

Section 6

Hardware and Education Software Application Choices

We have included a lengthy section on hardware and education software applications because the ease and effectiveness of the choices you make can affect teachers' ability, effectiveness, and willingness to use the HyFlex model. Keep in mind, however, that new — and potentially less expensive — solutions may be developed, so it is a good idea to check with others about the hardware and software applications they are using for HyFlex, especially if they have found them effective.

Considerations for Hardware and Software Application Purchases

The following questions are useful when planning a HyFlex program. A planning team should be able to answer them *before* purchasing or otherwise obtaining hardware or software applications.

- *Purpose.* What do you want your HyFlex model to enable you to do, or do better?
- *Learners' remote internet access.* What kinds of access do your learners have to the internet at home? Do they have affordable high-bandwidth access? If not, can you help them to get this essential tool for the HyFlex model?
- *Learners' digital literacy skills.* Do your learners have, or can you help them acquire, the digital literacy skills needed to comfortably and competently use a HyFlex model?
- *Technology budget.* What is your budget for hardware and software applications? What is the potential for additional funding to purchase more or higher quality hardware and newer software applications?
- *Piloting a program first.* Can you pilot a HyFlex model in one or two classrooms, with a few teachers, before you scale this up? If so, your initial hardware and software applications budget may be smaller than your scale-up budget.

Hardware

While specific hardware items for your program cannot be recommended in a guide intended for many kinds and levels of HyFlex programs with different budgets, here are several kinds of hardware to consider.

- Desktop or laptop computer, possibly with an additional external monitor
- Hardware and software to capture and video-record a combined in-person and synchronous remote class
- Display hardware in the classroom, such as electronic whiteboards (smartboards)
- Audio hardware in the classroom, such as microphones, speakers, and headphones
- Personal digital devices for learners in the classroom, such as desktop computers, laptops, Chromebooks, tablets or smartphones
- Hardware for learners logging in remotely, such as desktop or laptop computers, Chromebooks, tablets, and headsets
- A document camera

Each category of hardware has a wide range of price points. Included below are a variety of solutions to consider, from low-cost (under \$1,000); to mid-range; to high-end options (\$20,000 to \$30,000 per classroom).

Low-Cost Solutions

A laptop computer or smartphone is placed on a stand or tripod, with a built-in camera aimed at the instructor. Advantages are that this is inexpensive, you may not need to purchase any video hardware, and little if any teacher training is needed. Disadvantages are that careful placement is needed of multiple wired and wireless microphones and speakers to assure that online and in-person learners can all hear the teacher and each other. Also, unless the classroom is dedicated to HyFlex use, it can be time-consuming for instructors to set up and take down the hardware after each class.

A variation on this solution could include a second laptop or smartphone with a built-in camera aimed at the learners.

Mid-Range Solutions

An all-in-one tracking camera with speakers and microphones or combination speaker and microphones such as [JABRA speak](#) is widely used for HyFlex, and several of these are in the \$300–\$1,500 range, for example: [Logitech PTZ](#); [OBSBOT](#); [SWIVL](#); [Meeting Owl](#), [Meeting Owl Pro](#) and [Whiteboard Owl](#) (Meeting Owl Pro is intended for larger rooms) and [Panopto](#) (licensed with an annual subscription).

Some of these devices — the Meeting Owl, for example — have built-in microphones and speakers that are fine for small classrooms. Larger classrooms, however, may require two Owls, and an Owl Connect system. Some all-in-one tracking cameras are easy to learn and use; others may be more complex. Disadvantages may be that some cameras in this range are slow-tracking, and that large, and/or high-ceiling classrooms without sound dampening may not enable online learners to hear everything.

High-End Hardware

High-end hardware may include: a permanently installed ceiling-mounted, wide-angle camera that affords instructor tracking; a permanent wall-mounted, wide-angle camera tracking system; or a permanent two-camera system in one unit (wide-angle Instructor tracking of motion and voice). These are more expensive solutions but, in some cases, are less complicated for teachers to operate.

What To Consider Before Outfitting a HyFlex Classroom

Implementing the middle- and high-end options requires a financial investment that might not be achievable for a resource-constrained program, and choosing a low-end option might not be feasible because it does not support the activities that your learners need to be engaged in learning. Before you commit to any of these approaches, consider these questions:

- Do you have the bandwidth to support all the in-person and online learners on the internet at the same time?
- Does your audio solution (microphones and speakers) enable in-person and online learners to easily hear each other, to hear their teacher, and their teacher to hear them?
- Do you have headsets for in-person learners, and possibly also for online learners?
- Do you need room soundproofing?
- How will you video-record the class (e.g., a desktop or laptop computer with a built-in camera, or a camera that tracks the instructor's voice or movements and, when speaking, a learner's voice)?
- How complex is the hardware you propose to use for the teachers' technical capabilities?
- What kind of tech support is available to teachers?
- Are tech support staff people available to come to the classroom?
- How familiar are tech support staff with your proposed HyFlex hardware?
- Do tech support staff have experience providing training or professional development to (especially part-time) teachers?
- Is professional development training available to teachers to use the HyFlex hardware and software applications?
- Do you have a hardware maintenance plan?
- Do you have a hardware repair backup plan (e.g., at least one set of back-up hardware, especially if your program might need to send hardware to the manufacturer for repair)?

How To Learn More about the Various Hardware Options

We have just touched on hardware options you might integrate into your HyFlex programming. There are ample and, increasingly, more resources available online. You can:

- Look at the short videos linked to in [Appendix A](#) of this guide.
- Search [YouTube](#) to see videos of how a particular piece of equipment is used in a classroom.
- Search the internet for hardware comparisons, such as this [comparison of several kinds of classroom tracking cameras](#).
- Look for videos on a product website that show how the hardware can be used, such as [Catchbox Plus](#), a microphone that can be thrown to in-person learners to respond to a question.

Software Applications

Having hardware is just the start. You also need to choose the software applications required to deliver instruction and engage students in learning activities. Considering applications can be overwhelming, but the following list offers essential types of apps that will get you started.

Video Conference Applications

Online meetings are key to supporting remote live instruction. [Zoom](#), [Microsoft Teams](#), [GotoMeeting](#), [Google Meet](#), [BigBlueButton](#), [BlueJeans Meetings](#), or [Zoho](#) are all used in adult education programs. This [independent review](#) evaluates several of these.

A Learning Management System (LMS)

An LMS can be used as a home base for all HyFlex instruction. You can share links to your videoconference tool and specific meetings, post links to key engagement tools, such as [Jamboard](#) or [Wakelet](#), or store your asynchronous online curricula, which might include an online version of your in-person curriculum, open education resources, and free lessons developed by others. A promising resource for standards-based free and commercial curriculum in adult foundational education is [CrowdED Learning](#), an initiative of the EdTech Center @ World Education. It includes [SkillBlox](#), which may be a useful resource for building or adding to your HyFlex LMS. Popular learning management systems used in adult foundational education include [Schoology](#), [Canvas](#), [Moodle](#) and, though not a robust option, [Google Classroom](#).

Content, Course, or Curriculum Management System (CMS)

Curriculum Management Systems, or licensed and purchased curricula, might also be a key instructional component of your HyFlex course. If aligned with the objectives of your in-person instruction, commercial or proprietary content — such as [Burlington English](#), [EnGen](#), [USA Learns](#) (free), [GED Academy](#), and many other online course or curriculum products — can serve as the asynchronous mode in your HyFlex model.

Website Builders and Hosts

If you want to create a website to store links to assignments, additional learning resources or links to recorded videos of your HyFlex classroom that you may have stored elsewhere, for example on YouTube or Vimeo, there are free or relatively inexpensive website creation sites — such as [Google Sites](#), [Weebly](#), [Wix](#), [Site123](#), [Jimdo](#), and [Webstarts](#) — that do not require knowledge of Hypertext Markup Language (HTML). You might instead choose an option, such as using Wakelet, to organize linked resources. It's important that any recordings are private and not available to the public or an internet search to protect the privacy of learners.

Operational Software

You may also need software to help you operate the hardware you've chosen, either from a computer or other remote device. Some tracking cameras, for example, have computer settings that allow teachers to track only themselves, or to track themselves and their learners. Many electronic whiteboards (smartboards) allow teachers to share content from a computer. These require accompanying software. In some cases, that software is included with the hardware; in others, it must be purchased separately.

Conclusion

We have included a lengthy section on hardware and education software applications because the ease and effectiveness of the choices you make can affect teachers' ability, effectiveness and willingness to use the HyFlex model. However, less expensive solutions may be offered at any time, so it is a good idea to check with others who are using a HyFlex model about the hardware and software application they are using, especially if they have found them effective.

Questions to Consider

If you are exploring HyFlex, but have not yet implemented it: In addition to reading the chapter in the guide, watch the two HyFlex technology tour videos (Pima Community College and Hubbs Center). What hardware and software will you need to offer a HyFlex class? How will you learn more about your options and gather information to inform what technology you will use?

If you have already started a HyFlex class at your program: What hardware and software do you use to offer your HyFlex class? What is working well and what might be improved or changed?





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