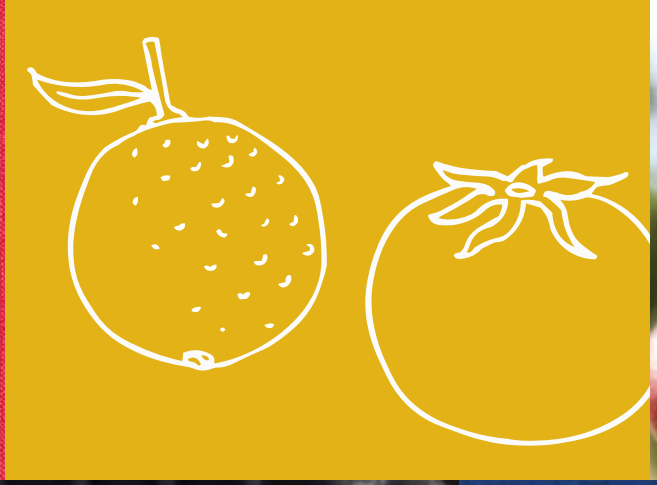

6

WHAT ARE THE TECHNICAL CONSIDERATIONS WE NEED TO KEEP IN MIND?

There are a number of technical choices that need to be made before you can begin creating your own radio programming. This component includes overviews of the different types of low-cost audio recording devices, their strengths, weaknesses, and examples of situations for which they may be most appropriate. It also covers devices that support interactivity, peripheral devices, audio editing software, and other important technical choices. This section will not make recommendations for the best devices. Instead, it aims to inform you of likely technical considerations, so that you can assess what is most appropriate for your situation.

COMPONENT GOALS

BY THE TIME YOU HAVE FINISHED THIS COMPONENT YOU WILL:

- ✓ *Determine which devices, accessories, and software you will use for your interactive radio activity.*

ONCE YOU HAVE DECIDED upon the general approach you plan to take, you will need to decide on which technical options you will use to help you implement your plan. As you have been working through the toolkit, you likely have a sense of what you will need to implement your plan. This component is designed to give you more information on the technical considerations for each of those items. Some of these options you may be deciding on to purchase for your own team, while others you may simply be helping your partners to decide on. We have broken this component into four different types of options:

1. Audio recording devices
2. Interactive devices
3. Peripheral devices
4. Software

The information contained in this section of the toolkit was accurate at the time of publication, although given the rapid development of technology some of the content may be outdated by the time you are reading it. Before making any final purchase decision, you should do your own research into each technology, including consumer opinions and any new models that have been released. A number of online resources exist to help you with this research. One of the most comprehensive sites is CNET (http://reviews.cnet.com), which includes expert and consumer reviews on both hardware and software.

At the end of this component, we have included a **Cost Calculation Worksheet** that you can use to keep track of your total estimated cost of equipment, accessories, and software. If you are planning to purchase equipment for your radio station partners, you will also want to include these in your calculations.

The total cost of hardware and software will likely constitute only a small percentage of the total costs of implementing your interactive radio activity.

Even so, it is important to keep track of what you anticipate those costs to be to make sure that they are within with your overall budget. You can use this worksheet to help you develop a rough estimate for what your costs are likely to include.

The worksheet is divided into five columns:

- **ITEM** – This is the name or type of device, accessory, or software you plan to use.
- **DISTRIBUTION** – This is the scope of distribution for each device, and would include the geographic areas you are planning to use each device in. For example, if you plan to distribute digital voice recorders to several locations, you can track that here.
- **NUMBER NEEDED** – This is the total number of items needed to implement your activity.
- **PRICE PER UNIT** – This is the price for a single unit of each item.
- **TOTAL PRICE** – This is the number of items needed multiplied by the price per unit.

After you have listed all of the items that you anticipate purchasing to implement your activity, you can add up the total price of each item to find out what your anticipated overall cost will be. For multi-year projects, make sure to also consider replacement costs for each item. The life expectancy of each device will depend on a number of factors, including the environment in which you are using it, the quality of the device, and the likelihood of theft.

Your organization may already use a set formula for determining replacement rates for equipment. If not, try to use past experience with similar devices along with consumer research to assess average life span. Generally, most electronic devices will need to be replaced at least every three years, although some devices will need to be replaced sooner.

Through its experience in Africa, for instance, Farm Radio International has found that the MP3 players/recorders that they use in the field need to be replaced every year.

If an item is not locally available, you should also consider the cost of shipping and tariffs if you plan to purchase it elsewhere. In addition, you will need to think about whether it is possible to repair the device locally. A brand in the country of your home office that is cheaper than another brand might not be the cheapest option in the long run if it is not locally available. Once you add the cost of shipping, tariffs, and lack of local repair options, it could actually be more expensive than a similar locally available brand that has a higher price. This is of particular importance if you plan to purchase anything for your local partners. If they will be unable to replace or repair a device on their own, then it will very quickly become an irrelevant piece of technology.

Ideally, you would work with your local partners to purchase on their own any additional equipment or software that they need. Should it be necessary to make any purchases on their behalf, you will want to develop a clear plan with them that includes who will be responsible for maintenance, and how they will pay for any repairs, upgrades or replacements over time. If this is the first time the radio station is using a type of hardware or software, they may not know what it will cost them to replace or how long it might last. You may need to help them with this process. You can use the **Equipment Tracking Worksheet** at the end of this component together with any partners you will be procuring equipment for to help them keep track of each item's age, operational status, and other relevant information.

All price estimates below are based on retail prices in the United States and are accurate as of July 2012. Prices and availability may vary in each country.

AUDIO RECORDING DEVICES

The type of audio recording device you will need will depend on how you plan to record audio. Generally speaking, you will either be recording out in the field, through the phone, or in the studio. The first two types of recordings will require specific audio recording devices, whereas recording in a studio can be done with only a computer, a good microphone, and the right software. Deciding on what type of setup you need will depend on how you plan to collect audio. In this section we will look at options for each method of audio recording.

IN THE FIELD

Your primary option for recording audio in the field is a digital voice recorder (also sometimes called an audio recorder or MP3 recorder). Nowadays, most recorders are portable, handheld devices that run on batteries and can save audio that you record into a digital format, such as a WAV or MP3.

THINGS TO CONSIDER

When considering which recorder to purchase, you will want to consider at least the following:

Memory. Some recorders have a built-in internal memory, while others use removable SD memory. Recorders that use SD memory will give you greater flexibility because if you fill up a memory card while in the field, you can always exchange it for an empty one. If the recorder only has internal memory, you will need to connect it to a computer to clear up room first.

Battery life. The average battery life for a device depends on typical usage, and what type of battery it uses. Some recorders have built-in batteries. Ideally, you should look for a recorder that has a removable battery. That way you can always have a backup battery charged and ready to use if the battery dies.

CONTINUED →

THINGS TO CONSIDER (CONTINUED)

Audio quality. Audio quality is measured through a combination of sample rate and bit depth, which are expressed in terms such as 96kHz/24-bit. Without going into too much detail, the larger these numbers are, the higher quality audio you will be recording. In reality though, your average listener will likely not notice any difference between 24-bit and 16-bit or 96kHz and 48kHz. What you will notice, however, is file size. A file recorded in 96kHz/24-bit will be about triple the size of one recorded in 48kHz/16-bit. This is all to say that you should not necessarily feel the need to purchase a recorder with a high sample rate and bit depth.

Microphone quality. What will likely impact the quality of sound much more than the audio recording capacity of the recorder is the microphone quality. Some recorders have adjustable microphones that you can move, while others are fixed. Models may also have more than one microphone on board to allow for multidirectional recording. You will also see models that have condenser microphones, which generally record at a higher quality than standard (or dynamic) microphones, although they are more likely to break given their sensitivity. Last, you should check to see if the device has a microphone input jack. This will enable you to plug in an external microphone if you desire that flexibility.

Durability. The durability of each device varies, and some are certainly designed to withstand more than others. You will want to check consumer and expert reviews for the actual durability of any device you are considering. Also check with colleagues to see if they have had any experience with a given device in the field.

CONTINUED →

THINGS TO CONSIDER (CONTINUED)

Multifunctionality. You may find that some devices you are already using, such as mobile phones or MP3 players, also have digital recorders built in. In its work with community radio stations in Africa, for example, Farm Radio International uses the Sansa Clip+ MP3 player because of its low-cost, compact size, and decent quality. As long as multifunction devices meet your minimum needs, you may want to consider using them instead of a standalone audio recorder to reduce costs and the number of devices that staff need to carry around.

ESTIMATED PRICE RANGE

Prices for standalone audio recorders can range from $40 to $500, although you can find models that will likely more than suit your needs on the lower end of this spectrum. In the $30 to $60 range, you can also find several different MP3 players with built-in microphones that may be sufficient for your purposes.

FOR MORE INFORMATION

There are lots of resources online, although B&H has a fairly helpful buyer's guide to handheld digital audio recorders available at: http://bhpho.to/wbyaO

THROUGH THE PHONE

If you plan to record interviews with farmers or experts in advance over the phone, you will need to consider your setup for doing so. Although you can always place your phone on speakerphone and record audio that way, for a small investment you can purchase a phone recorder that will greatly improve the audio quality of your recording. As mentioned in **Component 3**, there are general two low-cost options: phone recorders that plug directly into your phone or those that are external dual microphones. There are also much more sophisticated devices, such as digital telephone hybrids, that allow for cleaner sound than lower cost options. For live broadcasts of interviews, you can also configure the radio station's mixer to receive audio from the phone.

THINGS TO CONSIDER

When considering which recorder to purchase, you will want to consider at least the following:

Compatibility. You will want to make sure that any phone recorder you plan to purchase is compatible with the phone you will be using. Phone recorders that plug directly into landlines are different than those that plug directly into mobile phones.

Additional hardware. Most of the mobile phone recorders are standalone devices with built-in or SD memory, so all you need is the recorder and cables to connect to your phone, which should be included. For some landline recorders, however, you may need to connect them into a computer to record the audio. In addition, if you plan to use a digital hybrid you will need to connect the device into your mixer for live broadcasts or a computer for recording.

CONTINUED→

THINGS TO CONSIDER (CONTINUED)

Audio quality. Generally speaking, phone recorders that connect directly into your phone will record better quality audio than those that rely on external microphones to pick up sound. Placing the call to or from a landline will also generally result in better quality audio than calls placed to or from mobile phones. Mobile phones can also sometimes create electromagnetic interference, which you've probably noticed if you have ever had a mobile phone close to a computer.

Multifunctionality. Some digital voice recorders also include functionality for tapping into mobile phones to record calls. It may be worthwhile exploring devices that can do both if you plan to record audio both out in the field and over the phone.

ESTIMATED PRICE RANGE

The lowest cost option is probably the Olympus TP-7 telephone pick up, which is a dual external microphone device that costs around $15. The Mini Recorder Control from Radio Shack is another cheap option for recording landline phones at around $25. Standalone phone recorders range from around $50 to $150, while digital telephone hybrids can cost from $450 and up.

FOR MORE INFORMATION

Atlantic Public Radio's website Transom.org has a fairly informative, although slightly dated, article on recording phone calls for interviews that includes audio samples from each recording device. The article is available online at: http://transom.org/?p=1165

If you are going to be working with local radio stations, they will almost certainly already have the appropriate setup for recording interviews in the studio. There may be instances, however, where you want to record an interview or audio from your own office. If you have a digital voice recorder, you can always use that to record your interview in the office. That said, you can also record the interview directly into your computer if you do not have a digital voice recorder available or want to use a better quality setup.

THINGS TO CONSIDER

If you plan to record interviews or audio from your office, you will want to consider at least the following:

Computer. When recording audio directly into your computer, you want to make sure that you are using a computer that runs smoothly without any latency—or lag as it is common called. Close any programs that are running except for the software you will use to record the audio. If the computer you are using records clearly without any jumps or delay, then it should be fine. Otherwise, you can try limiting the number of programs that run at start up by typing 'msconfig' into the 'Run' field in the Windows start menu and disabling all of the items listed under the Startup tab. Any essential programs will override this disabling, so do not worry. Restart your computer. If it is still too slow, you will likely need to find another computer to use.

CONTINUED →

THINGS TO CONSIDER (CONTINUED)

Sound card. As mentioned in **Component 3**, if you plan to do a lot of recording on the computer you will want to invest in a good quality sound card. A sound card with a 192kHz sampling rate, 24 bit resolution, and a signal to noise ratio (SNR) of at least 95 dB should be more than sufficient for your needs. Also look for a sound card with more than one microphone input jack, so that you record from more than one microphone simultaneously.

Microphones. Having at least two microphones will make it much easier to conduct an interview, otherwise you will need to sit huddled around a microphone or pass the microphone back and forth. Most computer-ready microphones will either have a USB plug or a 3.5mm audio input plug. If you want to use a higher quality microphone with an XLR or ¼" input plug, you will either need a plug adapter or a USB audio interface to connect them to your computer. As mentioned earlier, you will also want to consider what type of microphone to purchase. More information on microphones is provided later in the component. Perhaps the best way to figure out what type of microphone is best for you, however, is to check out reviews of—and if possible, test—a few different microphones that fall within your price range.

Pop filters. These are placed in front of the microphone to help reduce the 'popping' sound that occurs when the person speaking is close to the microphone. You can buy these or you can make your own with an embroidery hoop and nylon stockings. Search online for 'DIY pop filters' to find several different do-it-yourself designs.

CONTINUED →

ESTIMATED PRICE RANGE

Since there are a number of different factors to setting up a computer recording studio, prices will vary based on your needs. Decent sound cards generally range from $75 to $175. Reasonable quality USB dynamic microphones can be found for as low as $30, while higher quality studio condenser microphones can sometimes be found for as low as $60. If you want to use a USB audio interface, expect to pay at least $80. The other alternative for using an XLR or ¼" microphone is to use an adapter. A decent XLR-to-USB microphone adapter will cost you about $40 to $60. Finally, a decent pop filter will cost about $15 or around $2 if you build your own.

FOR MORE INFORMATION

In the event that you need to help one of your radio station partners improve their recording facilities, Transom.org has a fairly comprehensive guide to setting up a small recording studio at: http://transom.org/?p=23904

INTERACTIVE DEVICES

As discussed in **Component 4,** interactivity can come in many forms. This section will focus primarily on the types of devices that you may need to purchase to facilitate that interaction. It will not talk about mobile phones, since you are likely not going to be purchasing mobile phones for individuals in your target audience. What this section will cover is devices needed to set up your own interactive voice response system and also devices that enable users to record radio programming for playback.

INTERACTIVE VOICE RESPONSE (IVR)

Choosing the right IVR solution for your needs can be complicated. Although these systems have been used by companies for many years now, there are a growing number of options that are explicitly designed to target the needs of development organizations.


PHOTO CREDIT: DEVELOPMENT SUPPORT CENTRE | INDIA

THINGS TO CONSIDER

If you plan to set up your own IVR system, you will want to consider at least the following:

Hosting location. Some IVR systems are hosted in the cloud, which means that you will need internet access in order to manage the system. The benefit of these systems is that they do not require any extra equipment on your end besides a computer and it will operate continuously even during periods when you do not have access to electricity. Other IVR systems are hosted locally, giving you complete control over their management. The benefit of these systems is that they do not require internet access to operate, although they do require a reliable power supply and staff qualified to manage the hardware. If your radio station partner has neither reliable access to electricity or internet, then you may want to consider hosting the IVR system off-site for them or not using IVR at all.

Additional hardware. If you plan to host your IVR system locally, you will need to have a dedicated computer to run the system and a GSM or UMTS gateway to route calls into the system using mobile phone SIM cards. Some local systems may also require their own hardware to manage the calls and to interact with your computer or mixer. You may also want to purchase a UPS backup device if your area is prone to power outages.

CONTINUED →

THINGS TO CONSIDER (CONTINUED)

Functionality. The functionality of IVR systems varies. You will want to make sure that any system you plan to use meets the functionality requirements you have. Some providers may be willing to add on a function that you want, so make sure to ask even if you do not see it offered.

ESTIMATED PRICE RANGE

The price range for an IVR system really depends on the functionality you need and how you plan to host it. Check with several providers first for price quotes. The price of a GSM or UMTS gateway can range from as low as $700 up to $2,000 or more, while UPS backup devices range from as low as $50 up to $400 or more. The exact price of each of these devices will depend upon your specific needs. Also, remember to consider the ongoing cost of mobile phone minutes if you will be calling out to farmers.

FOR MORE INFORMATION

Three IVR systems at the forefront of working with community radio and local development organizations are: Freedom Fone (http://www.freedomfone.org), Awaaz.De (http://awaaz.de/), and Gram Vaani (http://www.gramvaani.org/). There are other providers of IVR systems beyond these, so make sure to look around for the system that best suits your needs. 2N Telecommunications (http://www.2n.cz/en/) sells a range of gateway devices, including those mentioned in earlier components of the toolkit. Contact them directly for current pricing.

RECORDABLE RADIOS

If you are working with radio agents, or even listening groups, recordable radios can be a great way for them to record your program to play back to farmers upon demand. This will save you the time and resources of having to distribute recordings of your program after the fact via MP3 player.

PHOTO CREDIT: LIFELINE ENERGY

THINGS TO CONSIDER

If you plan to purchase recordable radios, you will want to consider at least the following:

Power source. Many of the models on the market are battery powered and require either disposable batteries or mains electricity (i.e., electricity through a power outlet). If the radios will be used off the grid, you will likely want to consider models that can operate from other sources of power. The Lifeplayer MP3 by Lifeline Energy, for example, has solar and wind-up chargers built into it, as well as ability to charge off of mains or a car battery.

Memory. Like digital voice recorders, most recordable radios have one of two types of memory: internal or SD memory. With internal memory, you cannot swap out memory cards once they get full and will have to erase recordings to make room for new ones. Radios that use SD memory allow the user to swap out SD memory cards, cost permitting, so they could actually catalog every show they record on SD cards and insert them into the radio for playback on demand. If you want to push out special content to your audience that did not air on the radio, you can also pre-load it on an SD memory card and mail it to the radio agents or listening group leaders.

CONTINUED →

THINGS TO CONSIDER (CONTINUED)

Local availability. This really applies to all of the devices mentioned in this component, but particularly so with the recordable radios since the end user will be one of your beneficiaries and not project or partner staff. Ideally, you want to make sure that whatever device you recommend can be purchased or repaired locally. Otherwise, once your project ends the radio agents and listening groups will have no way to sustain their activities with a recordable radio if it breaks.

Durability. Since these radios will likely be passed around and used out in the open, you will want to look for models that are durable. Dust and moisture are two of the most common reasons why electronic equipment malfunctions, and these radios will likely see a fair share of both. As with digital voice recorders, check consumer and expert reviews to research the true durability of the models you are considering.

ESTIMATED PRICE RANGE

The base price of the Lifeplayer MP3 is currently $80. Prices for consumer models vary by other brands, but you can expect to pay in the range of $100 to $250 per unit, depending on the make and model.

FOR MORE INFORMATION

Additional information on the Lifeplayer can be found in **Component I**. Kaito, Grundig, and Degen are a few brands that also produce consumer models of recordable radios. Finally, Literacy Bridge also has plans to include an FM receiver into future Talking Book models, although at this time it is unclear when those devices will be available.

PERIPHERAL DEVICES

MICROPHONES

If you are planning to record in the studio—or even as a supplement to your digital voice recorder—you will need to select the most appropriate microphone for your needs. There are a number of factors to consider when determining the right type of microphone to purchase, including:

- Type of microphone (dynamic, condenser, ribbon)
- Polar pattern (cardioid, shotgun, omnidirectional, figure 8)
- Diaphragm size (large, medium, small)
- Orientation (desktop, headset, handheld, lapel)

Dynamic microphones are what most people would recognize as standard microphones. They provide decent sound quality and are fairly durable. Condenser microphones, on the other hand, are more sensitive than dynamic microphones but record much better sound quality. Condenser microphones also require a power supply called phantom power.

The polar pattern is the direction from which the microphone records audio. Cardioids record in a heart shaped pattern directly in front of the microphone. Shotguns are much more directional and focused on audio coming from the direction toward which the microphone is pointed. Omnidirectional microphones pick up audio from all directions, while figure 8s pick up audio equally from the front and back, but not from the sides. There are other polar patterns besides these, but these are the most common types that you will encounter.

What is phantom power and how do I get it?

Phantom power is a 48 volt power source needed to operate a condenser microphone. You can get it through a phantom power supply unit, a mixer, or a preamplifier. Not all mixers or preamplifiers provide phantom power, so check first. If you are using a USB condenser microphone it will be powered through the USB port.

When recording your video, make sure that you turn off any mobile phones in the immediate vicinity. This will reduce your chances of recording any electrical interference with your audio.

Diaphragm size refers to the width of the microphone capsule. Unless you are a trained sound engineer, chances are that you will not notice the difference in audio quality between diaphragm sizes. For spoken word, though, larger diaphragms tend to be preferred by most studios.

Finally, you will need to decide on the orientation of your microphone. Some microphones are designed to rest on a desk or tabletop, others can be mounted to a tripod. If you are recording into a computer, you can also use a headset microphone, although these are more difficult to share with multiple speakers if you only have one audio input jack on your computer. Handheld microphones are often preferred when interviewing subjects out in the field, although some people prefer lapel microphones that clip onto the individual's shirt.

The best solution for you will depend on how you plan to use the microphone. If you are working in a studio or the office, a desktop or mounted condenser microphone with a large diaphragm and cardioids polar pattern is likely going to be your best option. If you want to capture an interview in the field without holding your digital voice recorder close to the speaker, you might use an omnidirectional lapel microphone that they can clip onto their lapel to capture audio.

HEADPHONES

If you would like to monitor the audio that you are recording in real time, you will also want to purchase a pair of headphones. Many digital voice recorders have an audio output jack that you can plug your headphones into. This will enable you to hear the audio as it is being captured by the recorder. If your recorder does not allow for real-time monitoring, a pair of headphones is still useful for playing back what you have recorded to check if you need to do a second take. For between $30 and $50 you should be able to find a pair of headphones that is suitable for your needs.

TRIPODS

If you are planning to record out in the field, you may want to consider purchasing a mini tripod to mount your digital voice recorder more securely on the table, rather than having to hold it the whole time. Not all voice recorders have a tripod mount, so check in advance before buying one. If you are using a mounted microphone in the studio, you will also need to purchase a tripod to hold the microphone. A mini tripod can be purchased for as little as $2, whereas larger tripods for the studio can cost between $30 and $50.

SD MEMORY CARDS

If you are using a recording device or radio that uses SD memory, you will need to purchase SD memory cards. Many models use microSD, which are a smaller version of an SD card. Most microSD cards also come with a standard SD card adapter so that you can use it with any device that takes either microSD or standard SD memory. Prices of SD memory cards continue to fall. You can currently find a 32GB card for about $20 to $30 and a 64GB card for $60 to $70.

RECHARGEABLE BATTERIES

If you are planning to use a device that uses alkaline batteries, you should consider purchasing rechargeable batteries. They have less environmental impact than disposable batteries and will likely save you money over time. When searching for rechargeable batteries, look for the milliamps hour (or mAh). The higher the mAh, the longer the battery will last when charged. Prices vary based on brand and mAh, so shop around first.

OFF-THE-GRID CHARGERS

If you will be recording audio for extended periods of time in a place that does not have dependable access to electricity and your device does not use disposable batteries, you may want to consider an off-the-grid charger. The most common solutions are either solar-powered charger or wind-up chargers. A solar charger with enough electrical output to power a digital voice recorder will cost you about $100 to $150, while a wind-up (or hand crank) charger costs between $15 and $30. Obviously, you will need to be somewhere with strong sunlight to get the most benefit from a solar charger. Not all chargers provide the same level of output, so make sure to do your research first before buying.[1]

SOFTWARE

To implement your interactive radio activity, your project or your partners will likely consider using three different types of software: audio recording and editing software, SMS management software, and IVR management software. Whether you use any of these types of software will depend on how involved you will be with radio program production and the type of interactivity you plan to use.

AUDIO RECORDING AND EDITING

To record and edit audio through a computer, you will need audio recording and editing software. There are a number of options available that you can purchase, although before investing any money in editing software you might want to consider using a free, open-source program to see if it meets your needs. One of the most popular, free audio editing programs available is called Audacity, which allows you to both record and edit audio. It is fairly easy to use with a little practice and will likely have all of the functionality that you require.

1 For more information on off-the-grid energy, read *Off-the-Grid Energy Solutions for Smallholder Farmers in Africa* online at: https://communities.usaidallnet.gov/ictforag/node/324.

A basic guide to recording and editing audio with Audacity has been provided on the accompanying CD. There are also lots of tutorials available on the Audacity website, as well as user-created video tutorials that can be found online on sites like YouTube and Vimeo. You can download Audacity free online at: http://audacity.sourceforge.net/.

SMS MANAGEMENT

If you are planning to interact with your listeners via SMS, you will want to consider using SMS management software to help you easily push out messages in bulk and to organize messages you receive. To send messages through your computer, you will need to be connected to the internet or to a mobile phone network through a compatible mobile phone or GSM modem. Sending messages through the internet is generally much cheaper than by mobile phone.

The most popular free program for managing SMS interaction is FrontlineSMS, which can be downloaded for free at: http://www.frontlinesms.com.

There are other options available as well, so you will want to look at a few different options to decide which one is best for your purposes. Features vary by program, but most of them at least include features for sending bulk messages, automatically replying to incoming messages, and visualizing responses to polls.

IVR MANAGEMENT

All of the IVR solutions mentioned earlier in this component have their own locally run or cloud-based software that are used with their systems. There are also a number of other providers of IVR systems that sell IVR management software that you can install and manage on your own. The downside of some these systems is that they are built primarily to be used

CRITICAL SUCCESS FACTORS

- Items purchased are based on what is most likely to help achieve your objectives.
- Total cost (including necessary support and training) is reasonable and within your budget.
- Items purchased are suitable to the local context, including environmental conditions, technical compatibility, availability of local repair, and user capacity.
- Local partners have the capacity to repair, upgrade, and replace items purchased for them.

to help businesses route incoming calls, and may not have all of the features that you need for your purposes. They are also generally built to work with landlines, so they may not be compatible with mobile phone systems.

All of that notwithstanding, it still may be worth looking into a couple of IVR management programs in addition to those highlighted in this component. It is possible that one of these solutions meets your technical requirements—or can be adapted by the developer to meet your requirements—at a cost that is reasonable. Since IVR systems can be a bit complex to set up and manage, you should also make sure that whatever provider you use offers technical support for free or at a reasonable cost.

NOTES

6

WORKSHEETS

Cost Calculation Worksheet

Equipment Tracking Worksheet

COST CALCULATION WORKSHEET

ITEM	DISTRIBUTION	# NEEDED	PRICE PER UNIT	TOTAL PRICE
TOTAL COST OF ALL DEVICES/ACCESSORIES/SOFTWARE NEEDED TO IMPLEMENT ACTIVITY				

EQUIPMENT TRACKING WORKSHEET

ITEM	PURCHASE DATE	QUANTITY	OPERATIONAL CONDITION (good, fair, poor, not working)	OTHER RELEVANT INFORMATION

This worksheet has been adapted from the *Computer System Sustainability Toolkit: A Practical Guide for Schools* by Eric Rusten, FHI 360, 2010.