

The effectiveness of live and pre-recorded video in a hybrid and remote learning environment

By Michael Peters

Abstract:

The idea of remote learning is nothing new. In fact distance learning has a history that spans decades and can even be traced back to over a century ago. It has come to the forefront of people's mind and is a hot topic of conversation due to the rapid adoption of a remote learning model due to school closures as a result of COVID-19. It has been up for much debate whether or not this model of learning is as effective as traditional models of learning. In the following paper I aim to argue that remote and hybrid learning, and more specifically the use of video in these models, can be just as effective as in-person learning. I do so by examining approaches to pedagogy such as Universal Design for Learning, the SAMR Model and Bloom's Taxonomy. I also theorize how upgrading tools and professional development can help make teachers more effective and help deepen understanding in students. Throughout the article there are hyperlinks that bring you to direct quotes and anecdotes from experts in the field regarding the topic at hand in a section called "[Ask The Experts.](#)"

Those Experts Include: [Seth Busching](#), [Chirs Brogan](#), [Brittany Handler](#) and [Emma Pass](#)

Introduction:

When the Covid-19 pandemic hit in early 2020 it threw the entire world for a loop. One of the areas hit the hardest was the education system. In the interest of public health and safety schools were forced to close their doors and send the students home. However, education could not simply stop, so in order to keep the curriculum moving schools all around the country switched to a distance learning model.

I have already mentioned, but it is important to stress that the switch to distance learning en mass was performed without warning. The 2019-2020 school year was over two thirds of the way completed and up until that point most schools were using very traditional pedagogies and meeting in-person. The methods for switching to distance learning varied from school to school and, fairly often, from teacher to teacher within the

same school. Teachers would now need to rely heavily on Learning Management Systems (LMS) to organize and have their students access their school work. LMS are tools teachers can use to post work, communicate with and grade students in one digital space (Pass, 2021). LMS are nothing new, in fact many teachers and schools were using them within their classrooms before COVID-19 shut their doors. Examples of LSM include Google Classroom, Canvas and Moodle amongst others.

The effectiveness of this new distance model varied greatly, and there were a lot of differing opinions on the success of this model. The remainder of the 2020 school year were filled with praise as well as criticism of distance learning. The rapid shift to distance learning led to many advancements in the concepts and practices of remote learning and embracing of the technology at hand. Collaboration amongst teachers seemed to raise in ways that hadn't been seen before even if overall the educators felt that direct instruction and assessment suffered in the first few months (Dietrich, et al.). The technology was there, but integrating it into the pedagogy took some time.

Like it or not, however, the distance model was going to be around for a long time. Returning for the 20-21 school year, schools were rapidly preparing for more distance learning. This time, however, there was ample time to prepare and the curriculum was now more fine tuned for remote classrooms. Even still, some found the experience to be a subpar learning environment, likening the experience to "little more than an instructional video." Citing challenges such as technical problems, lack of supervision, and competing with siblings as major problems that went unsolved. Even if those challenges could be overcome, some still felt as if online learning lacked in-classroom discussion, shared spaces for human connection and resources such as the library (Almagor, 2021). Some of these criticisms might be attributed to poor curriculum design, while other challenges are not so easily avoidable.

Now that schools are back in person, I think it would be a shame to forget all that was [learned and accomplished with the distance learning model](#). Even though we all would like to forget the collective trauma we all faced from a viral pandemic, there were certain advancements we saw take place in technology that could be wildly beneficial to the educational system and I for one am curious [how those advancements will shape](#)

[pedagogy moving forward](#). What role will these technologies play in education, and to what extent will video, both live and pre-recorded, be involved?

A brief history of video use in the classroom:

The idea of using videos for learning is nothing new. Since motion pictures were invented newsworthy events were shown to large groups of people, such as sporting events and politics as early as 1895. And even though they were silent, they were immensely popular. British Pathé began releasing weekly news reels to the public in the year 1911 (Schoenherr, 2008). The value of motion pictures to convey information to mass amounts of people could not be denied. Not only could films bring you up to date on current events, but innovators in multimedia figured out ways to teach the public about historic events that film cameras weren't even around for; think Ken Burns 1990 documentary "The Civil War" which was able to captivate millions. This style of storytelling is now in the filmmaking zeitgeist and would be emulated countless times, and even immortalized by non-linear video editors including a "Ken Burns Effect" in their digital toolbox.

Visionaries like Thomas Edison believed that movies were the future of education. In 1913 Edison said, "It is possible to teach every branch of human knowledge with motion pictures." Keep in mind this quote predated the first "talkie" or film to use audio by over a decade. With the rise of television in the 1950s, people began to see the potential of broadcasting educational programming directly into peoples homes. Such programming, however, was not organized by a uniform educational body and was wildly unpopular (Kentnor, 2015). The programs were unorganized, poorly produced and left the viewer at home with no direct instruction or interaction. Therefore, video or motion picture education might have a better effectiveness if there were an educator to correspond with.

The idea of films or videos used in a classroom was not a novel idea by any means, but was not as widely accessible until the inception of the VCR in the 1980s. Video cassettes opened up a lot of possibilities for many and educators were quick to realize their value. In 1986, the Corporation for Entertainment and Learning Inc. developed and sold over 75 hours of educational VHS tapes marketed as their "Video

Encyclopedia” (Hechinger, 1986). Since then the rapid advancements in technology have increased access, decreased cost and improved efficiency of integrating video into the classroom. So let’s hit fast forward (VHS Pun) and take a look at how video is used in contemporary classrooms.

Video, when used appropriately, is an [extremely useful tool to increase learning and understanding](#). One big way video is used is to supply background knowledge of a topic. A brief video on a topic and class discussion before a lecture can prepare a student on what to expect from an upcoming lesson. Another way video can help is by enhancing a text or spoken lesson. Following up a lesson with a video is a great way for students to visualize what they’ve learned and retain the necessary information (Alber, 2019).

For example, a history professor might start a class with a newsreel about the stock market crash of 1929, providing authentic background information before introducing a unit on The Great Depression. While in a science class a teacher may show a short animation depicting the water cycle, providing a visual reference to back up the information they received in a lab. Regardless of the subject, when done right, video can find a home in the classroom. The purpose of video is to supplement the teaching, not to replace direct instruction or other text. Providing students with video is a great way to ensure multimodal learning models.

These are typical examples of how video is being used in traditional brick and mortar schools. Video takes a slightly more important role in distance learning, as live video might replace entirely face to face instruction in a synchronous model. Prerecorded video may also be used as direct instruction in an asynchronous learning environment.

Remote Learning:

In order to successfully integrate distance learning with the same or better success rate (meeting the standards and increasing understanding amongst students) of [traditional pedagogy it is important to build a curriculum with intention](#). One of the reasons for the early failures of remote learning in early 2020 was the immediacy in which the shift occurred. The following school year teachers had more time to consider

the role technology was going to play in their lessons and designed their curriculum with that in mind. This, ultimately, led to a higher success rate even in a fully remote classroom. Disrupting the normal flow forced teachers to adapt and change, ultimately leading to better practices, and new ideas that fostered community and had a larger success rate (Abramo, 2021).

There are a few different learning models that incorporate remote teaching and learning. There are fully *remote classrooms*, this is a learning model where the teachers and students are never together in-person. Then there are *Hybrid Classrooms*. The definition of a hybrid classroom may vary a bit, but essentially these are classrooms that mix together remote and in-person learning (Pass, 2021). One example of a hybrid classroom might be a class which meets some days in person and then other days meets online. Alternatively you might have a hybrid classroom where certain students are in-person and others are online.

In addition to remote and hybrid learning models, there is also the consideration of whether or not the course will be synchronous or asynchronous. Synchronous learning is more traditionally how we view a classroom. When we typically picture a classroom, the teacher delivers instruction and students learn and must complete their work within the time constraints of a school day or even within shorter class periods. When the bell rings class is over and the learning is done. This method can be used in distance learning as well as a traditional classroom.

With asynchronous learning, the student has control of the pace in which the coursework is completed. With asynchronous learning there is no standard meeting time and students can access the content of the course when it is most convenient for them. This model is more so bred from an online environment, but not entirely unheard of in a typical school building. You may also take into consideration that the idea of homework would be an asynchronous learning model, in the sense that it takes place outside of the classroom and is done at a student's own pace.

Using a combination of remote, hybrid, synchronous and asynchronous there are a few models that we can explore. Each has their own unique attributes and would utilize video in different ways.

Remote/Synchronous:

In a remote synchronous learning environment a teacher will rely heavily on video conferencing apps. Some Learning Management Systems, such as google classroom, have video conferencing integration built in. Others will need to rely on third party apps like zoom to achieve the live video component. The choice is up to the teacher whether or not they will require their class to utilize the video and microphone features for their class.

Pre-recorded video may also play a role in this learning environment as well. Direct instruction from the teacher may also be supplemented with pre-recorded video. These videos may be embedded into your LMS, or able to be navigated to via a hyperlink. One more option, one that keeps students engaged with the video conferencing app, would be for the teacher to share their screen. This option, also, ensures that all the students see the content simultaneously.

Remote/Asynchronous:

Remote Asynchronous environments will focus less on live video, and more so on pre-recorded content. The teacher may choose to record themselves for the direct instruction portion, but it would also be beneficial (as well as adhering to the UDL guidelines) to have the instruction written out. Video conferencing software might remain relevant, as they are a useful way to “self tape” your instruction, as most of these apps have the option to record.

It would also be beneficial to have some sort of office hours that students can sign up for on a live video platform. Alternatively teachers could have, say, a set meeting link that students can click on at a designated time where the teacher will have the meeting open. This way students can log in without signing up in advance. Knowing you have the option to speak with the instructor directly without having to jump through hoops may alleviate some anxiety students or parents might have about asynchronous learning.

Hybrid/Synchronous:

A hybrid synchronous model might use video conferencing in a similar way to the remote synchronous model. In an environment that is part remote and part in person for all students, on remote days students would be expected to log in to a video conferencing application for direct instruction. Again, it would be at the teachers discretion whether or not they would require their students to utilize their own cameras and microphones.

In a model where you have some students in person while others are remote, you might be using video conferencing software while also teaching in front of students who are with you in the room. This concept might feel tricky, but with the proper groundwork in place it could be accomplished. Implementing the right technology is key here. For instance a chromebook webcam might not be the best way to engage your students at home, especially if you will be pacing back and forth in front of a smart board delivering a lecture. Consider instead a mounted camera at the back of the classroom that can capture all the action. A larger monitor for the teacher to have an eye on those logged in remotely would also be greatly beneficial. It is important to be just as locked in with the students in the room as those who are remote.

Hybrid/Asynchronous:

The idea of a hybrid asynchronous model could have a few definitions. This name could imply that some students learn in-person and some remotely both with an asynchronous model. This name could also imply that while some students learn remotely, other students learn in person synchronously. Let's take a look at how video might be used in each case.

In model number one where both in person and remote students learn asynchronously, pre-recorded videos might heavily be used. These could include videos direct instruction from the teacher as well as explainers, documentaries and other various educational videos.

A model that sees the in person students receive synchronous instruction while those who are remote work asynchronously would also use video in creative ways. Direct instruction might be taped live during synchronous learning and accessed later as pre-recorded material by those at home. The students at home will be able to work at

their own pace, but perhaps setting a time limit or rather an expectation on how much time each lesson should take might keep the students at home from spending too much or too little time on a given assignment (Pass, 2021).

So which model works the best? Well, as with most things, [there are pros and cons to each to consider](#). While synchronous learning incorporates immediate feedback for both the teacher and student and allows the teacher to build a classroom environment that fosters a sense of community it also requires all participants to be on the same schedule. There is limited flexibility in times to meet as well as time in which learning can occur.

Asynchronous learning has a lot more flexibility where learners can interact with the course material at their own pace and a time that is convenient for them. There is also typically more accessibility when it comes to an asynchronous model for those with special needs. However you can weigh those against potential barriers like lack of accountability and the possibility of distraction. Some students might share a house with many siblings and not have a space conducive to learning, or without the traditional supervision that they are used to students might have a hard time finding the motivation to complete work.

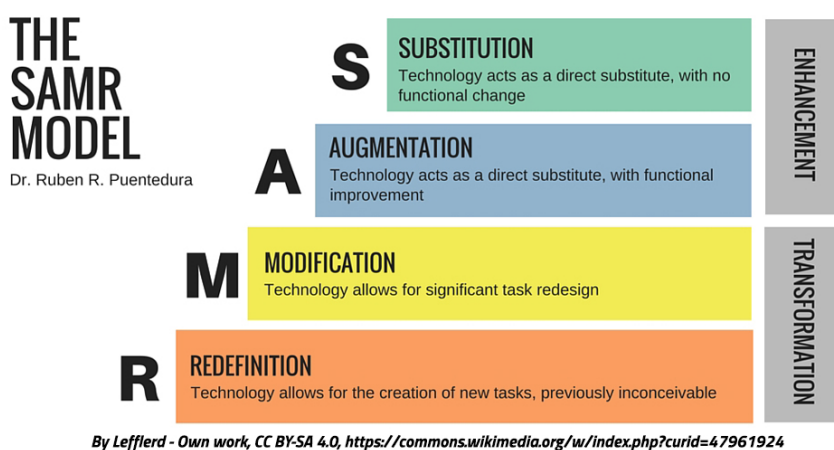
Since both methodologies have their strengths and weaknesses it is important to keep them in mind when designing curriculum. It is even more important when you consider taking either learning model and implementing it remotely. This may seem like a daunting task and that is why it is recommended that educators and curriculum builders use backwards design. In backwards design one must consider the intended learning outcome, figure out what would be sufficient as evidence of understanding and then plan your instruction around that. (Wiggins & McTighe, 2005). This is why so many had a hard time (students and teachers alike) with the mid semester switch to distance learning. The desired learning outcomes, for the most part, stayed the same, however in a remote learning environment the evidence of understanding, methods of assessment and even instruction needed to change.

Desired learning outcomes can change from subject to subject, school to school and state to state. There are learning standards from the department of education to

consider, as well as goals that are year long or even in the course of one lesson. Whatever the learning objectives are, it is imperative to align your instruction and assessment methods to meet those objectives. [How can video be implemented effectively with backwards design in mind?](#)

Video as a means of instruction:

We've covered briefly in what capacity live and pre-recorded video can be utilized. Let's look at video in the lens of the SAMR model. SAMR is a framework teachers can use in order to implement technology into the classroom in the most effective ways. The desired goal is to enhance and transform traditional pedagogy. SAMR stands for Substitution, Augmentation, Modification and Redefinition. Redefinition is the goal, but not every piece of technology necessarily has to achieve redefinition to be worth its use in the classroom. The big question the SAMR framework should get the educator asking is "does this technology add value to my classroom?" If the answer is "yes," then you're on the right track (Kharbach, 2013). The main takeaway is that technology should be used to enhance the effectiveness of pedagogy and be a transformative experience.



On its surface, video is a mere replacement for in-person communication. Video conferencing has become commonplace in our day to day, finding its

way into nearly all careers fields as well as our personal lives. I'm sure we've all pretty much had our fill with the practice of Zoom birthday parties or baby showers. So, it's fairly easy to comprehend this concept of live video chat as a direct substitution for

synchronous instruction. The teacher turns on their camera, unmutes their mic and addresses the class.

Pre-recorded video can be viewed in a similar fashion. A teacher might record their instruction or lecture directly to a camera, upload it and provide a link to their students to click on and watch at the time that is convenient for them. This method already has an augmentation to traditional instruction in that sense. Prior to recorded video a student wouldn't be able to pause to take notes or rewind to watch a section they were having trouble understanding multiple times. This can be seen as a major check mark in the "pro" column for pre-recorded over live as an option, but keep in mind you do lose the immediacy of feedback in the pre-recorded instruction. If a lesson isn't quite reaching students they would be able to say so, the teacher could then course correct and re-frame lessons to better suit the understanding of their students. This is why instructional design is so important. One must consider which method will work best to attain the learning objectives.

Augmentation doesn't stop at "pause and rewind," though. Video has come a long way from the VHS encyclopedias of yesterdays classroom. Videos are a bit more interactive now, and pre-recorded video can be embedded onto sites that provide external links to more resources or quizzes. Meanwhile proper use of video conferencing apps can make use of features available there, such as chat functions and reactions which not only provide instant feedback, but also might engage students. Teachers might also be able to make use of breakout rooms to facilitate small group discussions without the drawbacks of physical space in a classroom.

These functions are fairly easy to learn with just a few short sessions working with the software, and most of the hardware is already at the teacher's disposal. A laptop with an internet connection and a functioning webcam/microphone is all it would take. Zoom and Google Meet are easy to download with most features accessible at the free level. As with all technology, the more you explore their capabilities the more you'll end up redefining traditional pedagogy.

The capabilities of both live and pre-recorded video can completely change the way we view direct instruction and lecturing. For example, video can be used to take students on a virtual field trip to places around the world. With the advancements in 360

degree cameras (both in quality and price) as well as tools like Google Cardboard, which can transform a smartphone into an inexpensive VR headset, the video can feel fully immersive. These videos can be annotated to provide more information as well as interactive allowing students to explore more deeply the topics or ideas presented.

Video conferencing can be used to connect students with experts from around the world. It can open up a direct line of communication that was previously unheard of. The potential to connect students with experts is great, but the hierarchy of educator to student is still there, but another great opportunity is to connect students with their peers from other schools, states or countries. This can foster an environment of collaboration, as well as empathy and increase the nature of understanding for your students.

Video is clearly a technology that redefines traditional pedagogy. It's also a tool that can be used in remote learning as well as in a traditional classroom! While it is heavily relied on in remote learning, all of these ideas can be used in the brick and mortar schools as well. Video can be a tool in your curriculum to make your lessons more inclusive and beneficial for all students. How can educators make sure they integrate video into their curriculum in an effective way? For that, let's see how video factors into Universal Design for Learning (UDL).

The UDL guidelines are a framework for educators to use to help take into account the variability of all learners. They help plan out lessons, methods of assessment and provide the opportunity for all students to learn. One major consideration with the UDL guidelines is accessibility for students who need it. When you take accessibility into consideration and provide multiple paths to success, not only do you help students who need it (such as students with disabilities) but *all* students benefit. (Meyer, Rose & Gordon 2014). There are three main pillars in the UDL guidelines that focus on the following:

Engagement - The “Why” of Learning

This area focuses on how to capture the students attention. A tale as old as time, trying to get the student interested in the subject at hand. Not only does a teacher need to pique the students interest, but they also need to retain the students attention and keep

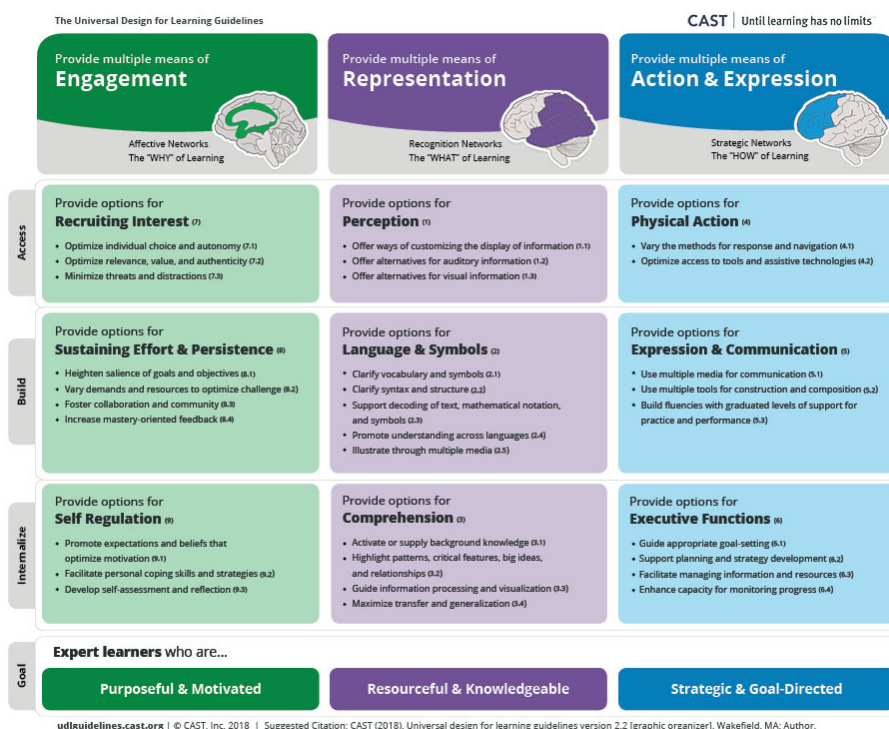
them motivated enough to follow through with the lesson plan in order to reach the end goal.

Representation - The “What” of Learning

This area of the UDL deals with how to provide the information to the students. Educators must consider multiple ways of delivering that information to students keeping in mind the variability of all learners. This is where the tools one chooses can greatly impact the method for delivering information to students.

Action and Expression - The “How” of Learning

This area deals with assessment. How can students demonstrate what they have learned? As with all sections of UDL, providing multiple options to students will greatly impact their ability to learn. Students will have different strengths and preferences for expressing themselves, giving them the option to choose what works best for them will be incredibly beneficial.



So how can video be used in conjunction with the UDL guidelines? Video, as we've discussed, is a tool and a powerful one. It could be just one tool out of many that are used to create an inclusive and accessible environment. However, when used properly, video on its own can provide multiple means of representation as well as action and expression. Let's take a closer look at how video can be used efficiently and effectively in the framework of UDL.

Beginning with "Engagement," it's no secret that video can be a great way to introduce students to a new subject. Why tell a student about an event in history when they can watch a reenactment or actual footage? Or are you having trouble getting the students interested in learning about the difference between sedentary, metamorphic and igneous rocks? Perhaps a video of a volcanic eruption might be just the thing to catch their attention. [These are ways to deliver an authentic learning experience. Video is an easy way to recruit interest.](#) It can also be one of many options of means of delivering information to optimize choice, whether it be for personal preference or out of necessity.

Video can also be used to support effort, persistence and self-regulation in students. First and foremost video can be used to provide clear learning goals. This can be recorded or done live via zoom. Providing objectives in a concise way will help keep students on track and motivated to continue. One benefit of recorded video is the ability to watch at one's own pace, allowing to pause and rewind sections to retain the information given. It may be a good practice to record even your live presentations and make the videos available to review later. Transcriptions of the videos into written text or even audio files will provide multiple means of engagement.

Using engaging visuals as well as interactive elements in your videos can also help in the retention of information and sustain effort amongst your students. Implementing the principles of multimedia theory will help maximize learning. Effective use of visuals, text and audio will help keep students engaged. This can be done through editing a pre-recorded video, but can also be implemented live via tools such as screen sharing available with all major video conferencing software. Finally video can be used to model effective strategies in order to achieve the desired learning objectives. This is a way to guide students in the best practices of the lessons at hand. This will

allow them to take control of their learning path and self-regulate and self-reflect on the process, which in turn will strengthen critical thinking and problem solving skills.

The next parameter detailed in the UDL guidelines require providing multiple means of representation. Video fits quite nicely in the representation. Simply by using video as one option out of many to display the information would be enough of a success in regards to UDL, but we can keep climbing the SAMR model and do more than just supplement, say, written text. Video is audible and visible information combined, but can often be separated into either one of those components providing multiple means of engagement.

In aiding in comprehension we can maximize the transfer of knowledge by including video recaps of former lessons and visualizing how that information helps us moving forward. Video hosting platforms can also auto generate closed captioning services to help with those who are auditorily impaired. The same affordances in caption technology can also be utilized to generate captions in several languages. Thinking critically about the technology at our disposal will make us more inclusive educators and make sure we reduce the barriers in learning.

Choosing the tools you use with intention and thinking of ways it can elevate the teaching experience is crucial in instructional design. Video can quite easily stop at the substitution level of the SAMR model, but with just a bit of extra thought and time it can wildly redefine traditional pedagogy. Likewise with the UDL guidelines, purposeful use and implementation will ensure that the instruction is the most effective it can be, and in turn making your students more effective learners and problem solvers.

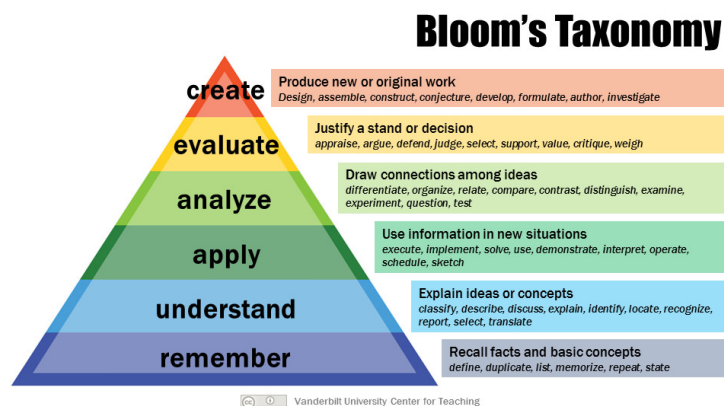
Video as a means of Assessment:

The use of video, both live and pre-recorded, can also be extremely beneficial when it comes to assessment. Educators can utilize video in a variety of ways that will demonstrate understanding in students, provide feedback, and foster a collaborative and inclusive learning environment.

Let's stick with Universal Design for Learning guidelines for a bit and examine how the use of video will fit into the "Action and Expression" parameters. Allowing

students to record themselves as an option for expression may be incredibly useful for students who prefer to use visual or kinesthetic means of communication. Students may have a hard time writing their thoughts down in a cohesive manner and prefer instead to speak. The use of visual representation will also allow the teacher to pick up on cues such as body language in such a response, allowing the teacher to gauge the level of comfort the student has dealing with the subject matter. Hand gestures, posture and even tone of voice can be indications of comprehension.

Video can also encourage active learning. By documenting strategy and decision making through video, not only can students submit that as evidence of understanding, but these videos can also be incredibly useful for peers working through the same curriculum. By watching these videos back, teachers get a first hand look at how students worked and used critical thinking to achieve the intended learning outcomes. Peers too might be able to use these videos as an engaging method of facilitating their own strategies, ones to emulate or elaborate on. All of this promotes self-reflection, a way for them to be metacognitive about their own learning experience.



Another framework we can use to analyze the effectiveness of video as a form of assessment is Bloom's Taxonomy. Bloom's Taxonomy is a hierarchy of different types of learning. It's a hierarchy because it begins with what is considered "lower level

learning" and moves through to "higher level learning" with "remember" being at the bottom of the hierarchy and "create" at the top (Hung, 2019). The lower levels of Bloom's Taxonomy are equally important, however, when you consider that you can not reach the "create" level without first remembering the material.

When it comes down to it, Bloom's Taxonomy is just another framework for educators to consider when building their curriculum. It helps educators set learning goals and can be used to reference the effectiveness of the methods of delivery of

instruction as well as methods for assessing understanding. Let's look at the levels of the taxonomy and examine where video can factor in.

If we start with the "remember" level we are dealing with activities that involve memorizing, defining, duplicating and repeating. At this level of learning educators must assess the recall memory of their students. The first way video can play a role at this level is by the method of delivering information. Teachers can deliver lectures in live or prerecorded video as well as sharing videos from other esports in the field or any other sort of educational resources. Video might also be used to supplement written text as an opportunity to highlight key terms or ideas. Teachers may choose to have their students take a quiz following these videos to see how much retention students had on the subject. Alternative to a written test, however, it might be beneficial to give multiple options for assessment and have students record a video of themselves answering the questions at hand.

This method of assessment leads me into the next level of Bloom's Taxonomy, "understand." A video response from students (again either live on video conferencing apps or prerecorded and uploaded) is a great activity for engaging students to assess their understanding. Rather than answering simple recall questions, video can be used as a medium in which students are free to describe and explain what they've learned. Discussion is also a major factor at this level, and video conferencing apps allow students to have real time open discussion with their peers and/or with their educators. Instructors can feel free to facilitate these discussions and even make use of break out rooms. Asynchronous discussion is also an option using video. Each student can record their own response and then use the learning management software to reply to their peers at their own convenience.

"Apply" and "analyze" are right in the middle of Bloom's Taxonomy. These are the levels where more critical thinking is coming into play. Video can be utilized by the instructor to demonstrate the material at hand. This is the chance to make use of active learning by demonstrating authentic real world examples through video and visualizing things clearly for students. In terms of a means of assessment, students can record their own process in achieving their learning goal. Recording these problem solving skills and demonstrating proper implementation could be, for instance, an ungraded

requirement that the teacher can use to monitor learning in real time and give feedback. These recordings might also be utilized by the student for metacognitive reflection, comparing and contrasting the material they've worked on with that of their peers or the real-world demonstration provided by the instructor.

Evaluation is considered to be on the higher end of learning. Video can be used by both educators and students alike to demonstrate their skill in evaluating topics. Live video conferencing can be utilized by classrooms for open debate, one that allows students to defend and support ideas from a lesson plan. Being able to use key points from lessons to build an argument demonstrates a student's ability to evaluate the information that has been given to them. Providing students with the opportunity to replace written responses with video responses provides another avenue for submitting their own evaluation of course material, using their own judgment to focus on what they believe to be the key takeaways. These recorded videos also allow for responses and the ability for students to critique their peers' work.

The final level, "create" is something educators often struggle with in designing their curriculum. Video is a golden opportunity to accomplish this lofty goal. Creation is at the heart of video. We discussed how students might use video at every level of Bloom's Taxonomy, however simple those examples might have been. Certainly video can merely be a substitution for written text and has been extremely simplified in this day and age; hitting record on a zoom meeting is all one needs to do now to record themselves. However, video can also be a complex and extremely effective tool for creation. Using video editing software a teacher might ask their students to think simply talking to the camera and incorporate visuals and text to back up their research and analysis of a topic. Even social media apps that many students use in their personal lives have powerful editing affordances to string together multiple clips, add audio, text and other graphics to be used in interesting ways. Allowing students the freedom to decide how they would prefer to submit a video can be a way for teachers to assess each level of Bloom's Taxonomy with just one submitted assignment while also adhering to the UDL guidelines.

Video is an incredibly versatile means of assessment. However, it must be aligned carefully with the desired learning outcomes. Instructional designers must consider many factors when integrating video into the curriculum. Providing multiple means of assessment will ensure that the UDL guidelines are being met and cover some areas where video falls short. Overall, when used correctly, video can provide authentic and inclusive learning experiences with a few different accessibility options such as closed captioning, as well as audio or visual only options for those who would benefit from that. [Using video in a variety of ways can help educators and students reach their learning objectives](#), promote critical thinking and deepen understanding.

TOOLS, OBSTACLES AND IDEAS WITH VIDEO IN REMOTE LEARNING:

We touched on briefly about a few different models of remote learning and how video might be used in each of those models. Using Universal Design for Learning, Bloom's Taxonomy and the SAMR model, let's take a closer look at how video can be implemented with maximum effectiveness. This paper has argued, at great length, how video is a "tool." I firmly believe that it is a tool that an educator can use to help deepen understanding. However, my background as a television producer gives me a slightly different perspective on video which I believe, at its heart, to be simply another method of communication. Video, like language, has different syntax and dialect and can be harnessed to strengthen conversation. Video conversation is no longer one directional, but multi-directional, non-linear and collaborative. Video is a tool, yes, but one that comes with its own tool box for an educator to sample from.

Let's look at the synchronous remote learning model again. This model will rely heavily on video conferencing apps such as Zoom and Google Meet. Live classroom discussion moved to a virtual space with students logging in from home, which can be viewed as a mere substitution on the SAMR model. However, there are affordances in all of these apps that allow redefinition, such as chat features, breakout rooms and the ability to record. Keeping students engaged is always difficult, but 10 fold in a remote learning environment. That's why it is so important to be straightforward with your

expectations of classroom involvement. Such as, will students need to turn on their cameras, will they need to turn on their microphones, how often will they need to interact with the chat feature? This is useful information and should be established with the students. Emma Pass breaks down structured and engaging example of a Synchronous Remote Learning Environment in her book “The Hybrid Teacher” as follows:

Check-in and community questions (5-10 Minutes)

Movement and/or mindful moment (2 minutes)

Review of norms and expectations (1 minute)

Direct Instruction (15-25 minutes)

Practice or application (20-30 minutes)

Wrap-up, exit ticket, goodbye (5-10 minutes)

In this breakdown, the instructor has made time for socialization as well as facilitating discussion in a no pressure situation, taking a short break from a screen, setting goals and expectations, directly instructing students, applying and assessing the knowledge and concludes the class with a metacognitive reflection. A jam packed and well rounded lesson plan. By first engaging the students in a “community question” or icebreaker you’re helping the students interface with technology and communicate with each other in various ways. Not only does this break the ice for the students with one another, but it also breaks the ice with the technology itself. As students become more comfortable with the tech, they will feel more confident engaging with the remote learning environment. Allowing for multimodal communication will foster an inclusive and accessible environment. Students can make use of video, audio and text.

Emma Pass is a teacher and an instructional designer who is also hired as a consultant for educational technology. In her book she details various technologies and how to integrate them into fully remote and hybrid learning environments and always “brings them back to the classroom” with excellent ideas on how to continue to use each of these technologies and practices within the physical buildings. Detailed in “The Hybrid Teacher” are ways to implement direct instruction over video conferencing apps

by use of third party apps such as Google Slides, Pear Deck, Nearpod and many more. These applications can be easily shown to students with the “share screen” function on most video conferencing apps.

A hybrid synchronous model might be formatted in much the same way. One model would have some students in-person and some logging in remotely and engaging on video conferencing apps. (Some hybrid models would have the at-home students on an asynchronous schedule). In both fully remote and hybrid classrooms integration of the technology is of the utmost importance.

Teachers who know how to engage well with the technology definitely have a higher success rate with remote education. This is why technological knowledge is of the utmost importance and professional development might be necessary for teachers who are making a shift. Just knowing the functionality of your LMS as well as the video conferencing software will make a world of difference in keeping your students from losing focus. This is why I feel that the quality and smoothness of the video aspect of this learning environment will directly impact student learning. If we can make the video more professional, perhaps educators could rely less on slide presentations and return more to one on one communication as if they were in the classroom, yet redefined by what video could provide.

Hardware:

Proper hardware is always an important first step. Budgeting varies from school district to school district and so there is a lot of inequity when it comes to tech across the nation. However the price of certain tech is actually becoming more and more affordable and there are government grants schools can apply for to increase funding for technology. Also, in an ever advancing market, there is no rule that says a school must have the most up to date devices either. Refurbished technology is a great way to narrow that equity gap. Companies like Neverware seek to do just that. Neverware is a subsidiary of Google, which allows a user to take an out of obsolete PC laptops and convert them into chromebooks. While the Windows operating system puts a heavy strain on the hardware of a PC, the ChromeOS that runs Chromebooks requires a lot less heavy lifting to run. This would allow students full access to the Google suite,

including Google Classroom and Google Meet, which is a wildly popular learning management system and video conferencing platform. One of the top priorities in making remote learning possible is achieving a 1:1 technology ratio with students. Prior to the pandemic only about two-thirds of middle and high schools had 1:1 technology and less than half of elementary schools. As of 2021 90% of middle and high schools report a 1:1 ratio with 84% of elementary schools also reporting that (Klein, 2021).

Once the students have the device that [is only half the battle](#). Reliable internet is also required to access remote classes. This is another area where there is inequity to deal with. Some school districts are fortunate enough to be able to provide personal hotspot devices to students who need them. These devices carry with them the initial cost of the technology and then a monthly cost for the service they provide. That cost adds up. The reliability of internet connectivity also varies greatly from urban to rural areas. This tech divide is a widely recognized issue and is being addressed on several fronts, even by the federal government (Lieberman, 2021). The House of Representatives even passed the landmark Accessible Affordable Internet for All Act, which aims to make broadband internet easily available for all Americans by 2030.

I wanted to write about the student perspective first, because if they do not have the tools that they need first and foremost, then, the bus stops moving there. A student can not be an effective learner without access to the information in the first place. Now, what hardware can make the teacher more effective through the use of video? I'll field this question from the perspective of a television producer again. A proper camera and a proper microphone. It might sound simple, but being able to see and hear your subject clearly will make a world of difference when communicating.

Staying in my producer mindset for a while, I have drawn certain parallels between the pre-production process and backwards design. In both cases one must identify the end goal and work backwards to figure out the best route forward. When choosing the correct tools for your remote learning model you must ask a few questions:

- Are there in-person students or is this a fully remote class?
- Is there a combination of in-person and remote students?

- Where will the instructor run the course? (From the school building or from home?)
- Is instruction synchronous or asynchronous?

This is just the tip of the iceberg when it comes to curriculum building, but will answer some major questions about the type of hardware we might use to elevate our “production” (class). During the pandemic most teachers taught from home so that a laptops webcam might be enough for them to interact with their students. As time went on and curriculum was refined teachers returned to their classrooms even if some or all of their students remained remote. [In a situation like this, would a laptop pointed at a teacher with Google Meet open cut it?](#)

Let’s picture a hypothetical classroom, one that uses the hybrid synchronous model where some students are present in the building and others are attending remotely. I use this model as an example because I feel that this is one of the hardest to picture and equally engaging learning experiences for the students at home and in-person. I also feel that the tools and ideas I will cover are easily transferable to fully remote or other hybrid models with alternating live and remote scheduling. When people picture traditional pedagogy, we typically think of a Teacher in front of the class at a blackboard (whiteboard, smartboard etc.) delivering a lecture while students listen attentively and take notes. Whether or not that is really effective pedagogy has long been debated, but one thing is for sure this does not transfer well to a laptops webcam. For one thing, the students at home would not be able to see the teacher well, and definitely not the board. Also as the teacher moves through the class, the students will have a hard time hearing what they are saying.

[High quality video equipment can create an environment that is engaging and promote higher-order thinking skills and deepen understanding of materials being presented.](#) And conversely, lower quality video will negatively impact learning. Students are often vocal about their distaste for outdated and low quality videos, this leads them to “tune out” and disengage with the subject matter. Therefore it must be a goal to elevate the quality of video production in a remote environment (Lange & Costley, 2020). There are simple and affordable hardware updates that can elevate this learning

model with not much thought the teacher needs to do beyond initial set up. Take, for instance, a mounted camera in the classroom that can be adjusted to pan, tilt and zoom with the teacher as they walk about the class. There are affordable models of these cameras that can be programmed to follow a teacher, even zoom into the smart board with the click of a button or even a gesture of the hand. Pair with that a bluetooth microphone that the teacher can wear, you can ensure that the students in-person and at home both get an engaging lecture that feels interactive and personal.

Now thinking about the students at home, sometimes we want to see them as well. Here, a computer monitor won't be the best option either. To make it more immersive, and to give the students in the classroom a chance to interact as well, a large monitor at the back of the class could be the solution. If the students at home are required to use their camera feature this can boost the sense of collaboration between the in person and at-home students.

These are very basic and inexpensive solutions that can be implemented with little labor as well. Non-teaching staff would not need to use a lot of resources to install this equipment and teaching staff, as I mentioned earlier, would not need to focus too much on integration beyond their initial training. (This technology could also be useful for collaboration from classroom to classroom within the school building as well). Technology around video is ever advancing and these are just small changes that I feel can make a huge difference, but there is even more that could be done. 360 degree cameras are also fairly inexpensive these days... consider the possibilities if these were implemented into a remote learning situation. Students at home could make use of DIY virtual reality headsets like Google Cardboard and suddenly they can have a fully immersive virtual classroom space, viewing the classroom from a remote location in real time. [The merits of virtual reality redefining classroom](#) are written about at great length elsewhere, and while the idea virtual field trips around the globe are very exciting, the notion that an average teacher could easily set up an experience where a student at home could feel like a they are with their friends in school when they can't actually be excites me even more.

Software:

All the hardware in the world won't mean anything if you don't have the software to back it up. Cameras and microphones integrate fairly easily into most teleconferencing software. Most consumer cameras are built for teleconferencing and have a "plug and play" relationship with them. And platforms like Zoom, Teams and Google Meet can all be integrated into learning management systems like Google Classroom and Moodle. So how can we improve on the average teleconferencing platform?

We've already improved the quality in the video and sound, that alone makes the video calls more engaging, but I feel there is a bit more we can do. One of the affordances teachers use often within these apps is the ability to share their screen, which is used as an opportunity to share a slide presentation or interactive white board. These applications have a lot of merit, but I believe there is a way to go beyond the simple "share screen" button when engaging students. I wholeheartedly feel that the addition of a streaming software like OBS studio could make a world of difference.

OBS Studio, or Open Broadcaster Software Studio, is a free to download open source software designed for streaming and recording video. It is a very popular application for live streamers as it allows them to add a lot of production value to their videos, with on screen graphics, live audio mixing, green screen capabilities and much much more. One of the best affordances this software has is "virtual camera" which converts the output of the streaming software as a selectable camera in most video conferencing softwares, the ones educators are already using to connect with their students. [Now, the teacher has the ability to add camera changes, on-screen text, images, videos and a litany of other digital media directly in their video window.](#) This would allow the teacher to implement the ideas presented in Mayer's Multimedia Principles... LIVE! Using graphics and on screen text along with spoken word can promote deeper learning (Clark and Mayer, 2011). As long as this is done thoughtfully and with intention.

Other things OBS could do would be to increase the interest of students by implementing certain things livestreamers do. Maybe displaying on screen chat so students can see their comments on screen. Or implementing a leaderboard that changes as students submit work? Odds are, students are already engaging with

content like this in their personal lives, so implementing methods of communication like this in the classroom can do wonders to recruit interest. Since OBS is open source, developers are constantly creating new plug-ins that can be implemented into it, so if there is a need in the field of education, there might be someone who has developed or is developing a tool to help.

For all of these reasons OBS can be incredibly invaluable to a remote/hybrid synchronous model. However, adding the ability to record video also makes it incredibly valuable for asynchronous models as well. Being able to watch video back at a later time and at someone's own pace. With asynchronicity in mind I wanted to shift focus from live to pre-recorded video. Pre-recorded video can be uploaded directly into most learning management systems, or linked from an external source. The most popular video hosting website is Youtube, and being that it is owned by Google, it works really well with Google Classroom. There are other services that an educator might consider that have a lot more affordances, so let's look at just one quickly.

Playposit is a video hosting service that is designed with education in mind. Some of its key features include the ability for the teacher to annotate each video, including specific pop-up information with timecode within the video. Quizzes can also be embedded directly into the video, corresponding with different sections. These are great ways for educators to amplify the use of video as a means of delivering information as well as assessment in one shared space. Playposit also helps educators reach "seat time" requirements, meaning that the instructor has control of how fast a student can view the content requiring certain parts of the video to be played before moving forward.

From the students perspective, playposit has the affordance of note taking directly in the video window, so the student can write down their thoughts or questions. This can help keep them on track and retain the knowledge presented in the video. Another key feature is the ability to have branching interactive discussions about information within the video presentations. This ability can foster a sense of community, deepen understanding and promote long term knowledge retention. All of these features, paired with its designer functionality and accessibility options can ensure that as an educator your use of video is promoting active learning and is implemented into

your curriculum with your learning goals in mind. The downside to these platforms is that there is a cost to use the platform and these features, while something like youtube is completely free. If an educational institution were to let their subscription laps access to these videos may be cut off, or worse the videos may eventually be lost.

Just like with backwards design, if we know what problems we need to address in the learning environment, then picking the proper hardware and software can help overcome them. If we boost the quality of the video and the efficiency in which it is shared, video will become ever increasingly more effective.

WHERE DO WE GO?

I covered a lot of what I believe to be the potential of video in the classroom from an instructional design perspective but with the expertise of a video producer. I feel that there were some practical improvements that could be made to a school district's technology in regards to video sprinkled in with some lofty goals of educators becoming streaming gurus. I see how the use of tools like social media in the classroom have boosted student engagement and community and do feel that the same attitude towards remote video can be useful and really drive home long term knowledge retention and understanding. Does this mean I think teachers need to become more like content creators? Of course not... However, is that really so far off from what teachers are these days?

Multimedia lesson plans are now mostly the norm, and teachers pour their hearts out "on stage" sometimes 9 periods a day to get a decent reaction out of their students and to make an impression. So what I would like to further research is this... would a teacher benefit from a multimedia "toolbox" of sorts? An online resource where they could download templates to help them with on-screen graphics and other multimedia to make use of in a remote and hybrid learning environment? And could this resource become more like a community of educators who share their own content with one another? Again, I know the idea of teachers spending their time creating content like this for their classroom is not a model that works for everybody, but it does not have to.

Traditional pedagogy does not have to go anywhere for something new to take shape, just like UDL, it would be providing a new outlet for teachers with a new way of thinking.

The way I think we improve the effectiveness of video is with the intention behind the design of the curriculum. Rather than shifting each classroom to a remote environment I believe that remote schools can be built from the ground up. With no restriction on school districts, we can have an interactive community of learners from all over who connect remotely, learn together, work towards goals and approach expertise.

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