

DESKTOP VIDEO PRODUCTION

~ TIPS AND TECH ~

INTRODUCTION

TIPS AND TECH FOR DESKTOP VIDEO PRODUCTION

Producing video-based resources is increasingly becoming part of many people's workflow. In academia as in many workplaces, people are looking to produce their own material at home or in simple workplace setups. With relatively simple equipment, high quality resources can be produced.

This document has been written to assist people get started. It covers tech options from the basic to slightly more sophisticated.

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For comments, tips or corrections, please email: misterianwright@gmail.com

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KEY MESSAGES

- Rich media is the communication medium of choice for many cohorts and many purposes
- What is possible on today's desktop was unimaginable only a few years ago
- The price of tools for high quality production are a fraction of what they were
- No amount of technology can compensate for poor planning or chaotic content
- Limited tools used cleverly will always beat sophisticated tools used poorly
- Start simply and add complexity later as confidence and expertise increases

Getting started

Digital literacy – expectation of competence in using digital systems

Academic staff in universities are expected to have a moderate to high level of digital literacy. One important element of digital literacy requires competence in using everyday technologies combined with a capacity to use online systems that are fundamental to modern teaching and learning. These include, but are not restricted to:

- Personal computers Windows or Macintosh with the Microsoft Office suite as the basic toolset
- Web browsers such as Google Chrome, Firefox, Edge, Safari, etc.
- Applications that enable manipulation of images
- Desktop videoconferencing applications such as Zoom
- Online systems that are foundational in learning and teaching such as Learning Management Systems and ePortfolios

Some disciplines use specialised software such as the Adobe Creative Suite, SPSS and MatLab.

Moving to rich media content

Increasingly, academic staff are being directed toward producing video-based learning content at the desktop. Whether a narrated PowerPoint presentation, an introductory video, or a much more fancy video production, people are keen to develop their capabilities and push their boundaries. With the relatively simple equipment described here, high quality results are certainly achievable.

Disclaimer

The information provided in this resource is offered in good faith and as far as the author knows, is accurate. No liability is accepted for errors and omissions. The author has no commercial relationship with the makers or distributors of any products mentioned. This document could be structured more coherently but as it grew like topsy and I didn't want to spend a few days redesigning it that's probably how it will stay.

Preparation

KEY MESSAGES

- Be prepared
- Practise then practise some more
- Before you go near the technology, have a clear idea of what you want to produce
- Look at what's around you find what you like and don't be
 afraid to copy
- Modesty is a virtue be modest in your initial plans
- Don't be afraid to try out your experiments on family and friends - and listen to their feedback

It is often tempting to jump straight into the technology to start your project. This is good when you are learning the new technology but when it comes to real projects you will find it much more efficient to spend time planning your resource. Of course, as academics, this is what you do all the time so I'm not telling you anything you don't already know.

Know what you want to say

- Self-evident, but once you sit down in front of a camera you need to be clear about what you
 want to say. Not many people can carry off a 'stream of consciousness' presentation and if
 not done well, none of us are likely to enjoy it.
- Spend time considering ways to 'chunk' your content.
- Some people like to prepare by storyboarding their presentations which is like a rough road map of what elements will be in the piece and when they will be included. For example, if you are using graphics, you'd identify which ones, when you'd display them in your piece and what the corresponding voice track would be.

Keep it as short and sharp as possible

- It is usually better to produce several short, focused pieces that address specific concepts rather than one long piece that includes all concepts.
- According to one study an optimal length for a video piece is around 6 minutes.
- It isn't always possible however, to break something up into small pieces. If you need to record a longer piece, give some thought to how you might provide visual clues so a person fast forwarding can find the relevant section.

Script or no script?

- It is important to sound authentic when recording yourself.

 Reading a script and sounding authentic at the same time is quite an art, which is why voice-over artists are called voice-over artists.

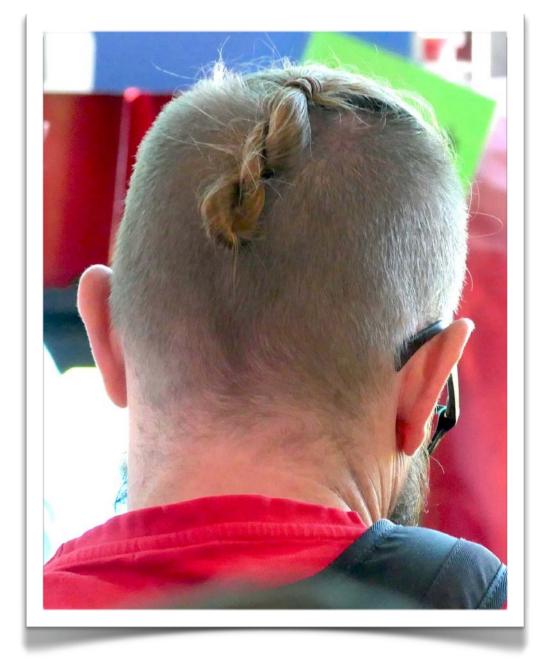
 Many of us can sound quite 'wooden' when reading prepared text.
- I often suggest that people speak to key points or concepts rather than try and follow a script. Natural pauses and little errors can be left in as they are part of normal speech. Bigger mistakes can be edited out.
- If you do use a script, use large text and open spacing and position it near the camera lens so you look like you're talking to your audience.
- Practice with a script in time you'll be able to deliver a scripted presentation in a natural way.

Practise, practise and then practise (self criticism)

- I'd like a dollar for all the times I've heard people say "I hate the sound of my own voice." Get over it Sunshine, that's what the rest of us hear all the time. You sound fine to us so don't be hard on yourself.
- Do lots of recording and listen to yourself. Before long you'll be much more comfortable about your recorded voice.
- Don't be afraid to add animation to your speech. Few of us like listening to droning monotones so adding emphasis and inflexions will liven up your recording.
- Humour can liven up a recording but be warned one person's hilarious throwaway can be someone else's major irritation. Use humour sparingly.

Be yourself

- Try to relax and be yourself don't be afraid to put some of your personality into your recording.
- Within reason, authenticity trumps word perfect delivery.



Someone revelling in being himself.

Technology

KEY MESSAGES

- You don't need lots of fancy equipment to get started producing quality resources
- Attention to lighting and good audio will go a long way to producing an acceptable product
- There is good free software available ask around
- Don't be seduced by flashy tech - you may find that the bells and whistles you thought would be wonderful don't actually add much to your message

Getting set up for desktop recording of learning content

This discussion of technology is directed to the 'low end'. Stuff you can set up and use yourself, maybe with a little help.

In considering tech for self managed recording, two elements need to be singled out as they can greatly enhance a recorded presentation. These are good audio and good lighting.

Audio

A great deal of information is transmitted by voice so investing in a good microphone is worthwhile. This is not only about clarity but partly about 'warmth'. A quality microphone can capture warmth in the voice that subtly enhances the spoken word. (This is why recording studios and radio stations use the highest quality microphones to record vocalists and the spoken word.)

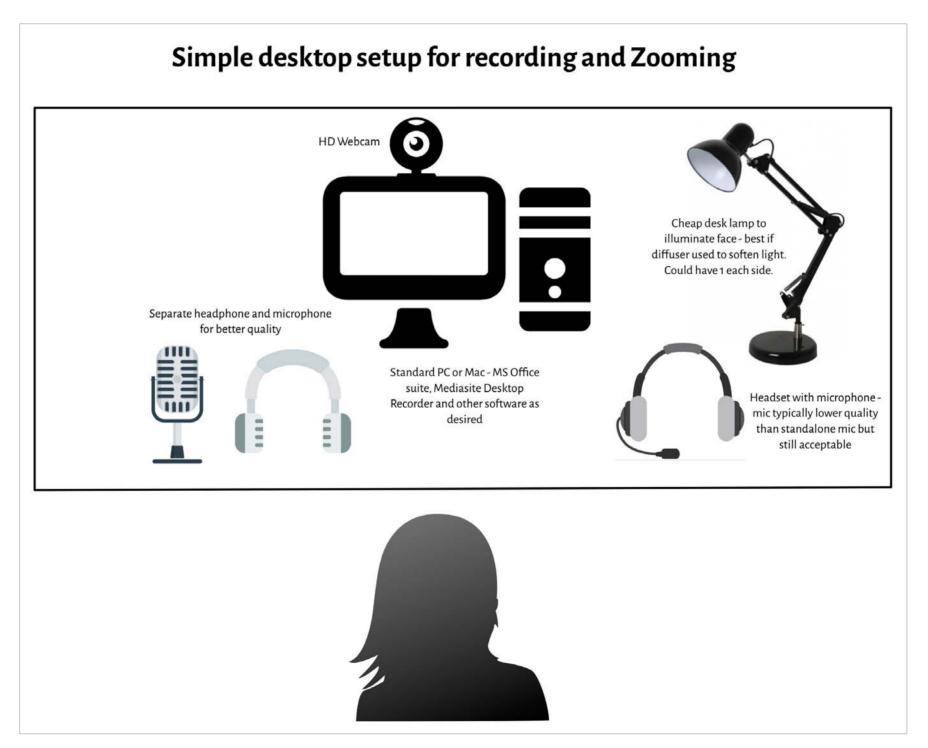
Lighting

A presenter whose face is poorly illuminated, has dark shadows or is otherwise difficult to see will be much less effective as a communicator than one whose expressions are clearly visible. This applies even when the 'talking head' is small on screen. There are also ways in which a face can be lit to make it more interesting and visually pleasing, resulting in a more engaging presentation.

The following examples show four variations of relatively simple setups.

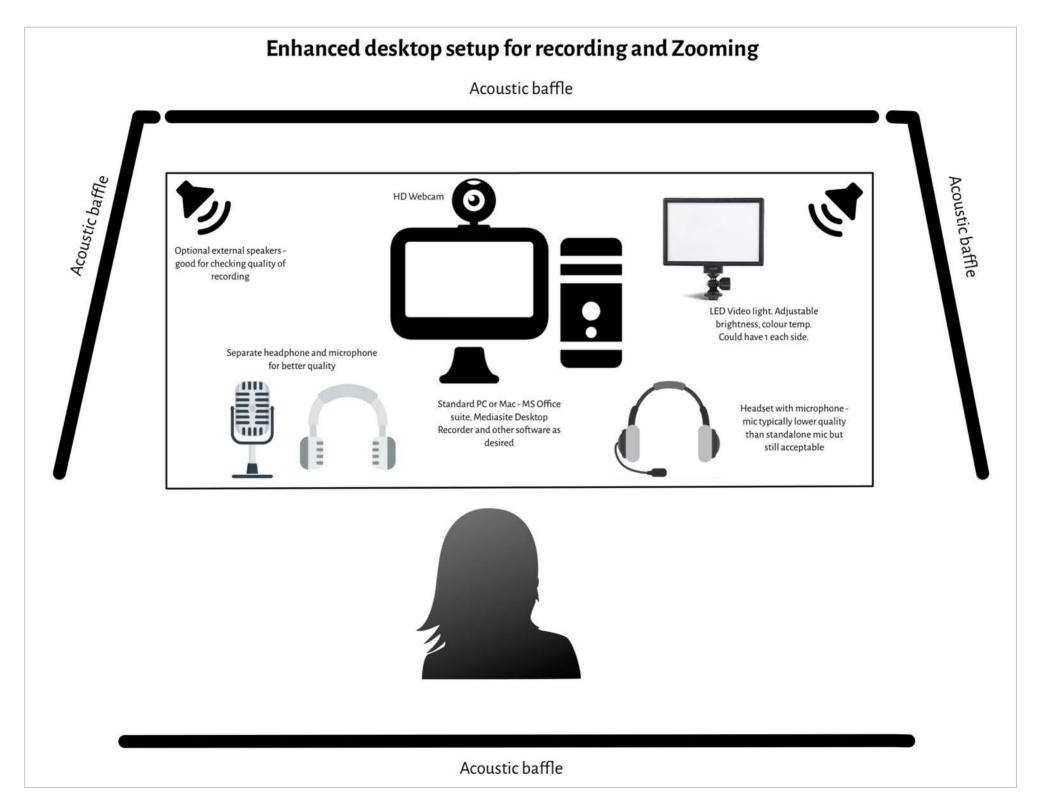
Simple setup for recording at the desktop

This illustration shows the simplest and cheapest option. With the exception of the desk lamp, this represents a common configuration for home and work computers. Increasingly, users have laptops but the functionality is similar and these typically have cameras and microphones built-in.



Enhanced setup for recording at the desktop

This illustration shows a slightly embellished option. The main variations are the use of a LED video light, the use of acoustic baffles and the addition of external speakers.



A more sophisticated setup

The arrangement illustrated to the right is capable of producing very good results. While it could be set up on a desktop it also lends itself to a small 'pop up' studio facility.

The main advantages over the arrangement on page 7 are:

- Much higher video quality from a digital still or movie camera than with a webcam
- Improved production values through the use of studio lighting equipment
- Audio quality much improved over built-in or headset microphones

The equipment shown here could be relocated to an alternative site within a couple of hours if mobility was important. Nothing in this arrangement needs to be permanently built-in.

Sound treatment

The space to be used for recordings should have specific sound properties such as:

- Not prone to loud bursts of noise such as equipment or crowd behaviour - listeners can tolerate low steady noise better than irregular sound with loud peaks
- Not overly 'live' with very obvious echoes

Spaces can be treated to reduce internal echoes fairly easily. It is much harder to prevent the entry of external noise so careful choice of location is important.

High quality desktop setup for recording and Zooming



External speakers good for monitoring recording quality Good quality still digital camera with live HDMI streamed output - DSLR or mirrorless - connected through HDMI-





Standard PC or Mac - MS Office suite, Mediasite Desktop Recorder and other software as



Fill light studio type 'soft box' light - less bright than Keylight to lift shadowed side of face.



Condenser or shotgun microphone for high quality -USB or XLR through analogue to USB mixer



Keylight studio type 'soft box' light - very even and soft light excellent for faces



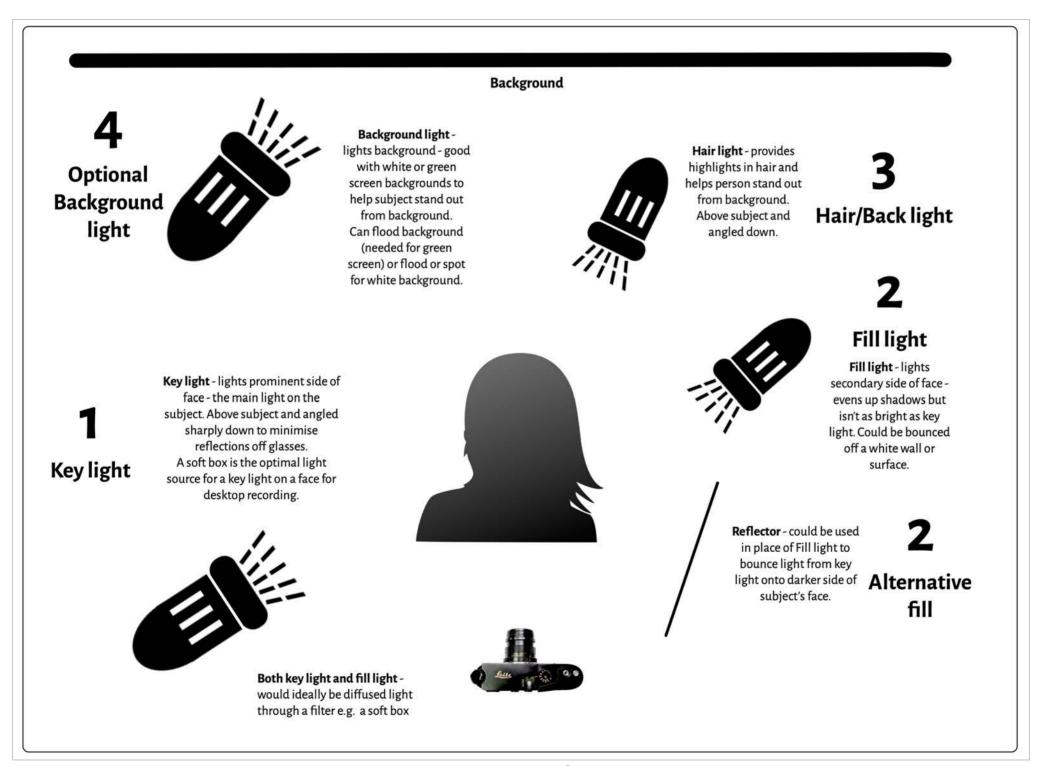
Backdrop - Black, white, grey, green/blue for chroma key (green screen effect). Could be roll up, painted or folding. Backdrop would need bright, even lighting.

Lighting setups

While a single light is suitable for a minimal setup, much better results can be obtained with a more sophisticated arrangement.

Three point lighting setup

A common lighting arrangement is the three point lighting rig. This can be varied subject to budget and aesthetic.



Beyond a webcam

So far the focus has been on relatively modest equipment that can be purchased for quite low cost. There are many options for higher quality equipment, of course, when more professional output is required. Professionally designed studios are the holy grail but the selection of equipment can greatly enhance the quality possible at the desktop.

Cameras

The main reasons for choosing a digital still or video camera over a webcam are **control** and **quality**. These cameras usually offer much higher quality lenses, in many instances interchangeable lenses, and much greater control over focus and exposure.

The preferred output from the camera is HDMI. Not all digital

movie or still cameras can provide a live HDMI stream.

Cameras also need to be capable of streaming live content continuously, and for long periods. Not all cameras have this capability. Some shut down after a fixed period, some overheat. The capacity to run the camera continuously from a mains adapter is also desirable to avoid battery issues.

Be very careful when selecting a camera as the wrong choice can be expensive. Get advice, and if purchasing, ensure you get agreement to return/swap the camera if it turns out to be unsuitable. It would be best to test before you buy.

Converting HDMI output (camera) to USB (PC)

Once you've found a suitable camera you need a device to connect the camera's HDMI output to the PC. An HDMI to USB convertor. Your computer needs the video stream to come in via USB.

Don't be confused by your computer having a HDMI port. This is an **output** from the PC to a monitor, **not** an **input** to the PC.

Look for a device that handles, at a minimum, a 1080p 30fps HDMI source. These range in price from around \$200 to many hundreds of dollars.

It's important to test the HDMI convertor with your exact camera as not all combinations work well.



Better quality cameras will produce better results. HDMI convertors are needed to stream HDMI output into a PC. Shown here are Blackmagic Intensity Shuttle and Elgato Cam Link.

Components required for a minimal setup

There are many suitable components that will achieve a high quality result. The equipment shown here is simply what we are familiar with and, most importantly, we know they work together.

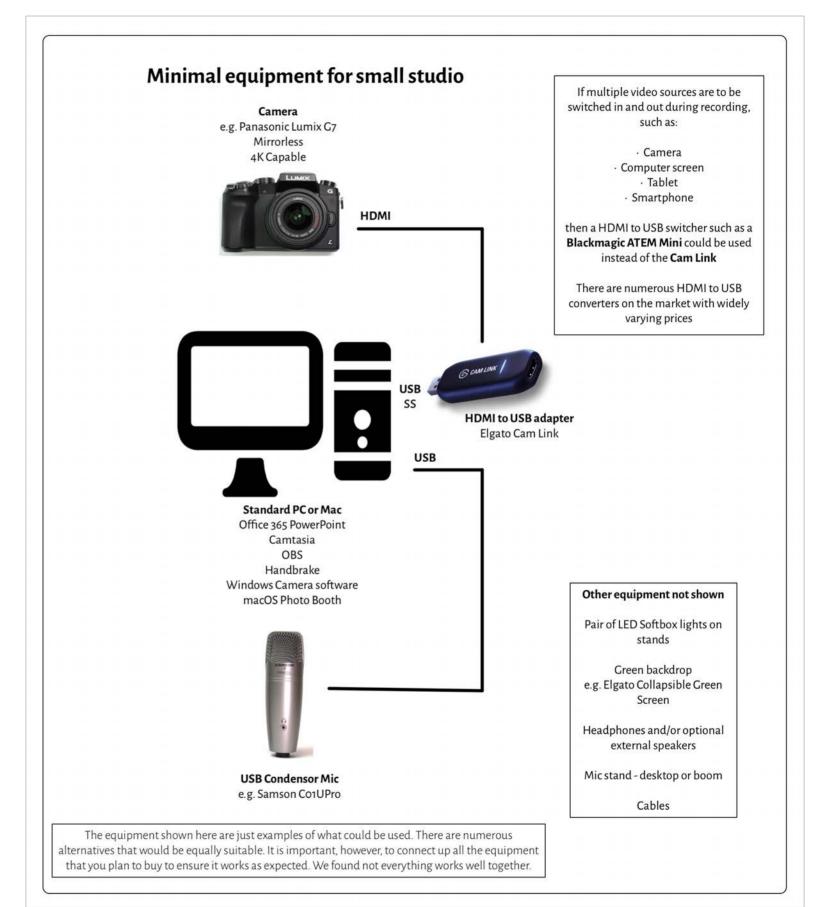
Using some of the free tools such as Windows

Camera and macOS Photo Booth can deliver a
very high quality recording of a basic talking head.
(Both can record video.)

Using software such as **Camtasia** to assemble your final piece consisting of the pre-recorded talking head and background materials is relatively easy and gives really good results.

There are numerous free video editing packages available although the quality can be a bit hit and miss. One outstanding free tool is **Blackmagic's Da Vinci Resolve** - a fully professional editing package - serious studio quality but requires considerable learning. Not really for the casual amateur.

As mentioned *ad nauseum* in this document, it's best to start out small and humble then become more ambitious as your skills improve.



Resources

KEY MESSAGES

- There are a huge number of resources available on the Internet - Google is your friend
- YouTube is a rich source of advice for recording, covering everything from equipment choice to lighting - with the advantage that you can see how a particular setup or technology works

Free audio and video software

Audacity: Audio recording and editing software. Very capable.

OBS (Open Broadcaster Software): Video recording and streaming software - very powerful although slightly complex to use but persistence will pay off. Excellent open source product.

<u>Shotcut</u>: A free open source video editor available for Windows, Mac and Linux. Relatively basic compared to expensive commercial products such as Premiere Pro or Final Cut X but adequate for modest video editing jobs.

iMovie: Apple hardware only. Very capable. Comes free with Macs and versions available for iPhones and iPads.

<u>Blackmagic Da Vinci</u> Resolve

A seriously high quality video editor that is free!
Quite a learning curve but a fully professional product.

There are quite a few other open source/free options available that I haven't tried.

Don't overlook Windows Camera and Windows Movie or macOS Photo Booth - all free.



KEY MESSAGES

- It is possible to create quite high quality resources with limited technology through good choices
- Work at mastering the basics first and knowing what your technology can do
- Technology alone never produced great work
- The learning curve for sophisticated software can be steep be sure you need the features

Software and hardware

SOFTWARE	DESCRIPTION
Considerations	There is a wide range of suitable software. The process of selecting software can be assisted by answering these questions:
	• What do you want to create? Seems obvious but could help unpack a world of challenges and avoid inappropriate choices.
	• Do you have aptitude for learning new software and mastering new technologies? For best results, some learning required.
	• How much money do you have? Can you afford commercial products or do you need to use free products?
Software	Powerpoint: The current Windows version of Powerpoint in Office 365 offers quite sophisticated recording features. In addition to audio narration it is possible to record a webcam as picture-in-picture. Also permits outputting as mp4 video file. For Windows and Macs but Mac version does not have same capabilities.
	Camtasia: High quality, well featured - excellent editing/ authoring app. Relatively easy to use at a basic level but has many advanced features. Has one major weakness in that it does not handle high quality input via HDMI-USB converters reliably to a high standard in PC version. (Is fine with webcams.) For Windows and Macs.
	OBS: Very capable, advanced features but requires effort to master and use. Does a great job of handling high quality input. For Windows and Macs. Free/open source.

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HARDWARE	DESCRIPTION
Video - cameras	Webcams: Microsoft or Logitech webcams are very good. Higher end models include 1080p recording and autofocus.
	Handycam/Digital still cameras: Handycam – small digital video cameras can provide high quality video and have the advantage of lenses with variable focal lengths. They can be used as video input sources if they support live USB or HDMI streaming. USB live streaming can feed directly into a computer but HDMI streaming would require an intermediate device. (See below.)
	Most modern digital still cameras are capable of capturing video but less are capable of live streaming. Unless they provide a live USB or HDMI stream, then they are not suitable. For HDMI streaming into a PC an intermediate device is required. (See cell below.)
Video - HDMI-USB convertors	HDMI Streaming Interface: Connects HDMI streamed output from digital camera to USB on computer. Examples: Blackmagic Intensity Shuttle, Elgato Cam Link.
	An excellent device to consider is a model from the Blackmagic ATEM range. This is a sophisticated video switcher in a small package at a very reasonable price, given its capabilities. These enable 4 HDMI inputs to be switched and provide USB output to the computer plus an HDMI monitoring feed to a monitor. Various features such as picture-in-picture and built-in transitions. Supported by a well featured software package that adds features and lets all functions be controlled from the computer. (Start at a bit over \$A400.)
Audio - microphones	External USB Microphones: Samson C01U Pro USB Condenser, Behringer C-1U USB Condenser. Excellent quality at good price. Simple to install and use. Lots of others available.
Microphones come in many types and with a number of different 'pickup patterns'. i.e. 'omnidirectionals' pickup equally from all directions, 'shotguns' pick up from a small focused area directly in front, 'cardioids' pick up in a heart-shaped pattern etc.	Headset with boom microphone: A headset combining headphones and boom microphone is an alternative to a standalone mic although the quality of the mic won't be as good. Simple to use. Analogue Microphones: There are many 'traditional' microphones available that offer great quality. These require equipment between the microphone and computer to convert the analogue microphone output to a digital form (usually USB). This can be done through a 'mixer' or USB interface. Mixers offer many additional capabilities to alter the final sound of what's being recorded (voice, instrument etc).

ITEM	DESCRIPTION	
Audio - interfaces/mixers	These two options permit the connection of traditional 'analogue' or 'XLR' microphones to a computer, usually via USB.	
	USB Interfaces: These convert an analogue source (mic or line level) to USB for connection to a computer. Some offer controls such as levels and can have more than one source attached.	
	e.g. Behringer UM2 U-Phoria 2x2 Audio Interface, FOCUSRITE Scarlett 2I2 USB Interface, PreSonus Audiobox iONE.	
	Others are quite minimal and provide no level controls or a mic input. e.g. Behringer UCA202	
	Mixers: These combine multiple sound sources to produce a final 'mix' and provide much more control over things like equalisation, left/right balance, etc. More features equal more complexity - you takes your pick. Some provide their output only as an analogue signal that needs to be converted to digital using an additional device, others provide their output in both analogue and digital (USB typically) forms.	
	e.g. Behringer Xenyx Q802USB	
Lights	LED video lights: Small video lights designed to mount on cameras. Battery or power pack operated, quite bright and good for placing on small tripod on desk to light a subject's face. A good choice. A good tip is to place a layer of baking paper over light to soften and diffuse the light. More gentle on subject.	
	Softbox studio lights: Much larger lights that typically mount on stands and provide beautiful soft light onto subject. Very pleasing effect but require space to deploy.	
Greenscreens and backdrops	Backdrops: Can be set up behind the subject to provide a plain background to reduce distractions. Papers can be white or many colours and can be changed as required.	
	Greenscreen : Uses a backdrop that is of a lurid green or blue. During recording or in post-production the background colour is replaced with a still or moving image. Often referred to as 'chroma key' technology.	
	Here's a very basic intro to simple greenscreen effects: https://vimeo.com/481548538	

Tips and gotchas

TIPS/GOTCHAS	COMMENTS
Test the combination of equipment you are planning to use	When choosing equipment, if possible, test it or an identical combination to make sure it does what you need.
	A particularly tricky thing is the combination of digital still or video camera and the HDMI to USB convertor. Not all combinations work well together and the only way to be sure is to try them.
Latency - or not all signals arrive at the same time	An issue that can arise is when the video and audio come into the computer through two separate USB ports. The computer generally processes audio more quickly than video, resulting in the video and audio being 'out of sync' - observed as faulty 'lip sync'. This can be fixed this but it requires some tweaking. More powerful computers may not exhibit this issue.
Video recording in Camtasia	Camtasia does a great job of recording live video (talking head) into a project using a webcam. However, we've had very mixed results with the higher quality combinations (HD through HDMI to USB convertor), often producing pixelated and jerky video. The same hardware works perfectly with Windows Camera, Zoom, OBS, PowerPoint etc. so it's a Camtasia issue. Camtasia Mac does not have this issue to the same degree.
Camera settings for Camtasia	Camtasia can only handle video coming in at up to 30fps so make sure your camera is set to this. (Many cameras output up to 60fps.) The symptom is the camera video (usually your head) in the Camtasia project is very jerky and often freezes.
Zoom and Powerpoint	The setups as described can provide excellent quality in Zoom and Powerpoint. Neither of these have the 30fps limit so you can use the full frame rate of your camera.
Zoom for recording learning objects	Zoom is a good app for making short video recordings. It also has the option of using an image in the background. A greenscreen is no longer required but still gives best results. You can share the screen if you want to record a Powerpoint presentation and it all gets captured. The only downside is that your camera feed goes off onto the Internet and returns, meaning that there's occasionally a loss of quality.
Angle of lights	When setting up your lights, place them above the subject, angled down onto the subject's face. This prevents the lights being reflected straight back into the camera lens from the subject's glasses. Setting the light to one side produces pleasing 'modelling' that adds interest and depth to the face.

Known equipment

This equipment is known to the writer and has been used successfully. Models constantly change so there is no guarantee that these specific models will be available at any time. There will be many other alternatives that will be equally suitable.

ITEM	COMMENTS
Camera	Panasonic Lumix G7: A mirrorless interchangeable lens digital camera with HDMI output up to 4K. Can be powered with a mains adapter and can run for extended periods without overheating. Micro four thirds camera that comes with its own lenses and can take a variety of other lenses with suitable adapters.
HDMI to USB interface	Elgato Cam Link: HDMI to USB adapter that works well in combination with the above camera. The Blackmagic ATEM products are a great way to connect multiple HDMI sources for live switching and other effects. They seem able to interface with most (all?) HDMI sources.
Microphone	Samson C01U Pro USB condenser mic: A simple USB plug and play microphone that offers good quality. A small, very cheap downloadable software app that enables good digital noise reduction is available for this microphone. (Samson Sound Deck - www.samsontech.com/samson/products/microphones/sounddeck-win/ .) Many high quality analogue mics are available - respected names include Shure, Rode, AKG, Sennheiser, Beyer, Neumann among others.
Analogue or USB microphones?	USB microphones plug straight into a USB port on a computer and need no other hardware to operate. Analogue mics need to pass through an analogue-to-digital converter, such as a mixer with USB output, to be connected to a computer. A reference to 'XLR' means the mic is analogue.
Mixer	Behringer Xenyx Q802USB is a small 4 input mixer (2 x XLR) with USB output. Well priced, well made with good equalisation and other options able to plug straight into a computer.
Speakers	Self powered monitor speakers: Good quality small 'bookshelf' speakers are useful for monitoring recordings - much better than built in PC speakers. e.g. Behringer MS16

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Connecting microphones to a PC

There are various ways to connect a better quality microphone to a PC.

Microphones are made with two alternative connection options.

A 'traditional' microphone has an analogue output that typically ends in an XLR or phone connector. Connecting to a PC requires an analogue mic input and these are becoming less common.

Many modern microphones have internal analogue-to-digital converters that provide a USB output that can plug into any USB port on a PC.

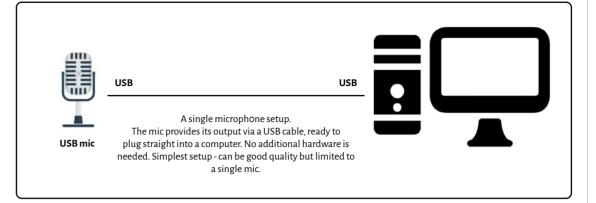
So, if you're using a microphone with a USB output, pretty much end of story. Plug it in and configure it.

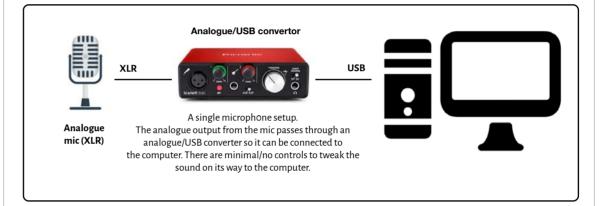
If using an analogue microphone, you'll need a piece of electronic gear between your mic and the PC that will do the conversion from analogue to digital.

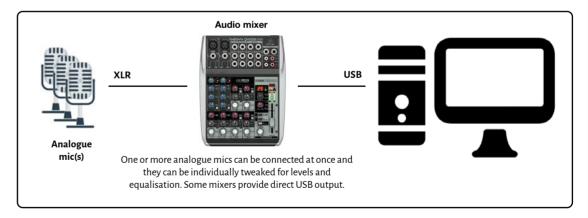
Without going into detail, for convenience and when you're essentially just needing one microphone, go with USB.

If your needs are more complex (you need multiple microphones for different instruments or several speakers, you need lots of control over the sound etc) then you'd use analogue microphones being combined through a 'mixer'. The mixer's output could be USB or if analogue, would need to pass through an analogue-to-digital converter.

Better quality options than inbuilt or headset mics for audio recording on PC







USB versus analogue microphones

- · USB mics are excellent for ease of use and convenience
- · USB mics generally limited to one mic per computer
- · USB mics can be high quality
- · Analogue mics available from cheap to extremely expensive, with quality to match
- · Analogue mics can be specific to purpose with various 'pickup patterns'
- · Multiple analogue mics can be combined through a mixer
- · All these options work on both PC and Mac
- · XLR refers to a common type of connector on analogue mics (see image)

XLR connectors



KEY MESSAGES

- While it can take some effort to sort out and ensure copyright issues are correctly addressed in your productions, in the long run it could save you a lot of trouble
- Doing the right thing by copyright is a moral obligation to the original creator of the material you're using
- The information in this section is not in any sense legal advice
- If unsure, get advice from a suitably qualified legal professional
- This little booklet is released under a Creative Commons Attribution-No Commercial licence. You can copy and share it but you can't sell it or use its content in a commercial product. You must acknowledge me as the author.

Copyright and stuff

Unless you have produced every element of your production yourself then you will come up against copyright. This essentially goes to ownership of the material you are using. If you are including material that isn't yours (that is owned by a third party) you need to:

- Know who owns the copyright in it
- · Know the terms under which you can use it
- Comply with those terms

Third party material can be:

- Commercial, in which case a fee is usually paid in order to use the material and specific conditions apply as to how and where and for what you use it
- Free, in which case no fee is payable for its use but other conditions may apply

Some tips

- Free materials may have requirements such as acknowledging the owner of the material or from where it was sourced
- Many people release their materials for use in the hope that it may gain them recognition that may lead to employment, commissions etc. so it's nice to give them a plug
- The most universal system for releasing material while retaining some control over its use is Creative Commons

Creative Commons material [https://creativecommons.org]

The Creative Commons organisation manages an international system "that gives every person and organisation in the world a free, simple, and standardised way to grant copyright permissions for creative and academic works; ensure proper attribution; and allow others to copy, distribute, and make use of those works". (*taken from CC website*)

Finding free materials

There are vast amounts of free material (images, sounds, music) on the Internet. Just use 'free' when searching and beware, not all that comes up is free so read the fine print.

KEY MESSAGES

- Don't believe everything you read, especially in a self produced booklet purporting to provide advice
- Love your children, or if they prove unlovable, love your pets instead
- Keep your cats inside, especially at night, as they are decimating Australia's small native fauna
- The old days weren't intrinsically better or worse just different. Those dudes who built the pyramids had pretty much the same power plants for intelligence (brains) as us and look what they did with what they had!
- Sometimes I need to just shut up and finish!

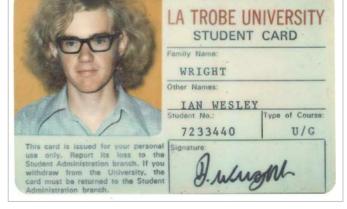
Who's the clown who wrote this?

The author of this remarkable* piece of opinionated opinion has recently retired after twenty years in Higher Education - working across the intersection of technology and pedagogy (or androgogy for the pedants) for most of that time. It's been a blast seeing what technology has made possible, and helping people who don't see themselves as 'technical people' do really clever things. Usually it's a confidence or self perception issue, rather than anything to do with aptitude or intelligence.

When I first went to uni in the early 1970s, the tech consisted of a bank of Tandberg open reel tape decks that recorded lectures in the theatres arranged around the AV hub. With a note from the lecturer, you -may- have been loaned a cassette dub of a lecture if you'd been sick. And there were Kodak carousel slide projectors in some spaces plus 16mm film projectors for loan. Oh, I nearly forgot the overhead projectors - the fancy ones had continuous rolls - wow! I did SPSS on punch cards run through a PDP-11 overnight. How I learnt to hate that line on the next morning's printout "Syntax error on line xx" Ouch - redo the punch cards!

My best wonderful lecturers seemed blissfully unaware of the tech to come, that we take for granted today, and were bloody good teachers regardless. So, as long as we keep our focus on the student learning experience, the tech can be a wonderful servant but should never be the master. Fundamentally, it all starts and stops with good teaching.

*Intentionally ironic!



A circa 1972 version of the author