

**Implementation and training of procedures for  
documentation of skills performance through  
video recording**  
V.1.0

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Deliverable Title	Implementation and training of procedures for documentation of skills performance through video recording
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## 1 Qualification and learning outcomes data in Skillsbank.

The updated ChemPharmVet Process Operator qualification will be used for linking the identified critical skills and or tacit knowledge in the learning outcome description. This is part of the work with IO2 & 3.

CODE		CPV-U2											
QUALIFICATION TITLE		ChemPharmVET Process Operator											
UNIT TITLE		ChempharmVET-U2 Conduct processes											
ACRONYM		ChempharmVET-U2											
POINTS CREDITS		ECVET POINTS	ECTS CREDITS	EQF LEVEL	REVISION DATE	REVISION NUMBER							
		0	0	4	21/06/2017	1							
ECVET POINTS/RELATIVE WEIGHT													
AT	BE	BG	CZ	DE	ES	FR	IT	NO	PL	PT	UK		
LEARNING OUTCOMES		DESCRIPTION:											
		RESPONSIBILITY & AUTONOMY COMPETENCE				KNOWLEDGE				SKILLS			
ChempharmVET-U2: Conduct processes													
2.1 Process preparation													
		Autonomously execute all steps of the adapted work plan/ task schedule				Outline fundamental basics of production planning (including process optimization, work safety, quality management and GMP)				Evaluate the task schedule/work plan according to the current situation of the plant			
2.1.1 Basic process understanding													
		Autonomously instruct their team on the adapted work plan and monitor that all steps are being carried out				Know the organisation's production schedule and internal standards and requirements				Adapt the work plan to task specific needs (taking into account the optimization of processes, work safety regulations and product quality)			
2.1.1.1 Production process													
		Autonomously instruct their team on the instrumentation to use after consulting the piping and instrumentation diagram				Express fundamentals of the respective production process				Select respective instrumentation according to the process being conducted			
2.1.1.2 Equipment													
		Take responsibility for the correct installation of the equipment used by the team				Name equipment that is needed to conduct the process Explain the operation mode of the respective equipment				Clarify equipment parts and describe their function correctly			

However, the videos will be very specific detailed, so we need to investigate how to link the indexing/tagging in Skillsbank on a more detailed level than the LO description in the qualification. This will be discussed in IO8

## 2. Guidelines for the video recording of best practice:

### 2.1 What are you going to record? preparation:

*Step 1: Make notes (see template):*

- When
- Location
- What kind of Learning outcome will be documented?
- What kind of activity? make a short description step by step
- Do we need to prepare a dialog?
- What kind of equipment is needed?
- Other digital materials needed?
- Any props needed?
- The persons involved
- Any security Issues

*Step 2: Create a script/storyboard, plan the recording in detail, (see examples):*

Based on your notes for the recording create a screenplay/script, including all dialog (if any). it will save you time in the recording phase but also in post-production. If not, you may end up with a bunch of video clips to be edited and it will look like a big puzzle. Remember to also add any graphical, text, voice over or other objects that will be added in post-production to the script.

If you are adding a dialog, it is extremely important to practice, it is harder than you think when the recording starts.

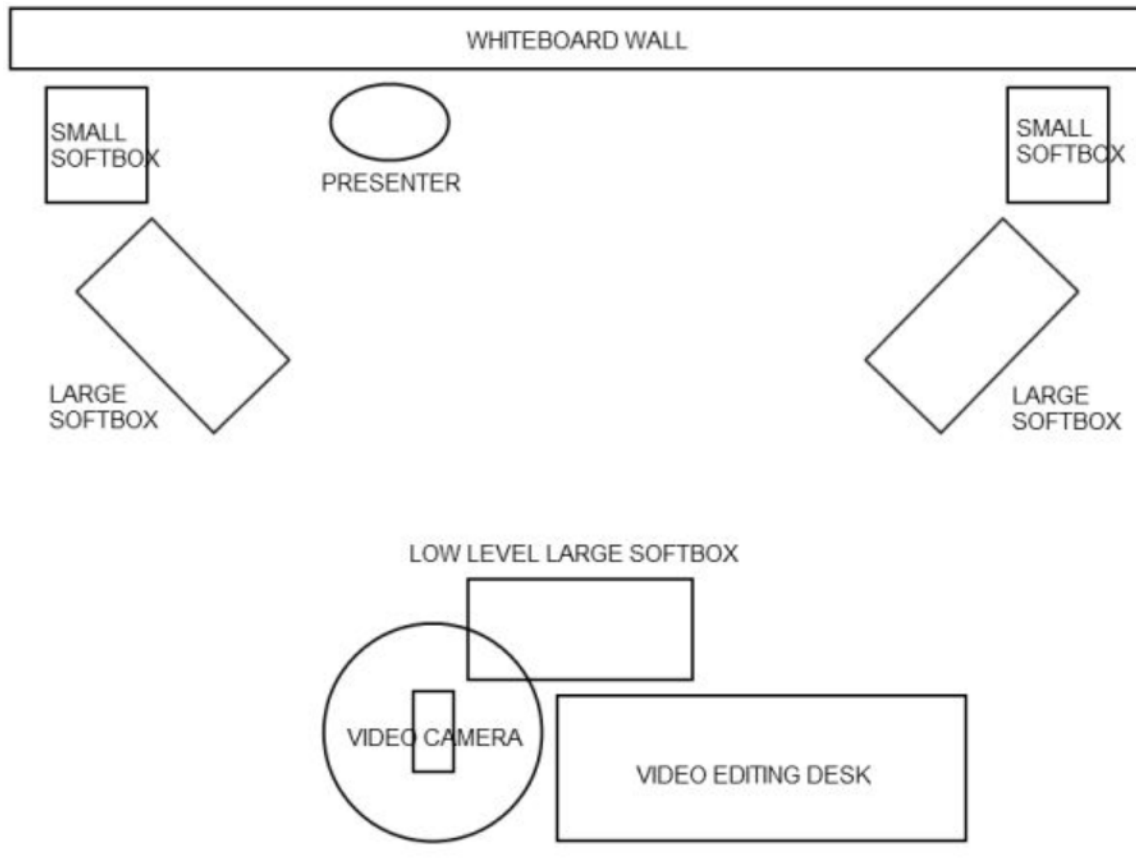
- Focus on the main objective, keep it simple.
- Create a list of each phase of the recording. from start to finish.
- Have a clear beginning, middle, and end
- Tell a story: Connect with your audience and frame the video in the most effective way possible.
- Not everything needs to be spoken
- Narrative style or should the persons speak to each other?
- Will it be necessary to add graphical elements or voice in post-production? If so, keep that in mind when creating the screen play.
- Remember still photos might be very useful for highlighting certain areas etc

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- Go through each step of the recording, and if needed (practice) before the recording

## 2.2 Location:

The “perfect” setup, but probably not for recording in a laboratory.



- Check the lightning conditions:
  - Extra light needed?  
*Remember the closer you get to the object you are filming the more light you will need.*
  - What about the light coming from the windows/sun?
  - Check that the recording area is illuminated consistently.
  - Avoid strong light coming from a single source.  
it might burn out some areas in the footage.
- Noisy? (separate sound recorder needed)?
- «Clean up» remove, if possible disturbing/distracting objects
- Look for a good angel of view for the recording
- Check for disturbing activities that might “popup”  
(window is open, traffic, talk outside the room etc)

### 2.3 Light conditions:

Explanations:

Hard light:



Hard light: Direct sun light or direct small light source (flash).

Hard light is very directional. It casts distinct shadows and has much more contrast than soft light.

Soft light:



Soft light is when a light source is large relative to the subject.

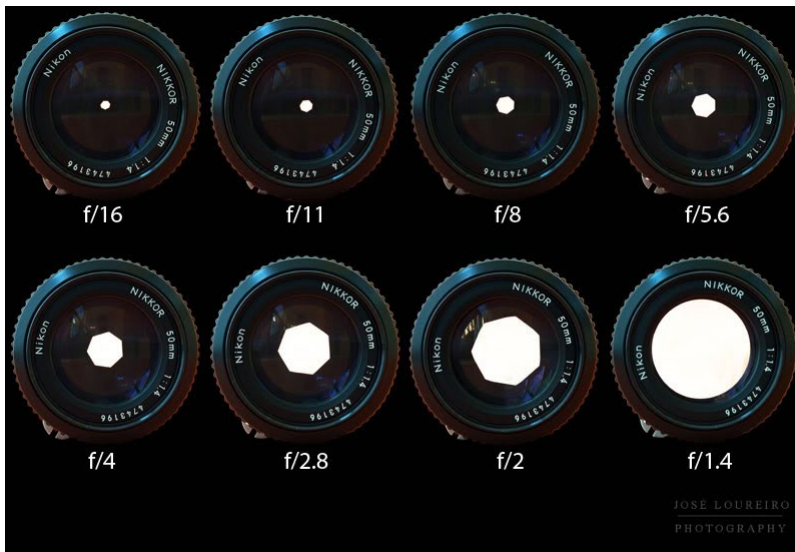
Soft light is light that creates shadows with a gradual transition from light to dark.

## 2.4 Camera terminology:

The 4 pillars of photo & videography:

- Aperture –
- Shutter –
- ISO –
- White balance -

### Aperture:

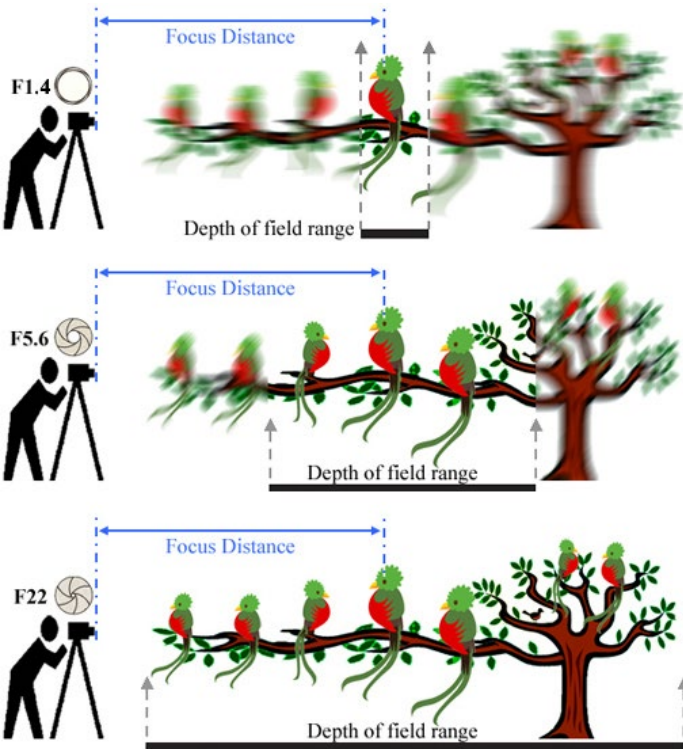


The amount of light that enters the lens

The higher F-number (f 16) the less light passes through the lens.

The lower F-number (f 1.4) the more light passes through the lens.





The higher F-number (f 22) the more DOF (depth of field)

The lower F-number (f 2.8) the more shallow DOF

Depth of field is a combination of:

1. Size of the sensor.
2. The focal range being used (lens)
3. Aperture.
4. For more information about DOF and how to calculate visit <http://www.dofmaster.com/dofjs.html>

**Shutter:**

**Shutter Firing Sequence**

After shutter release is pressed,

1. Rear curtain opens
2. Front curtain opens  
- Exposure begins
3. Rear curtain closes  
- Exposure ends
4. Front curtain closes

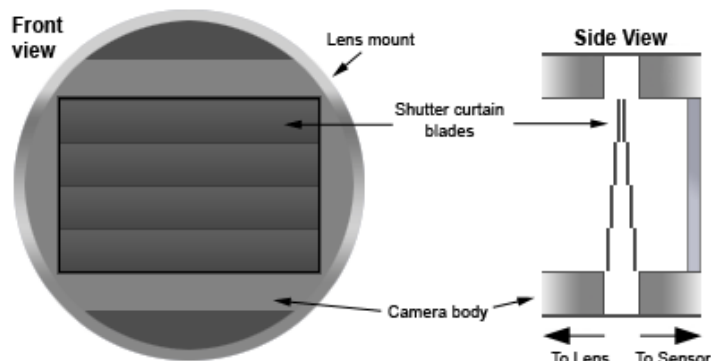


Fig 1.6.1: Shutter Firing Sequence

The shutter exposes the camera sensor to the light that passes through the [lens aperture](#). It could be an electronically shutter or mechanical. The illustration above is an example a mechanical shutter.

The Electronically shutter is always used in video recording

*Shutter speed:*

*Photo:*

At lower shutter speed (example 1/10 sec) the risk of camera shake /blurry pictures increases.

At faster shutter speed (/500 sec) you can freeze a fast movement

*Video:*

A slow shutter speed will create a smeared look to the video, a high shutter speed cause a stuttering or staccato effect.

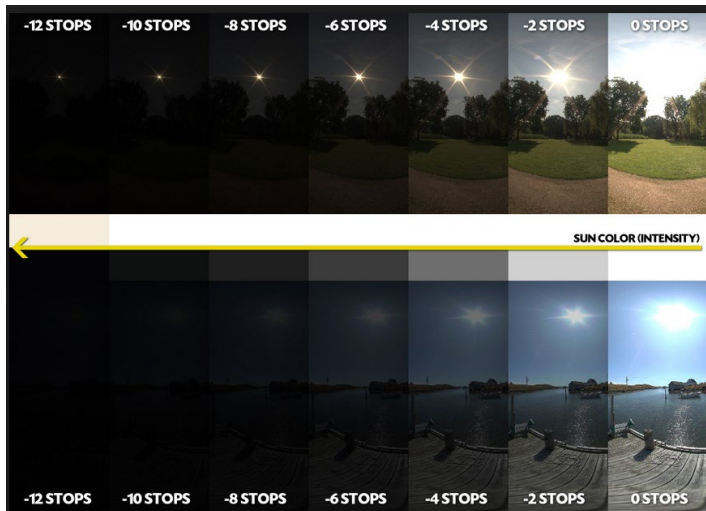
**ISO:**

Adjust the ISO number increases/decreases the sensitivity of your camera/sensor.

Advantage of increasing the ISO setting: It will get you the picture you want...

Disadvantage: it will increase noise in the picture/video, and it will reduce the dynamic range

Dynamic range describes the range of light intensities from the darkest shadows to the brightest highlights. Measured in Exposure Value (EV for short) or stops.

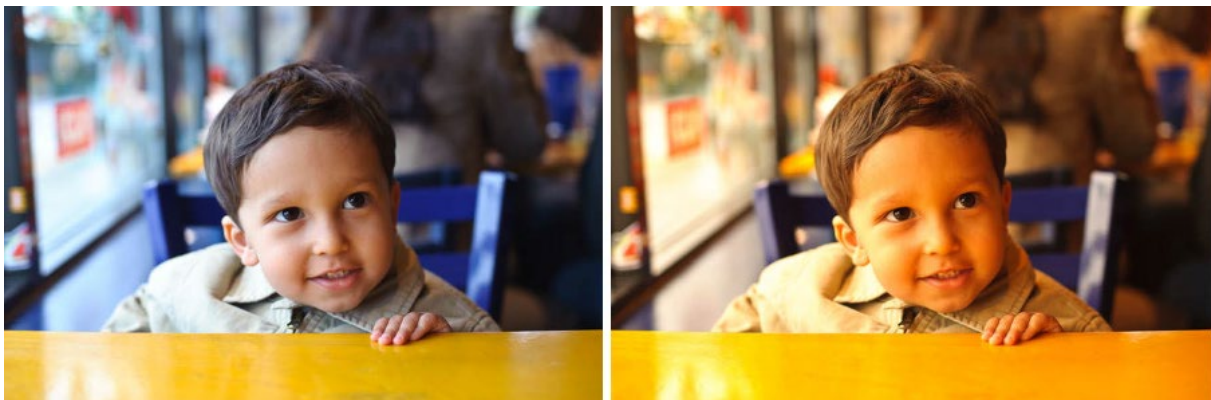


**White balance:**

Different light sources have different color temperatures.

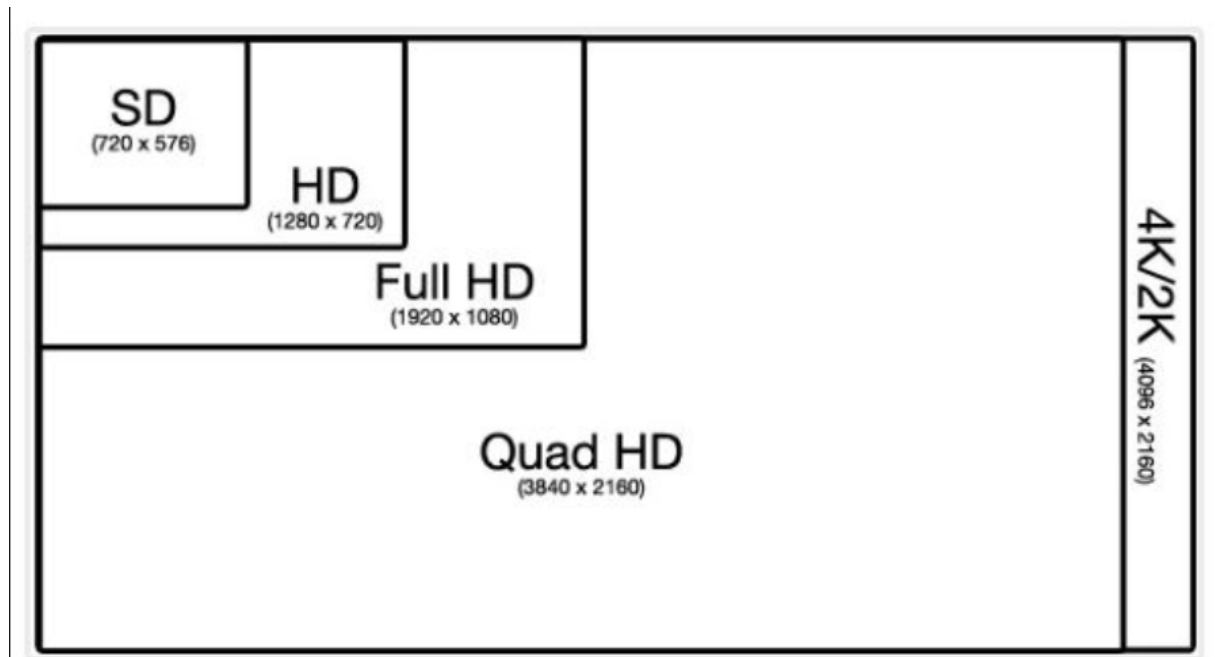
Light Type	Color Temperature in Kelvin (K)
Candle Flame	1,000 to 2,000
Household Lighting	2,500 to 3,500
Sunrise and Sunset	3,000 to 4,000
Sunlight and Flash	5,000 to 6,000
Noon Sun and Clear Sky	6,000 to 6,500
Cloudy Sky and Shades	6,500 to 8,000
Heavily Overcast Sky	9,000 to 10,000

Example of wrong white balance:



## 2.5 Video formats and resolution:

These are the most common resolution also named: 480P, 720P, 1080P and 2160P:



Video formats is a mix of:

- The file extension (example mpg, flv, wmv)
- The container (example MPEG-4, Quicktime, ASF)
- The video coding (example H-264, RealVideo)
- The Audio coding (example MP3, AAC, Vorbis)

See [http://en.wikipedia.org/wiki/Video\\_file\\_format](http://en.wikipedia.org/wiki/Video_file_format) for more information.

Many of the different formats has been developed over many years by different companies or organisations, but they all have the same goal, reduce the size of the video. *Size vs quality.*

The quality of the video is also depended of the bit rate used:

The examples below shows a typical examples of file sizes per minute from LD=low definition (mobile devices) to HD=High definition on TV/Tablet/PC.

- LD 240p 3G Mobile @ H.264 baseline profile 350 kbps (3 MB/minute)
- LD 360p 4G Mobile @ H.264 main profile 700 kbps (6 MB/minute)
- SD 480p @ H.264 main profile 1200 kbps (10 MB/minute)
- HD 720p @ H.264 high profile 2500 kbps (20 MB/minute)
- HD 1080p @ H.264 high profile 5000 kbps (35 MB/minute)

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File size:

File size = bitrate (kilobits per second) x duration

Example:

- 720p video 16 min:  $5637 * 16 \text{ min (960 seconds)} / 8 \text{ (bits per byte)} = 676540\text{kb}$
- 640\*360 16.min:  $875 * 16 \text{ min (960 seconds)} / 8 \text{ (bits per byte)} = 105000\text{kb}$

Frame rates (number of frames per second):

- 24p (used by filmmakers)
- 25p PAL (Europe standard)
- 30p NTSC (US Standard)
- 60p (can be used for slow-motion effects)
- other

In the ChemTube project we will use the MP4 format, 720P or 1080P.

## 2.6 Equipment:

“The Best Camera Is the One That's with You!”

Examples of devices capable of recording in 1080P/720P:

Compact, DSRL, Phone, Mirrorless camera, “Super Zoom”, GoPro, traditional video camera, professional video camera.

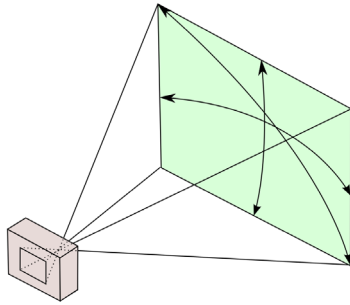
However not all of them might be the best choice, it depends of the recording situation



In general, we can say that cameras with a small sensor (GoPro/phone) will need more light to record without disturbing noise in the footage, and you will need even more light the closer you are to the object you are filming.

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**Angle of view:**



Your camera & lens will have a defined angle of view, keep this in mind when you position the camera. If you have a zoom lens you can of course easier adjust.

The important thing is to make sure the angle of view is appropriate for the recording, not too wide or not too close if not needed.

For more info visit: [https://en.wikipedia.org/wiki/Angle\\_of\\_view](https://en.wikipedia.org/wiki/Angle_of_view)

**Lenses:**

A lens with a low F-number = more light available for the sensor in the camera, will be better suited for recording in low light situation, if you have a system camera and different lens options select the “best lens” available. See also Aperture.



**Other equipment:**

- Tripod/monopod
- External microphone \*
- Headphone \*
- Extra lightning (if needed/available)
- External sound recorder: remember that the sound must be synced to the video in post-production.
- Extra camera might be handy if you plan to add pictures in the video

\* If available and can be connected to your camera

**Tripod, monopod, gimbal:**

Tripod. A tripod is very stable but check that it is suitable for your camera (max weight load).

Remember that the tripod needs some space, especially if you need to move it during the recording session.

Monopod: A monopod is not so stable as a Tripod, but easy to move and setup.

Gimbal Motorized stabilization might be the “best solution” but could be difficult to balance.



*Tripod & monopod head:*

*Ball head:* You can set the camera exactly in the right direction, however, you cannot tilt or pan so for video work it is not so usable.



*Pan/Tilt head:*

You can tilt and pan the camera with very high level of control.



*Fluid heads:*

Fluid heads use a sealed liquid to create a miniature hydraulic damping system that enables smooth, steady motion when moved through a



given space.

*External microphone:*

To be connected to the camera.



*Headphone:*

To be connected to the camera.



*External video light:*



*Sound recorder:*



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## 2.7 Camera setup:

Remember to:

- *Charge the batteries!*
- *Format the memory card(s)!*

Dependent of your camera and available settings:

*Auto:*

- Select video mode and set the camera to 1080p or 720P
- Number of frames per second should normally be set to 25 or 30
- Check/adjust the white balance.

*Manual:*

Set the shutter speed to 2x the number of frames per second. (50/60)

Adjust the white balance to match the light in the room.

ISO: For shooting indoor, it should normally not be a problem to set the ISO between 200 and 800.

Aperture: if possible, avoid to shoot with the lens wide open: Example maximum aperture of the lens F3.5 select F 4.5/5.

*Focus:*

Autofocus: To let the camera do the focusing is of course very convenient, there are however a few problems:

- In low light condition the camera could “hunt” for focus.
- The selected focus point is not where the focus should be. (Select correct focus point before recording)
- The camera will focus on faces/eye, that might be a problem. (Select the correct type of autofocus method)

Manual focus: Manual focus gives you full control, but it is difficult to follow if the object is moving. To avoid this problem do the following:

1. Put the camera on the tripod/monopod.
2. (If available) I turn off the optical stabilizer in the lens
3. Let the autofocus, focus on the recording object and then turn the autofocus off.
4. Calculate the number of meters from the camera to the recording object
5. With the DOF calculator set the aperture so that you have some space (DOF) both in the background and in the foreground
6. Check and adjust ISO if needed

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## 2.8 Suggestions for recording in a laboratory environment:

- Before you start have a finale look at the script/storyboard
- Clean the desk as much as possible, remove objects that are not needed.
- Remember to present the topic for the video (this can also be done in post-production)
- Present the tools/equipment/chemical substances that will be used in the video.
- Any security equipment and risks to be mentioned?
- As far as possible: limit the number of persons in the room.
- Try to record in front of the person (depended of the activity of course).
- Split the recording in overview and detail

## 2.9 Test record:

After recording a few minutes, check:

- Exposure; under exposed, some areas overexposed?
- Focus: is the subject in focus?
- Sound level ok? to low or to high (avoid clipping, disruptive sound)

If possible, check the recording on a monitor and not only on the small screen on the camera.

Remember that it is better to have the recording a little bit under exposed than over exposed.

In opposite to taking still photos it is much harder to adjust the exposure of video recordings in post-production.

Headphones could be very useful for checking sound level/quality.

## 2.10 During record:

- Look towards the camera, if you are in the picture (frame) and if you are explaining something.
- Speak slowly and keep the language “simple”
- In each clip add a small “internal “dialog of what to be presented, that will make the post-production easier.
- If you need to move the camera/angel of view or the recording subject in any way, stop recording, adjust and continue.

*Keep track of clips:*

After a typical recording session, you will have a lot of separate clips. To avoid total confusion of what to use in post-production, keep track of which clips to be used and in which order. An assistance to take notes during recording will be very helpful.

*Camera:*

Be careful if you need to pan, avoid camera shake.

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Avoid zooming when recording. Stop & start the recording.

Keep an eye on disturbing elements/sounds popping up that should be removed before you continue recording.

(Depending of the camera being used) keep an eye of any problems with sound level, over exposure warnings (like zebra stripes/histogram).

*Monopod:* Hold it as still as possible.

Remember if you are very close to the subject, even the smallest movement could be visible in the recording.

*Tripod/monopod:* Turn off the IBIS or optical stabilizing in the lens, if available.

Auto focus: remember that the sound of the focus motor can be picked up by the microphone.

### **2.11 Complexity of the recording:**

The more equipment to be used in the recording the more complex the recording will be.

Example 1: if you have extra light, you need to position the light not only to illuminate the recording area in a good way but also make sure the light is not directly pointed to the camera and adjust the white balance.

Example 2: if you have an external sound recorder, you also need to check the positioning and the recording level. And remember to start and stop the recording + add the recording to the video project in post-production.

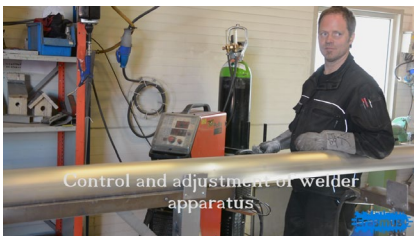
## 2.12 Examples of typical problems:



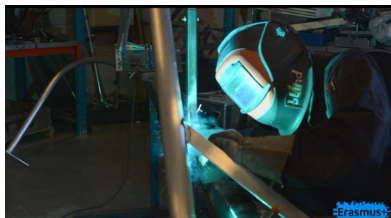
- Backlight problem
- Noisy environment
- Video recording/clip not good: Panning to fast



- Colour cast/wrong white balance (colour temperature)



- Look into the camera



- Hard to see...



- “Activity” in the background



- To Close
- The left arm is in the way

- 
- 

- Disturbing objects in the foreground





### 2.13 After the recoding:

- Have a quick review of your recordings to check that the recordings seems ok.
- Backup to external drive/PC/Network
- Don't wait too long before starting editing.

### 2.14 Updating tags and add info about your video.

Depending of the software you use you will have different options, in some programs you can also add your own tags. If you only have a few files this is of course not very important, but if you have a lot, then adding information about the videos will make the retrieval when needed much easier.

See example for windows: <https://www.youtube.com/watch?v=ZoHgSKcNunI>

### 2.16 Audio recording “voice over”:

- If needed translate to English and write down what to record.
- Practice
- Remember: silent environment
- Headphone needed for video playback
- Audio recorder/pc, + a good microphone needed
- Eliminate all possible distractions and interruptions

### 2.17 Post-production:

#### Checklist:

- Make sure you work on a copy of the footages!
  - Sort the clips according to the script.
  - Remove clips not to be used. (mistakes etc)
  - Rename all clips to be in line with your screenplay/and to be easily identified.
  - Pictures: select the pictures to be used and crop to the size of the video for 1080p 1920x1080
  - Import the video clips to be used into the video editor
  - Add other objects like pictures or graphics to the timeline.
  - Cut: Edit each clip on the timeline if needed (length, beginning, end etc)
  - Remember to Save the video project!
  - Position the clips on the timeline(s)
  - Add sound/voice over \*
  - Add Transitions \*
  - Add Subtitles \*
  - Render/export the video.
  - Preview the video together with all persons involved in the recording and modify if needed.
  - Add the ChemTube intro and outro clip and finalize.
- \* if needed

### **2.18 Post-production: “how to” example from DaVinci Resolve (free video editor)**

Tutorial: <https://drive.google.com/open?id=1QZrQ0iLRyn4bhpS7urhUvvQAwVFXLvm1>

DaVinci Resolve <https://www.blackmagicdesign.com/products/davinciresolve/> was selected, partly because there is a free version and partly because it has all the functionality needed.

You will find a lot of tutorials on YouTube.

### 3. Suggestions for the video recording of the individual performance:

Although most of the topics and recommendations also apply for recording of individual performance, we will in this chapter focus more on what is important from a learner/student perspective. It is also important to remember that the aim is not a professional video presentation, but a live recording of your presentation.

#### 3.1 What are you going to record?

##### *Step 1: Preparation:*

- When
- Location
- You will need an assistance (another student/teacher)
- What kind of Learning outcome/process will you document?
- What kind of activity? make a short description step by step
- Make it short, it is better to have several short videos than one long
- What kind of equipment is needed?
- Any props needed?
- Go through each step of the recording, and if needed (practice) before the recording

##### *Step 2: Equipment checklist:*

- Check storage/memory card, enough memory space available?
- Battery fully charged.
- Clean the lens

##### *Step 3: Suggestions before recording:*

- Clean the desk as much as possible, remove objects that are not needed.
- Remember to present the topic for the video (what are you going to present)
- Any security equipment and risks to be mentioned?
- Do a test recording where you are simulating the different steps in the video, to check that “everything” is in the frame and also that the sound quality is ok.
- Record in landscape modus, if you are recording using your phone!

##### *Step 4: After recording:*

- Have a quick review of your recordings to check that the recordings seems ok.
- If you have a cloud storage, upload the video (backup) first.

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- Post Production: Hopefully there is no need for editing, but if needed there are several free apps for editing video on Apple store or Google Play.