How to Set Up an Affordable Hybrid Zoom Meeting

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(I'm not connected with Zoom, don't speak for them, and aren't a meeting or audio/video professional.)

With COVID receding, perhaps as much as it's going to, there's been a lot of interest in hybrid Zoom meetings. Some people want to go back to live meetings and are comfortable there, some are not, and that situation isn't going to change any time soon. I think the answer might be hybrid meetings, to allow people to literally vote with their feet.

Some meetings work well as hybrids and some don't. The ones that don't are freewheeling business meetings where lots of people talk in a hurry with lots of interrupting and talking over. That tends to shut out the Zoom participants, who might never get a chance to talk and often can't even hear clearly.

The ones that work are those where a moderator calls on people who have raised their hand to speak, Zoom hand or actual hand. The ensures that only one person speaks at a time and allows the moderator to go back and forth between in-room and Zoom. And it provides time for a wireless mike to arrive before a participant needs it.

So, before you decide to go hybrid, make sure you have the right kind of meeting and, most importantly, that you have a moderator who can do their job. They have to be scrupulously attentive, strong-willed, polite, and fair. These people are hard to find, a lot harder than is the hybrid hardware, which you can just buy.

Much of what I say here probably applies to vendors other than Zoom, but I only know Zoom, so I'll just talk about what I know.

That said, the rest of this paper is concerned with hardware. There are two parts: audio and video, and they're handled very differently.

Audio is way more important than video. After all, we have lots of audio-only conference calls, some even with a moderator, but a video-only call never happens, except perhaps in deaf communities. We have audio-only radio, but no silent TV. Also, we can't understand well if there are two people talking, but video showing several people works fine.

You have to go out of your way only for in-room audio. The Zoomers will take care of themselves, just as they've been doing for the last couple of years.

The system I'm describing here has the entire in-person room as a single Zoom user. Audio is that of the room, video on the room is the Zoom video, and Zoom speaker output is amplified to the room. I suppose one could design a fancier system where there are multiple Zoom users in the room, but I didn't even try. There are Zoom Rooms which are specifically designed for hybrid meetings but there are four reasons why we can't use them: More than the $150/year we want to pay for Zoom; requires IT support, which we don't have; requires a dedicated room, which we don't have; and needs thousands of dollars in equipment, which we can't afford. (A room full of laptop users isn't a hybrid meeting; it's a shared office.)

Audio

As you read this section, take a look at the audio diagram at the end.

What you need to do for audio varies depending on how many people are in the room.

If you have two or three people huddled around a computer, don't do anything. The computer's mike will probably work OK. Add a cheap USB external mike if you want.

More than three but less than ten sitting around a table and you can use a conferencing mike positioned in the middle of the table. I don't have any experience with these mikes, but it seems that Jabra and others have several models for a few hundred dollars. They'll probably work fine.

But for my groups, we have way more than ten, so conferencing mikes probably won't work and would be too expensive even if they did. Before COVID, my weekly world affairs discussion had as many as 70. Only about 20 of them ever talked, but they were spread around the room. The discussion was very organized, in that someone raised their hand to talk and then waited their turn. We moved these meetings to Zoom in March 2020, and they've been working fine on Zoom ever since.

With this large group, you need wireless mikes. We don't have the budget to put in multi-thousand-dollar ceiling speakers and the like. Three mikes for the room work well, and two might even work. It goes like this: I say something like, "John, you're up, then Mary on Zoom, then Ellen in the room." John already has a mike, and cueing Ellen is the signal for someone to pass a mike to her. When her turn comes, she's miked and ready to go. Meanwhile, the mike that John was using gets passed to whomever I've cued as I give Ellen the OK to talk.

We use a Phenyx Pro Quad Channel Wireless Mike Set ($290), which has four mikes. The moderator keeps one. This set or equivalent alternatives puts out analog audio, but Zoom needs the computer's mike, which is almost always connected with USB if it's not built-in. A Behringer USB Audio Interface ($35) does that conversion. Its USB cable plugs into a laptop, which also supplies power. That becomes Zoom's microphone, and you have to select it in the Zoom audio settings.

That's all you really need, but it's better to have in-room amplification. Remember that Zoom cuts out the computer's speaker when the microphone is in use. Amplification is desirable for two reasons: Without it, people won't trouble themselves to speak into the mike, and being able to hear has always been a problem for us, so we can conveniently address that problem as a bonus byproduct of going hybrid.

Fortunately, the Behringer puts out a direct monitoring output, and that goes to the in-room amplification system (see below).

Of course, the Zoom audio coming out of the laptop also has to be amplified. So that and the direct monitor audio go into a Donner Audio Mixer ($25), which allows their relative volumes (in-room vs. Zoom) to be adjusted.

Then the audio from the Mixer goes into whatever amplification you want to use. If the room you're in has it, then great. I've found that often the house system doesn't work or the mysterious switches aren't right, and there's nobody around who knows anything. So, I prefer to take along my own amp, a Fosi Audio M02 ($54), but there are many choices. I use a speaker I bought 30 years ago; again, almost anything will work.

To set up the system, I turn volumes on the Phenyx, the Behringer, the amp, and the computer speaker to the max and then use the volume knobs on the mixer to adjust the sound.

The hardest thing is getting people to speak *into* the mike instead of *across* it. They need to hold it nearly horizontally, not vertically. Eventually, they get it.

The total cost for our audio system is about $500, including the components I've named, a purchased speaker, and cables. This assumes you already have a suitable laptop and that the room has WiFi. Nobody uses that laptop; it's just there to be the room's Zoom user, with its mike, camera, speaker, and display all reaching the room in one way or another. As moderator, I have my own laptop, also connected as a Zoom user, but with its mike and speaker muted. Zoomers can see my video if they want to, but, as I'm using a wireless mike, there's no lip-sync. Note that when Zoom switches to the speaker, it will switch to the room video webcam, not my personal laptop's camera. Zoom video follows the mike.

Video

So the people in the room can see Zoom, just connect the laptop's display port to a projector. Many meeting rooms already have one you can use but, as I said, I like to be self-sufficient, so I bought a reconditioned Epson EX3280 for $400. It's VGA only, but that's fine for Zoom Speaker View and the occasional slide or photo. (For a photography club, say, you need something better.)

The room's screen usually works. When it doesn't, there's always the wall.

That projector is for the in-room people. For Zoomers, ideally, you'd show the speaker, but since the entire room is a single Zoom user, a single webcam won't do that. Our single webcam just shows the room. You can sort of tell who's speaking, but certainly no better than you can in person. After all, in large meetings, you often can't see who's speaking and sometimes don't bother even turning around if the person is behind you. (But you need to hear them, of course.)

You might as well use a high-quality, focusing, USB webcam such as Logitech C920x ($69). There are lots of choices here, of course.

If you have the money and the personnel to do production video, then you want multiple HDMI cameras and a video/audio switcher. I haven't gotten to that yet, but, when and if I do, I'll use something like two or three MOKOSE 4K HDMI Industry Cameras ($186 each) and a Blackmagic Design ATEM Mini Pro ($490). Probably the ATEM can also replace the Donner Mixer I mentioned in the Audio section, and it might even replace the Behringer Audio Interface. The ATEM puts out USB video and audio, so it and everything it connects to works as Zoom input.

You can just put the cameras on fixed tripods and switch between them for the Zoom camera feed, or get assistants to aim the cameras. It depends on how demanding your participants are, what your budget is, and whether anyone skilled enough can do the work.

As you can tell, I haven't gotten to this more advanced video yet, so the details I've given you are somewhat fuzzy.

Final Words

I've told you what equipment to buy and how to use it, but there are a few points I've made that should be repeated here at the end:

1. Only highly moderated meetings can be hybrid. Strict hand raising and calling on to speak.

2. It's critical to get participants to speak properly into the wireless mikes.

3. Make sure you give Zoom participants equal opportunities to participate.

And, one more suggestion:

4. Tell everyone the first meeting is an experiment and that a few things will go wrong and will need to be corrected. This will be true anyway, so you might as well say it.

In-room Audio for Hybrid Zoom Meetings

USB video in (webcam or ATEM)

USB

Zoom

audio

Behringer USB Audio Interface ($35)

Phenyx Pro Quad Channel Wireless Mike Set ($290)

in-room audio

Zoom audio

display out (to projector)

Donner Audio Mixer ($25) (in-room + Zoom audio)

audio

Amplifier ($55+)

Speaker ($50+)