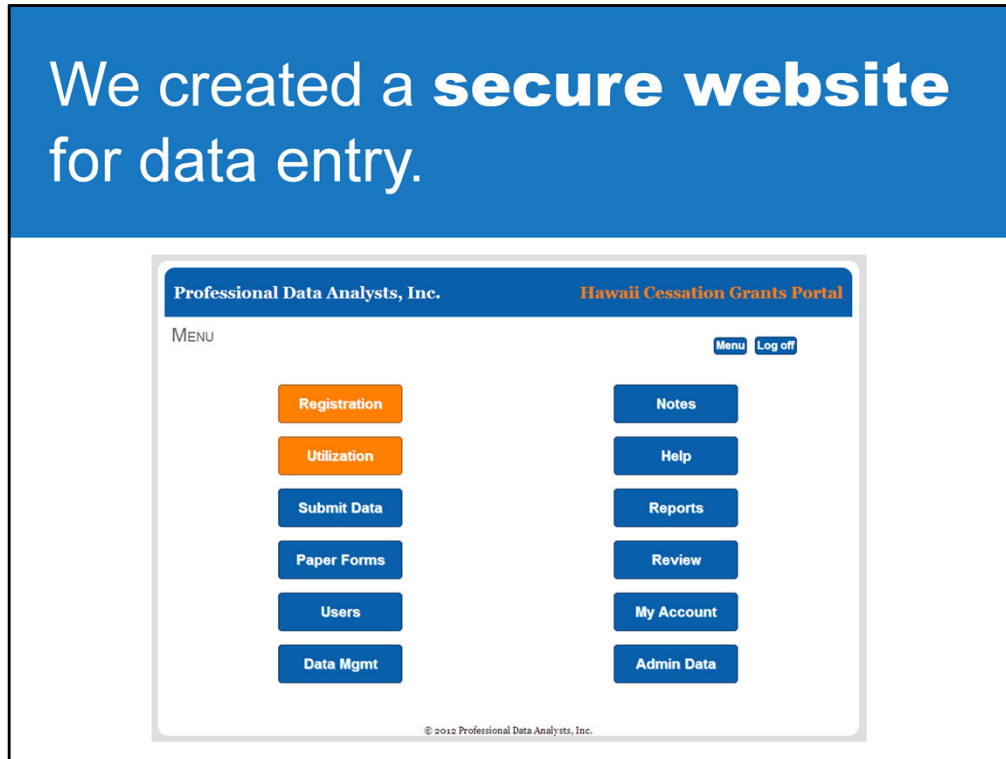
On the other end of the spectrum, the smart phone or even something like an iPod or iTouch were simply too small for our data collection procedures. Our surveys require some typed responses, and we felt the small keypads would be a barrier or result in poor data entry. We also wanted to be sure the full question would be visible on the screen, and this isn't always possible on such a small screen.

Enter the tablet computer. It was something that could be carried around, even if someone is working in a homeless shelter. With a data plan, you have internet access at all times. And we felt the screen was big enough for viewing questions and typing responses.



How we used tablet computers

We created a **secure website** for data entry.



Because of HIPAA, we elected to build our own web-based data entry portal versus using an app of some sort. This is the main menu of the portal we created. Grantees can directly enter data via their tablet or own computers and they can also print paper versions of the data collection forms from the portal and at a later time enter the data into the portal.

This means that you actually have to have an internet connection to enter data – no data is stored on the tablet itself. For our work we don't see this as a limitation since it means we don't have to worry about the tablet getting lost or stolen with protected health information on it. However it does mean that we needed to provide a 3G data plan with each tablet.

We have a programmer on staff so building a web-based portal was not new territory. Additionally, using this approach has given us flexibility to expand the evaluation in some exciting ways. For example, there is a page on the portal that allows each grantee to monitor their data in real-time, including progress in meeting benchmarks, grantees can print the data collection forms from this website if needed, and we uploaded all of the evaluation training materials to this website. So we think it's pretty sweet.



We used refurbished iPad 2s. The cost was similar, maybe slightly higher than, other tablets, but at the time we were setting up this project (two years ago), there were far fewer tablets on the market than there are now and other tablets were still really new and we wanted to make sure that we had something that was dependable. If we did this project again we would probably reassess the tablet market and determine if this is still the best route to go.

Refurbished seemed like a good option for us because it allowed us to save a little on the cost and all Apple refurbished products are tested and certified, include a 1-year warranty and include a brand new battery and outer shell. We also purchased Apple Care for each device, which extends the warranty for an additional two years and pretty much covers any malfunctioning of the iPad, but not things like damage from dropping it. Apple Care was another unique and important aspect of the iPad versus other tablets. It actually came in handy for one iPad so far – it wasn't charging anymore, so we simply called up Apple and they shipped a replacement iPad to the grantee right away, free of charge.

iPad setup



At the start of the funding period we met with all of the grantees over the phone and, not surprisingly, they all expressed interest in having an iPad. With the first grant cycle we gave each staff person involved with data collection an iPad, which could be several staff members for one site, but we learned that was often too many. So the second time around we gave each site one iPad, and then later determined if each site needed more/less. That seemed to work much better in terms of each site ending up with the right number of iPads.

So the idea of having a free iPad for a few years sounds pretty nice right? Well, we of course had to take a little bit of the fun out of it. We really wanted to be sure that the iPads were only used for data collection since they were purchased with grant dollars...

iPad setup

Restrictions



... so we installed what's called a configuration profile on each iPad that set up some passcode restrictions. The configuration profile is unique to Apple products and is free to download, which was also another reason we chose the iPad over other tablets. We also restricted their ability to download apps and make changes to some of the settings. So limiting the available features of the iPad helped to justify the purchase of them with grant dollars.

iPad setup

Data plan



As I mentioned the grantees needed internet access to enter data, so we set up a data plan on each iPad. We limited the amount of data that could be used on the 3G network each month, but it was plenty of data for data collection but not quite enough to watch a movie on it every Saturday night. The data plans were set up through AT&T because they have the best coverage in Hawaii, and we received automated emails from AT&T if someone was approaching their data plan limit for the month. To date we've only have two instances where someone was approaching their data plan limit. We simply made the grantee aware of this and haven't had any problems with people going over the limit.

iPad setup



Contract



Each grantee or organization signed an equipment loan agreement for use of the iPad. The agreement outlined what happens in the event of theft, loss, or damage, what they're responsible for, that the iPad will be returned to us at the end of the grant period, and things like that. We had to have a signed agreement from the grantee before giving them possession of an iPad.

To date we haven't had any issues with theft, loss, or damage.

iPad setup



Training & TA



At the start of the project we trained the grantees how to use the iPads and portal. This training was part of a bigger grant / evaluation training but we were able to incorporate some hands on activities. For one activity we created a checklist of tasks for the grantees to complete on the iPad along with images or screen shots of how they might complete that task. It started with simple tasks like 'turn on the iPad' and gradually worked up to more complex tasks in the portal itself like 'complete an enrollment form'. The grantees worked at their own pace and we walked around and helped where needed, which I think worked really well because people have such different levels of technological expertise.

We also subcontract with a local evaluation firm in Honolulu who provides ongoing technical assistance to the grantees and is able to provide any follow-up training or troubleshoot any issues with them. That's really helpful for us to have given our distance from the grantees and time zone difference.

iPad setup

Restrictions



Data plan



Contract



Training & TA



So to recap our iPad setup, we restricted some of the features and enforced passcodes, we set up data plans to access the internet, we had each grantee sign an agreement that outlined the expectations of iPad use, and we trained the grantees on the iPad at the start of the project and contracted with someone in Hawaii to provide ongoing technical assistance.

And as I mentioned grantees still had the option of using their own computers or printing paper forms and data entering them on their own.

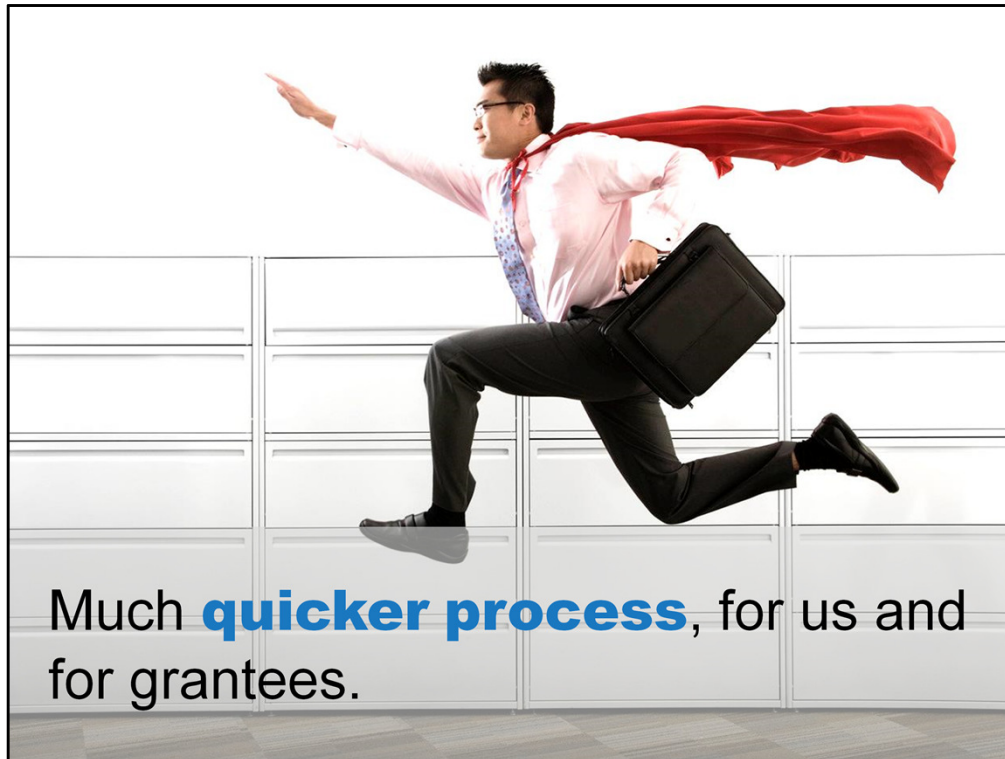


What we learned

To date we have used the tablet computers for two evaluations, with a total of 17 organizations. Next we will share some of the things we have learned so far.



Well for starters we have saved a tree so far, or up to 7,000 pieces of paper in a year and a half assuming no one is using paper anymore, though we know a few grantees still are. By the end of the evaluation we will have saved up to five trees, which certainly isn't the size of a forest, but it's a start. Using tablet computers, or any electronic device for that matter, is a greener solution, which is important to PDA as well as the grantees.



We also no longer have to invest so much time to coordinate printing and sending forms. Data don't need to be sent in and scanned or data entered. This in turn allows us to turnaround the data in a more timely way. Overall it is much less time intensive, though there is of course some ongoing training and TA needed for iPads/portal.

The data are more **secure**.



There is less security risk associated with entering data into the portal versus having a bunch of paper surveys floating around. When we used paper we had an instance where it was believed that some paper forms got lost in the mail (they were later found), which was concerning. We have had no issues with lost or stolen data under the new system. As we said earlier, this was an important factor given the type of data we were working with.

The data are **cleaner**.



Now this isn't necessarily specific to using an iPad, but really the difference between using an electronic versus a paper survey.

First, grantees who had never worked with these data collection forms had an easier time following the skip patterns on the iPad than those from previous cycles who used the paper forms. So there's certainly a benefit of electronic forms and being able to program question skips.

There's also the option of forcing answers on an electronic form. We don't require an answer for every question on our forms, but there are a few key pieces of data that we have made required fields, which helps to get complete data.

Finally, with our system grantees are able to see the data they entered after submitting it, so they can see if they entered something wrong. We have more requests now from grantees asking to correct a data entry error they made, which may not be addressed if they used paper forms and someone else entered their data.

We had increased **buy-in** to the evaluation.



We also feel that there was increased buy-in and use of the evaluation. For one, there is likely a novelty of using a tablet computer for data collection. And then with the portal we were able to add some features that were helpful for the grantees, like being able to monitor their data in real time and printing completed forms from the portal. Additionally, we think it may in some ways further legitimize the evaluation – as it makes it clear that the funder cares enough about it to invest in equipment.

And for the grantees involved with the first cycle when we used paper, it demonstrated that we responded to their feedback.

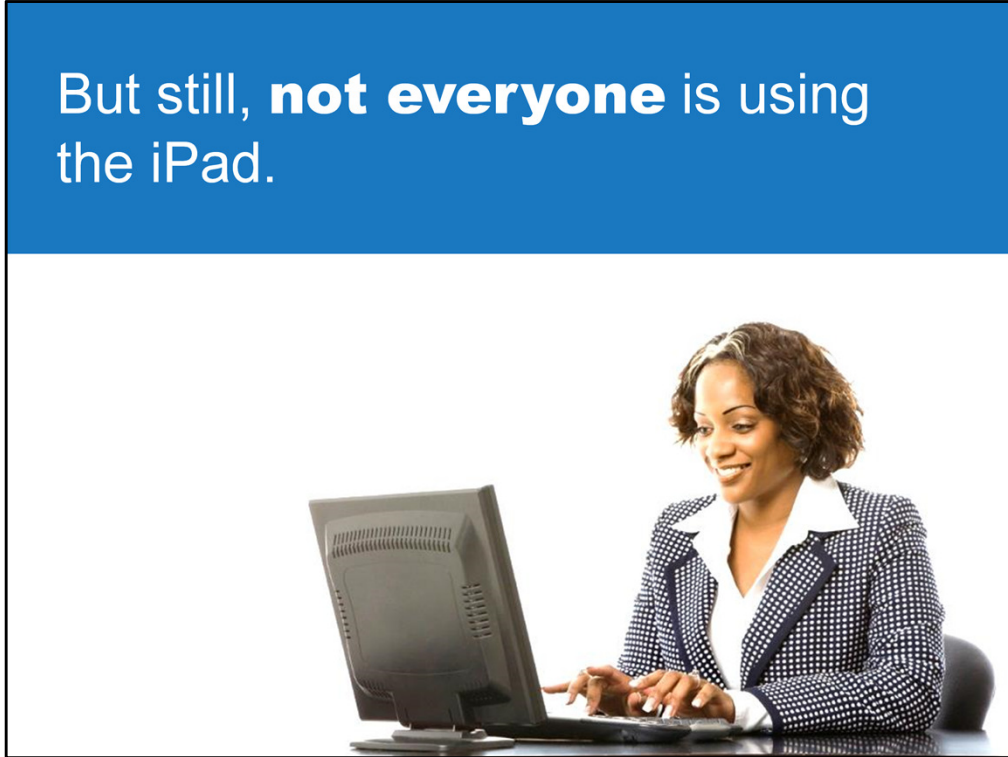


So several months into the first grant cycle we did what evaluators do and evaluated our evaluation. And naturally we learned a few important things that needed fixing.

We learned that if the iPad remained idle for more than 2 mins, grantees would get kicked out of the portal and have to restart a form. This was an issue for those who were pulled in many directions during their intervention or who had to take a lot of time to explain each question to their participants. We simply increased the time the iPad went into idle mode.

Some grantees really wanted to have a printed version of their completed forms for their own records – to refer to for counseling or to use demographic information for other forms they had to complete for their organization. And some just wanted to make sure they entered the information correctly. We added a feature that allowed them to do this.

But still, **not everyone** is using the iPad.



Even with some tweaks and improvements, not everyone is using the iPad. We administered a web survey to the most recent round of 12 grantees, 9 of which were also grantees when we used paper forms for the first evaluation. With all grantees responding, we found that half of the current grantees are using their iPad at least to some extent.

The other half who don't use the iPad said that either it worked better for them and the way their intervention was set up to complete the surveys on paper and then enter the data into the portal later on, or they simply found it easier or were more comfortable using paper or their desktop computer for data collection and they like the larger screen and keyboard of their computer, or they were in a rural area and experienced a slower 3G connection on the iPad.

Those who feel the iPad is not very easy to use do not feel that additional training would help.

... but
almost
everyone is
happier
with the
new data
collection
process.



Seven of the nine returning grantees like the new data collection process that has a web portal and option of electronic data entry better than the old process of using paper forms. They feel it is much more efficient. So while we certainly wish for everyone to use the iPad or at least a computer, we understand that one size does not fit all and were glad that the evaluation could accommodate the various intervention settings and capabilities.

What about the **cost**?

This is what you really want to know right?

Material costs for our project

1 iPad	\$500	} one-time costs
1 iPad case	\$25	
1 AppleCare warranty	\$90	
1 data plan per year	~\$200	

So first we have the material costs for the iPads. Of course there's the iPad itself, or whatever tablet you use – the refurbished iPad2 was \$500. Then we wanted them to have a protective case that also allowed you to prop the iPad up, which were \$25 each. Then we decided to purchase AppleCare for each device, which was \$90 each. For our project we are using data plans because we need an internet connection. Those run us \$16 per month per iPad, which amounts to about \$200 per year per iPad.

These first three items are one-time costs. The data plan is the only thing here that is an ongoing cost for our project.

Labor costs in Year 1 for our project

iPad set-up	~170 hours	} one-time costs
Web programming	~160 hours	
Technical assistance (5 sites)	~6 hours	

Then we have labor costs which I imagine would vary greatly from project to project depending on how many iPads you're dealing with, the technological capacity of your clients, the complexity of your survey, whether you create your own secure website for data entry versus just using an app or SurveyMonkey, etc. Since hourly rates may differ from our project to yours, I'm going to present the labor costs in hours worked for our project.

First there's the time we spent researching which tablet to purchase, figuring out how many each site needed, setting up the iPad agreements with each site, setting up the data plans with AT&T, figuring out what the heck a configuration profile was and how to make it work for us, and setting up each iPad with the configuration profile, restrictions, etc. That amounted to quite a bit of time. The staff we used for these hours includes evaluators, our programmer, and evaluation support staff. And certainly if we did it again, it wouldn't take nearly as much time.

Then there was the web programming. As I said earlier our programmer created our own secure website for data entry. Programmer's are not cheap, and the portal he created was not a simple task. I think it was totally worth it, but it also required quite a bit of time. For your project you could decide to use a programmer too but maybe it would take half as much time. That's really going to vary from project to project. If you don't use any programming and instead use something like SurveyMonkey, at most that would run you about \$800 per year and wouldn't require nearly this amount of time to set up your survey, so if that meets your needs, great. In addition to the programmer, staff assigned to web

programming included a few evaluators to discuss design and do some QA testing.

Finally we have the amount of technical assistance that was provided in the first year and continues each year of the grant period, though it can certainly vary from year to year. This mostly includes troubleshooting iPad issues with staff and training any new staff. In our first year this only amounted to 6 hours across 5 sites – so about an hour per site in the first year. This amount of time you spend on TA could of course vary by how many iPads you have in the field and what people's level of comfort and familiarity with the iPad is.

The bottom line is that these labor costs are going to vary greatly from project to project and depend a lot on the size and scope of your project. If we had to do this again we probably wouldn't have to spend nearly this much time on iPad set up or programming.

I also want to point out that again we mostly have one-time costs – iPad setup and web programming only happen at the start of the project. The TA is the only real labor cost that continues throughout the project.

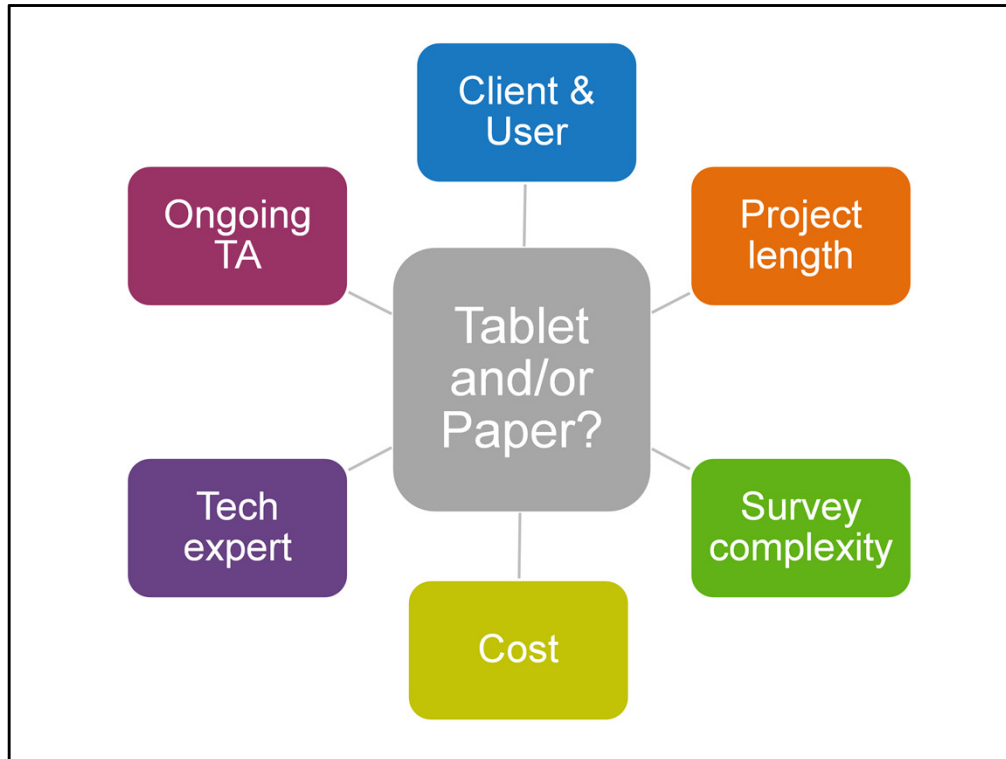


So between the material costs and labor costs, almost everything is a one-time cost. For us only the data plans and providing TA are ongoing costs.



What you should consider

So when thinking about your current or future projects and deciding what type of data collection device would be best...



1. First consider the people who are going to be using the device. May be varying levels of comfort with technology & also considerations in terms of the way in which data will be collected.
 2. Then you will want to think about the length of your project – will it last one year or multiple? Is there a chance you’ll be doing this project again in the future?
 3. You also want to think about the complexity of your survey(s). How long is it? Are there complex skip patterns? Does one survey ID need to link to another survey ID? This will help you think through your options of using a programmer versus Survey Monkey versus paper surveys.
 4. The length and complexity of your project will factor into your cost consideration. At first it may seem like using paper is a cheaper method, but may not be the case.
 5. Our strategy required technological expertise. We developed our own website for data collection, but I know there are a lot of survey type apps out there that don’t require such expertise. But there may of course be some tradeoffs with that.
 6. It may also be important to consider your ability to provide ongoing training and technical assistance to those collecting data. Consider your time availability, proximity to the data collectors, and own familiarity with the device or program.
- For our evaluation, we felt that iPads would work well in the grantee settings, we knew this was a multi-year project, we had relatively complex survey needs, the costs for start up were high but greatly decrease after, we had a brilliant tech expert in our office, and we could contract with someone in Hawaii to provide TA. We found that using tablet computers was more efficient, more environmentally friendly, more secure, it improved the data quality, and increased buy-in.

**Go out
on a
limb
and try
it out!**



I definitely encourage you to consider your own projects / surveys and think about whether a different device would alleviate any issues you're experiencing. Research the costs associated with that device and consider the feasibility of actually using it. There are probably some pros and cons to both sides. Go out on a limb and try it out if it seems like something that might just work.



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