ITRC has developed a series of fact sheets that summarizes the latest science, engineering, and technologies regarding environmental data management (EDM) best practices. This fact sheet describes:

- general field data collection training considerations
- paper form training considerations
- digital form training considerations

Additional information related to field data collection is provided in the fact sheets on Defining Data Categories and Collection Methods, Field Data Quality Assurance and Quality Control (QA/QC), and Other Considerations for Field Data Collection.

1 INTRODUCTION

After you have defined project data types and collection methods (Defining Data Categories and Collection Methods) and established a field data collection process (Field Data Collection Process Development Considerations), for successful field data collection, it is critical that staff are adequately trained and understand the expectations for field data collection. A robust training on the mechanics and the importance of completing field data collection activities helps to ensure that data are collected efficiently and with fewer errors. The following sections provide general training considerations for all types of field data collection processes, as well as specific training considerations when using paper versus digital field data forms. The following sections have also been reduced into a Field Data Collection Training Development Checklist that can be used to assist in the development of a training program.

2 GENERAL TRAINING CONSIDERATIONS

Just as field data collection forms are developed, either paper or digital, training materials should be developed to accompany those forms. And, as with those forms, the training can be provided via paper documentation and standard operating procedures, or it can be provided digitally via live or recorded videos/screen sharing. Effective training should be planned and implemented strategically. Specifically, consider who should develop and review the training materials, what is the useful life of the form, who needs the training, when should training be provided, and who is the support team once data collection begins. The following subsections pose questions that should be taken into consideration when developing training materials.

2.1 Who Should Develop and Review Training Materials?

When developing training materials, it is recommended that the individual(s) who developed the form or the individuals(s) leading the form implementation also develop, at a minimum, the first draft of any training materials. These individuals have a complete understanding of intended use of the form and how the form was developed, which will prevent others from making assumptions while developing training materials. Development of these training materials can be done in parallel to the form development. Once complete, identify reviewers of the training materials at multiple skill levels (including field staff) to ensure that the material is clear, concise, and addresses all training needs. Form developers may exclude key instructions because they complete those steps instinctively from having developed the form. Reviewers should also ensure consistent, clear, and generic use of language to describe how a user will interact with a form, including how users may enter field data into a form (such as pen/pencil, keyboards, mouse, touch screen, voice, and more). Lastly, it is important to consider how and where training will be delivered, and training material should be developed to support that venue. If training cannot be completed in person, it is critical that a virtual training include screen sharing options using the equipment and forms that will be used to perform the data collection.

2.2 What Is the Anticipated Useful Life of the Tool or Form Being Trained?

When developing training materials, consideration should be given to the useful life of the tool or form being trained. Will the tool or form be used for a single event, or is it anticipated that it will be used regularly for several years? If the life of the tool or form is an extended period of time, consideration should be given as to the potential need to update the training materials over that period of time. If it is anticipated that there will be updates to the tool or form, then any associated training materials will need to be updated in conjunction. This may include photos, videos, or hyperlinks. In addition, you may need a mechanism for ensuring users receive and understand any updates to the training materials.

2.3 Train Early Adopters First Before Training Users at All Skill Levels

After training materials are developed, identify the first round of users to be given the training. It is recommended that a small group of early adopters are trained first. These users can provide valuable feedback not only on the training and training materials themselves but on the tools and forms as well. These early adopters can also drive late adopter engagement and implementation of the tools and forms. It is also critical to train users at all levels of an organization, from field staff to program leaders. The training provided to each skill level may need to be tailored to those skill levels, but providing training at all levels is another way to drive engagement and implementation across an organization.

2.4 Plan for Troubleshooting Assistance and Feedback Following Training

Finally, once your training is complete, ensure that users have a mechanism for obtaining assistance with troubleshooting. Provide resources that users can refer to for assistance and identify who should be contacted if those resources prove to be insufficient for users in the field. If a user cannot reach a resolution in relatively short order while collecting data in the field, then the field data collection activity will not be successful. Users should also be provided a mechanism to provide feedback (by name and anonymously), both on the training/training materials and on the tool/form that was the subject of the training. This feedback should be acted upon, or an explanation as to why it was not acted upon, within a reasonable time period. Responses provided in a timely manner foster continued engagement in the feedback process.

3 PAPER-ONLY CONSIDERATIONS

It is important to understand the end use of the form. If the form is going to stay in paper form only, there are fewer considerations. If the form will be scanned after being filled out, the margins of the page should remain clear of any notations because they may be cut off when the form is scanned.

If the form will be transcribed, it is important that the handwriting be clear. Also, if shorthand is allowed, consider making a key for allowable entries. It may be beneficial to provide a laminated sheet with the shorthand entries, as well as the allowable values for other fields on the form.

When working with paper in the field, the weather should be taken into account. Weatherproof paper and pens are available, which allow writing on paper forms even when they get wet; however, these materials may not be used in certain circumstances (for example, when sampling for per- and polyfluorinated alkyl substances [PFAS] analyses).

Availability of the paper forms and any laminated key sheets should be taken into account. The staff will need to have a sufficient supply of the materials with them in the field to complete the project.

4 DIGITAL-ONLY CONSIDERATIONS

As training plans are developed, it's important to identify factors that can impact the successful adoption and use of a new digital data collection tool. The following suggestions should be considered and incorporated into any digital data collection training program.

4.1 Consider Your Users

Your audience will likely have varying levels of comfort and experience with technology, and tailoring your training to the audience is key. Early adopters of new technology may have an easier time with your training. Late adopters are more likely to face a steeper or dual learning curve, needing to gain familiarity/comfort with the technology being used in addition to the new application.

Regardless of the type of audience, be sure to schedule training well in advance of the field event. This will provide an opportunity for users to perform a test run at their leisure to confirm that they fully understand the training and provide a final opportunity for feedback prior to the event.

A crucial part of digital data collection training is ensuring that each user not only understands how to use the field application but can easily use and navigate the features of the device. Identify the appropriate devices to be used during the field event, whether personal devices are acceptable or if managed devices are required. This should have been determined during process development (see Field Data Collection Process Development Considerations Fact Sheet).

Be sure to address features or behaviors that may be unique to the device or operating system. Users may be more familiar with one operating system over another (Windows, iOS, Android), which can introduce an additional learning curve into the training session. You can keep the learning curve manageable by providing devices for your users to “play” with well in advance of the training. This will provide an opportunity for the user to gain familiarity and comfort with the device, allowing them to be better prepared to learn how to use the application/field form.

4.2 Training Program Design Considerations—Digital

When designing a digital training program, training may need to be provided about the device itself prior to training specifically for the digital form or application. Training should also address challenges that may be unique to the field event. Consider including the following information in your training program for digital forms:

4.2.1 Train on the Device

- Define the acceptable devices (personal vs. managed devices)

Users must be made aware of which devices can be used successfully for a given form or application. As described in the Field Data Collection Process Development Fact Sheet, applications are often developed to work on specific devices or operating systems or require certain versions or updates of operating systems.

- Ensure all devices are in working order and up to date.

Prior to providing training on any field form, trainers should inspect the devices to ensure that the device is in good working order and all needed accessories are available, confirm all needed software/applications are installed and up to date, make sure they are able to log in to the device successfully, and that any connectivity needs are met.

- Provide guidance on how to use the device.

Individuals may have varying level of experience using certain devices or operating systems. It is vital to provide users the opportunity to acquaint themselves with the device and operating system prior to training on the application/field form. For individuals who may be unfamiliar with the technology being used, a separate short training focused on the device itself will help to make the learning curve more manageable. Device training should include:

- everything needed to complete field event, including button orientation, logging in, connecting to Internet, taking photos, etc.
- identification of special features or limitations of the device (for example, ruggedness, water resistance, intrinsically safe)
- identification of unique behaviors and layouts within the operating system

- Address the security specifics.

Users should be made aware of the security features of the device, so they are not caught off guard while in the field. The most common features reviewed should include any standard log off or sleep settings due to inactivity, who can and should access the device, and confirmation that everyone has the needed usernames and passwords to login to the device, applications, or other features.

- Include instruction on connecting device with other measurement equipment.

Provide users with training on connecting their devices with other equipment. This should include a demonstration with an opportunity to work through the steps on their own using the devices they will be using in the field. A copy of the instructions should be included either as a document on the device or in paper form for reference while in the field.

- Provide information on basic troubleshooting and who to contact for additional support.

Users should be provided with the contact information of those who are available to provide support and troubleshooting for device- or form-related issues. If screen sharing or remote connection capabilities are available, instructions should be provided and reviewed prior to the field event.

- Review care and storage expectations.

Proper care and maintenance of devices help to ensure a longer working life. Expectations regarding maintenance and care should be reviewed. Common examples of care and storage expectations include:

- proper battery charging practices, using backup batteries and battery extension packs
- acceptable storage locations while not in use to avoid damage caused by temperature or environmental extremes, physical hazards, or theft
- cleaning, including decontamination and disinfection methods to prevent current and future users from encountering potentially harmful substances

4.2.2 Train on the Application

- Make sure your application is installed on every device and is working.

Review each device to confirm that the application is up to date and the correct form version is available. If applications require user logins, be sure to have all users confirm that they can log in to the application, access all needed forms, and confirm that all forms open without issue.

- Provide an overview of all the features of the application.

Thoroughly review the features of the application, including required fields, reference values, auto-filled or calculated fields, syncing procedures, etc. Demonstrate how to save/submit data, make revisions if appropriate, and extract deliverables. The training should include a run-through with a data entry example that mimics what may be encountered in the field. Users should be provided an opportunity to either follow along on their device or practice after training to gain familiarity and confidence.

Address how to handle special scenarios where appropriate. (For example, performing a synoptic groundwater gauging event and a well is inaccessible or a unique observation needs to be recorded.)

Last, provide troubleshooting guidance, including who to contact for additional assistance. This may be a different person than the one providing device-specific help.

4.2.3 Address Challenges Unique to the Field Event

- Connectivity considerations

Connectivity challenges can occur in any area, whether it be in the city center, remote location, or in the basement of a building. Be sure to review what type of connectivity will be available (Wi-Fi or cellular connection), if any, and what to do in instances where connectivity may be inconsistent or unavailable.

Discuss any required procedures for working offline, including downloading forms or materials prior to losing connectivity and syncing procedures, including manual sync or auto-sync. Have backup plans and provide training on those plans if digital collection becomes impossible. Further discussion relating to backup plans can be found in the Field Data Collection Process Development Considerations Fact Sheet.

- Environmental considerations

Review any unique environmental conditions that may impact the successful use of the device. Device performance can be impacted by temperature extremes, precipitation, or dust, while user performance can be impacted by issues with screen glare or the use of dirty, oily, wet, and gloved hands.

5 REFERENCES AND ACRONYMS

The references cited in this fact sheet, and the other ITRC EDM Best Practices fact sheets, are included in one combined list that is available on the ITRC web site. The combined acronyms list is also available on the ITRC web site.