

How Video Lectures Can Free Up Time For Other Learning Activities

Commander Geir Isaksen
Norwegian Defense University College, ADL section
Oslo, Norway
gisaksen@fhs.mil.no

ABSTRACT

The Norwegian Defense University College (NDUC) is continuously challenged with cost reduction while increasing instructional quality within the educational system. Specifically, in 2017, the educational sector within the Armed Forces was challenged with reducing overall training costs by 65 million US dollars over the next few years. Less money, fewer instructors and constrained student training time forced the NoD to rethink resident training requirements and leverage online courses.

This paper highlights how video lectures have begun to replace the traditional classroom Power Point-based lectures in the Norwegian military. Furthermore, this paper discusses how NDUC, based on well-known learning principles and instructional science, uses an in-house video studio to produce video lectures in close cooperation with the Subject Matter Experts (SME). Finally, the paper presents the evaluation results from NDUC students engaging in online video lectures and recommends development guidelines for producing online video lectures to maintain, if not increase, instructional quality and decrease overall costs.

ABOUT THE AUTHOR

Commander (CDR) Geir Isaksen has more than fourteen years in the field of Advanced Distributed Learning (ADL) and is responsible for more than 30 e-learning and R&D projects in the field of e-learning, m-learning, online learning and emerging technologies. So far, he has published more than 10 papers covering different fields like mobile learning, student motivation and cognitive overload in e-learning. He has a master's degree in Information Computer Technology (ICT) & Learning from the University of Aalborg (2014) and a bachelor's degree in Electrical Engineering from Vestfold University College (1998). CDR Isaksen holds the position as an ADL Staff Officer at the Norwegian Defense University College/ADL Section, where he is responsible for leading and coordinating procurement, development and implementation of ADL projects. His military background is from the Navy, serving on submarines for six years as an electro engineer. He has been a member of the NATO Training Group Task Group IT/ED since 2005, where he served as the ADL subgroup chairperson from 2007 to 2011. As the Norwegian ADL Partnership, executive director and a member of the NORDEFACO ADL Forum of Experts, he works closely with international cooperation.

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BACKGROUND

The Norwegian Defense University College (NDUC) was established in its present organizational form in 2002 and is based at Akershus Fortress in Oslo. NDUC consists of several departments: The Norwegian National Defense College (NDC), Norwegian Defense Command and Staff College (NoDCSC), Institute for Defense Studies (IDS), Norwegian School of Sports Science Defense Institute (NIH/F) and the NDUC Staff. The college offers the highest level of national military education. Through both degree and non-degree granting programs it prepares officers of all services and selected civilians for advanced leadership positions in the defense and public sectors.

Since 2005, the NDUC's advanced officers training and education has been conducted in the form of a one-year-long Staff Course and a two-year-long Master of Defense Studies. In the same year, the college, and its graduate program, were accredited by the Norwegian Agency for Quality Assurance in Education (NAQAE). The commandant of the NDUC is responsible for coordinating education in the Norwegian Armed Forces and is the principal adviser to the Chief of Defense on matters regarding education. Most of the offered courses are module-based and governed by selected NDUC faculty personnel responsible for each course. The lecturers and teachers come mainly from NDCSC and IDS, complemented by external experts. Few courses are offered online, even though there are some examples. The basic staff officers course (3 weeks), Defense Activities course (3 weeks) and the Joint Operations module (3 months) are a blended mix of online lectures and campus based group activities, lectures and exercises. Video lectures replace existing classroom lectures previously used in these courses.

Norwegian Defense is continuously challenged with reducing costs and increasing quality in the educational system. In 2017, the educational sector within the Armed Forces was challenged with reducing costs over 65 million US dollars over the next four years (Norwegian Ministry of Defense, 2016, page 22). Starting in August 2017, the NDUC will also add entities including the Royal Norwegian Naval Academy (RNoNA), Norwegian Military Academy, Army (NMA), Royal Norwegian Airforce Academy (RNoAFA) and a Joint Junior Officers School, forming a new NDUC. All this while retaining the same budget cuts.

External reports have previously documented how other governmental universities have a student/faculty ratio of 17:1, while the Norwegian military universities have a ratio of 3:1 (McKinsey & Company, 2015, page 66). This, among other factors, has prompted an initiative to reduce the number of faculty at the new NDUC. Prior to the educational reform, students at the 3-year NDUC master's program could use 50% of their working hours on studies in Oslo, at the NDUC Campus. However, this is no longer the case and students are limited to use no more than 20% of their working hours toward studies, resulting in less time on campus and more time studying outside office hours.

*Savings In Millions of US Dollars	2017	2018	2019	2020	Sum
Improvement and effectivization	36*	39,3*	62*	74,7	212*
Phasing out structure elements	5*	4,7*	5,1*	1,6*	16,4*
Base reductions	1,3*	1,74*	0	0	3,1*
Educational reform	4*	24*	27,7*	9,5*	65,3*
Downsizing of personnel	36*	26,5	19*	7*	88,5*

Table 1: Targeted cost reduction in the NoD 2017-2020 (Norwegian Ministry of Defense, 2016, page 22).

Less funding, a higher student/faculty ratio (fewer teachers) and reduced time to study within normal working hours, forces NDUC to rethink how much time students can/will spend on campus and how NDUC must conduct and offer courses online. NDUC can no longer afford to offer campus based courses only, as students most likely will spend less and less time physically on campus.

THE TRADITIONAL LECTURE

The term lecture, where a teacher transfers information to several students, by reading from a book, telling a story, using a chalkboard/screen to explain a topic or sharing his experience, can be traced back as early as ca. 387 BC, when the philosopher Plato taught students at The Platonic Academy, a place of learning that lasted for 916 years (C. Leor Harris, 1981).

In recent years, the lecture has been much degraded as a pedagogical form by many focusing on the importance of factors like activity, engagement and motivation and the introduction of more and more sophisticated technology. Yet some will argue that the lecture is still alive and even flourishes in the form of podcasts, TED talks, and the endless number of conferences still having the lecture or presentation as their main form (Friesen, 2011, page 1). Friesen claims that: *“The lecture... is most effectively understood as bridging oral communication with writing, rather than as being a purely spoken form that is superseded by textual, digital, or other media technologies and other mediatic forms as they have coevolved”* (Friesen, 2011, page 2).

In that sense the lecture has not changed much in its core over centuries. Lectures also do not change, even if delivered online. The most effective lecturers are most likely doing much more than simply reading notes or reciting facts. They are telling stories and connecting with their students through activity and engagement. A 2014 comprehensive analysis comparing lecturing to active learning in undergraduate studies of STEM teaching methods concluded that teaching methods that turned students into active participants rather than passive listeners reduced failure rates and boosted scores on exams by almost one-half a standard deviation (Freeman et al, 2014), indicating the importance of student activity.

THE DIGITAL LECTURE

New technology enables learning activities to be released from the restraints of time, place, frequency and conformity. The connection between teacher and student is still a very important factor in the academic educational system (Handelshøyskolen BI, 2013, page 1). Currently, this connection can take place in several different ways, outside the traditional classroom. As an example, new technology allows for distribution of lectures in a way that enables students to view when they want, where they want, at their own pace and how often they want. In that way, the classroom is “Flipped”. It means that students get the lecture before they show up in class and thereby teachers time is released to offer other, maybe more active learning activities, when they meet on Campus.



Figure 1: Screenshot Classroom recording

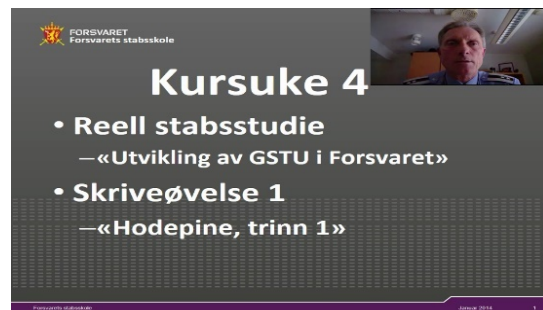


Figure 2: Screenshot Power Point voiceover



Figure 3: Screenshot Studio recording



Figure 4: Screenshot Multimedia lecture

The rapid development of technical solutions, programs and hardware, pose both a challenge and gives new opportunities for the higher educational system. Up until now, the most common way of implementing new technology has been to substantiate existing systems and practice. As an example, the most common way of producing online lectures is by simply filming the lecture in the classroom or using Power Point videos containing a lecturer's voice and Power Point slides (Gordon, 2017, page 1; see Figure 2). By doing so, most schools and universities just try to copy today's practice and thereby failing to exploit the full added protentional value technology offers to learning-effectiveness and quality (Christensen, 2011, page 47).

A digital lecture can either be streamed, recorded or developed based on different multimedia elements. The distribution can be both synchronous, by live streaming and asynchronous through publication on Internet or internal networks. There are numerous technical solutions available for both live streaming and lecture capturing and many universities have begun converting their existing portfolio of classroom lectures.

Different types of video lectures

Video lectures can be categorized after three factors: production time, quality and degree of multimedia elements used in the lecture (Figure 5) (Norwegian Defense University College, 2017, page 12). Based on these three factors the NDUC divide video lectures into five different categories:

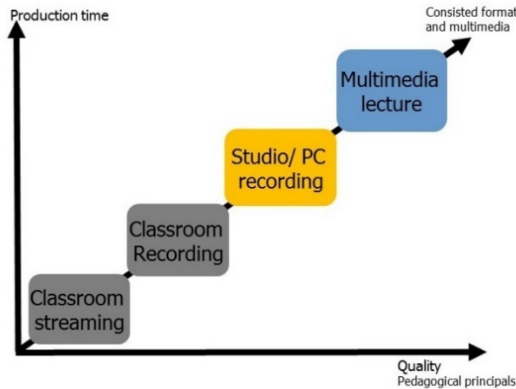


Figure 5: Video lectures, (NoDUC, 2017, page 12)

Classroom streaming: Technical audio- and video equipment is used for live streaming of a classroom lecture on Internet. There are several solutions available that will allow for live broadcast online. Examples are YouTube®, Facebook® and Mediasite®.

This kind of video lecture demands a robust technical solutions and access to technical personnel to conduct the live broadcast. It is vulnerable to any technical errors or mistakes from the lecturer. Often streamed classroom lectures can be published online, directly after the stream. Even if a streamed lecture can be accessed from anywhere around the world, it happens in a fixed time.

The production time is minimal, because the result can be published directly. But it also means that the ability to edit the content is very limited (Norwegian Defense University College, 2017, page 11).

Classroom recording: (Lecture capture) (Figure 1) Technical audio- and video equipment are used to record a traditional classroom lecture, either by a fixed recording system or manually with a video camera. The recording must happen at a specific time and place and often with the support of technical personnel. In a classroom recording there is no need for the teacher to change his/her presentation or format, as the recording captures what happens in the classroom. Good or bad, what you see is what you get. There is no effectiveness gained in time when the recording is published as it is. Like the live stream, the production time is minimal and the result can be published directly. Again, the ability to edit the content is limited (Norwegian Defense University College, 2017, page 11).

PC recording/Power Point voiceover (Figure 2): For this type of video lecture, software installed on a computer is used to record the lecturers face, voice and the onscreen activities. Commercial Off the Shelf (COTS) programs allow the user to choose what include in his/hers recording. As an example, you may choose to just record your activities on a drawing program and your voice, or to record your face, voice and a Power Point presentation. Recordings like this can be done anytime, anywhere, all you need is a computer with the right kind of software. Like a classroom recording, the video is made in one take, but it can easily be edited to remove errors or to add multimedia resources. If needed the recording can just be replaced by a retake (Norwegian Defense University College, 2017, page 13). The most common video editing software used in NoD is Camtasia®, but there are several COTS programs available, with the same functionality.

Studio recording (Figure 3): This type of lecture uses a fixed film studio to record a presentation or talk. The final recording can be edited, using video editing software before publication. COTS systems like TriCaster® can be installed in a studio and enables you to edit multi-camera videos, assemble and ingest multimedia, select the best shots and edit the result. This type of video lecture is also based on the one take principle, but like the PC recording it can be edited or replaced by a retake. This type of video lectures demands more preparation from the lecturer in the form of a script and a well-timed Power Point presentation and the support of technical personnel.

Multimedia lecture (Figure 4): This kind of lecture is based on the aggregation of different kinds of multimedia elements into a video lecture. Single files of sound, speech, animations, videos, pictures and graphics, are combined to placating information about a subject matter. This type of video lecture also requires that the lecturer identify multimedia elements that should be used in the video, in addition to developing a script. Developing a multimedia lecture often requires access to personnel that are experts on using video software and that can aggregate all the different multimedia resources per pedagogical and didactical principles.

HOW VIDEO LECTURES ARE USED TODAY BY DIFFERENT UNIVIERSTIES

In 2015, Kaltura Inc. conducted a survey among US educational institutions, regarding the use of video in education. Of more than 1,200 respondents, 60% were from higher education. At the higher education institutions, 72% reported to frequently use video to capture lectures and to supplement course material; 50% used video in a flipped classroom strategy and 26% used video to give feedback to students (Kaltura, 2015, page 10); and over 70% frequently used free online video resources, but only 37% frequently used teacher generated videos.

Last year, the University of Vermont College of Medicine started to flip their courses, by replacing traditional lectures with video lectures (New Media Consortium, 2017, page 18). Also, Oxford University established a service for teachers, enabling them to capture lectures, called REPLAY (Frisen, 2016). Both initiatives have the goal of fostering more active learning online. Oxford University's REPLAY solution is based on software that allows the teachers to record onscreen activities, video and audio. When completed, the video lecture is uploaded onto the university's web library. Interestingly, use of this service is not a demand from the Oxford leadership: *"the service is opt-in, with no expectation or requirement that all departments (or all lecturers) should adopt lecture capture technology"* (Frisen, 2016).

Key research and findings

As previously discussed in this paper, some studies indicate that facilitating the students to be active learners, rather than passive listeners, will enhance the learning outcome. This is a significant logistical challenge when it comes to video lectures. Learners are usually alone and must somehow interact with a computer or mobile device, without a teacher present. Additional activities can be added in video lectures by including multiple choice questions, reflection activities, or by simply giving them task to complete following watching the video lecture. An emphasis on student motivation and effective pedagogical methods, when developing video lectures are therefore paramount. Key elements are implementing motivational strategies like the ARCS-V model, that focuses on how to maintain student attention, satisfaction and confidence by focusing on variation, relevance and self-regulation (Keller, 2010). It's also not indifferent how multimedia is used in a video lecture. According to Richard Mayer there are certain rules to be followed, when you aim to improve learners understanding of the subject matter and to maximize learning outcome (Mayer, 2012, page 1). Among Mayer's twelve multimedia principles are the Redundancy principle, stating: *"People learn better from graphics and narration than from graphics, narration and on-screen text"* (Mayer, 2010, page 267) and the Modality Principle saying that: *"People learn better from graphics and narrations than from animation and on-screen text"* (Mayer, 2010, page 268).

When developing a video lecture, it's a question if you want to develop a lecture with or without a visible teacher? It's an ongoing debate whether a visible teacher is disturbing or improving retention of the learning material. Results from an eye tracking experiment looking at students watching online videos concludes that: *"Eye tracking data show that users are easily distracted when watching video on websites, especially when the video shows a talking head and is optimized for broadcast rather than online viewing"* (Nielsen, 2005). It also states that the eye tracking data clearly show that a talking head is often conceived as boring, even for 24 seconds and that the viewer is easily distracted if there are disturbing elements in the background or if the "talking head" is perceived as strange, weird or tiresome.

This is somewhat supported by Guo et al (2014) as they, in their study on how video production affects student engagement, conclude that: *"Videos where instructors speak fairly fast and with high enthusiasm are more engaging"*

(Guo, 2014, page 42). This suggest that the success of a talking head video is much dependent upon the attractiveness and delivery expertise of the presenter. But on the other hand, the same study found that informal talking head videos are more engaging than videos without a visible presenter, that shorter videos are better and Khan-style tablet drawing are more engaging than Power Point slides (Guo, 2014, page 41). Then again Mayer`s 12th multimedia principle says that: “*People do not necessarily learn better from a multimedia lesson when the speakers image is added to the screen*” (Mayer. 2010. Page 268).

The optimal length for a video lesson seems to be around 10 minutes. In Kaltura`s report from 2015: “*71% of respondent`s state that the optimal educational video should be no longer than 10 minutes,*” (Kaltura, 2015, page 19). This is supported from findings in similar research (Brecht, 2012, page 203., Stech, 2013, page 56 and Prunuska et al, 2012, page 70).

Faculty involvement from other universities

Can universities move to a more student centric approach, by adopting computer-based learning? Clayton Christensen is not very optimistic when he says that: “*One reason we might believe it is not possible, centers on another common gripe about why schools struggle – their teachers and administrators aren’t sufficiently motivated to improve*” (Christensen, 2011, page 64). Lloyd et all (2012) divides the most prevalent barriers against online learning from faculty, in four factors **1)** interpersonal barriers, **2)** institutional barriers, **3)** training and technology barriers and **4)** cost/benefit analysis barriers (Lloyd et all, 2012, page 1). Through a literature survey and a survey conducted among 75 faculty members at a US university, they arrived at a list of common barriers against online learning. The ten most significant barriers were:

1. Increased workload
2. Time commitment
3. Lack of personal relationship with students
4. Frequent technology failures
5. Inadequate compensation for instruction
6. Inadequate technology support
7. Inadequate time for grading & feedback
8. Lack of social interaction within the class
9. Inadequate instructor training
10. To impersonal

Table 2: Barriers against online learning (Lloyd et all, 2012, page 6).

Some of the same barriers were found in another study looking at the use of video in education. The five biggest challenges for educators wanting to use more video were: **1)** access to easy tools for video capturing, **2)** a video solution integrated in the LMS, **3)** training to use video tools, **4)** access to useful content and **5)** simple workflows to publish video lectures (Kaltura, 2015, page 18).

Students feedback from other universities

In a study from 2007at University of Salford Manchester, UK, students indicated that they felt the summary videos used in the courses were useful for repetition in preparation for exams, when they had missed a lecture, needed extra help to understand a topic or to help put the material into perspective (Whatley, 2007, page 194).

A study conducted in 2016, among medical students at the Imperial College London highlights the students’ appreciation of being able to combine the physical comfort of interacting on campus with the convenience of completing assignments and watching video lectures online. The study showed how students attributed the success of the model to its high-quality design and structure of the video lectures, with easy to follow animations and interactive quizzes (NMC, 2017, page 18).

VIDEO LECTURES AT NORWEGIAN DEFENSE UNIVERSITY COLLEGE

NDUC has begun to replace classroom lectures with mainly classroom and studio recordings and a few multimedia lectures, moving towards a Flipped classroom strategy. With reduced time on campus, the goal is to give the students access to lectures before they meet face to face with their teacher. In that way, the valuable time on campus can be used for more practical learning activities, supporting a more deeper learning outcome. Some new courses are offered

as online courses and several existing courses are being partly rebuilt to fit a more a flipped approach. Today it is voluntary for teachers at NDUC to produce video lectures and they choose themselves how to conduct their teaching (Norwegian Defense University College, 2017, page 7). It's not the goal for NDUC to convert all resident courses into online courses, but to replace those lectures suitable for conversion. These lectures will then be used in a blended learning design, in combination with other learning activities, both online and on campus. Late in 2014 NDUC ADL



Figure 6: Recording in the NoD video studio

Section started to experiment with recoding learning activities in a mock up video studio at Akershus Fortress in Oslo. Over the years NDUC has invested more than 50 000 US dollars, in what is today a modern video studio with a green screen, multiple cameras, teleprompter and a TriCaster® recording system.

The TriCaster® system can deliver one take recordings, combine Power Point slides with a “talking head” or produce single recording assets, used in multimedia lectures. One technical engineer has the main responsibility for the studio, but several people are trained in how to produce video lectures.

In addition, NDUC has invested in video editing software (Camtasia) to allow faculty and the ADL section to produce PC recorded- and multimedia lectures and to edit studio recordings.

The NDUC ADL section invested in initial training, by cooperation with Kristiania University College, who had used TriCaster® for some time. Their video studio was used for the first few recordings of lectures, training both teachers and personnel from the NDUC. It was an easy and practical way of learning from experienced users of the system and to gain important experiences. Another effort completed to reduce the cost of producing high quality video lectures, has been to hire students who attend a 2-year program at Kristiania University College in graphical design and animations, to develop multimedia assets. This has reduced animation production costs by over 50%, compared to vendors normally used by NDUC.

Production methodology

The NDUC ADL section has developed a methodology for converting existing classroom lectures or producing new video- or multimedia lectures. It's all based on a thorough Training Needs Analysis (TNA) with well-defined learning objectives. Together with the ADL section, teachers will develop a video script, a pedagogical strategy and identify appropriate multimedia elements to be used in the lecture. For a studio lecture recording, main elements are the speech script and in most cases a Power Point presentation, while a multimedia lecture is put together based on studio recordings and multimedia elements. Both types of video lectures are edited, tested and checked against the script, before the lecture is published on the NDUC LMS.

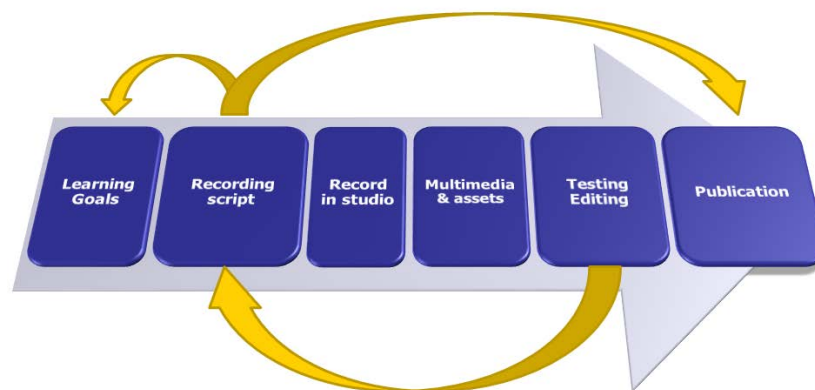


Figure 7: NDUC Video lecture methodology

Findings from the use of video lectures at NDUC

To get faculty members to try out video lectures, NDUC ADL Section has extended the support beyond the normal capacity. So far the lesson learned is that once faculty members have developed a video lecture as a classroom recording, most of them see the potential in increasing quality by producing a studio recording or multimedia lecture instead. Even though its more work and a more significant commitment on their part, they see the added value of using editable studio recordings and multimedia lectures, that can benefit more from the use of a greater variety of multimedia elements.

Regardless of the type of video recording used in a video lecture, you get the benefits of anytime, anywhere access, repetition, self-pace and releasing valuable time on campus for other learning activities. Other lessons learned from the use of video lectures include (NDUC ADL Section, 2107):

Classroom recording:

Benefits:

- No or little rebuilding of existing lecture needed
- No editing required
- Can be published right away
- Added value as Q&A are included in the recording.

Challenges:

- Requires technical assistance to record lecture
- No time reduction: 45min lecture = 45min video lecture
- Vulnerable for technical problems
- Editing or change of content difficult/impossible
- Greater pressure on the lecturer, «one take»
- Possibilities of capturing “disturbing” elements that could inflict on student focus
- Hard to read Power Point slides in the video.

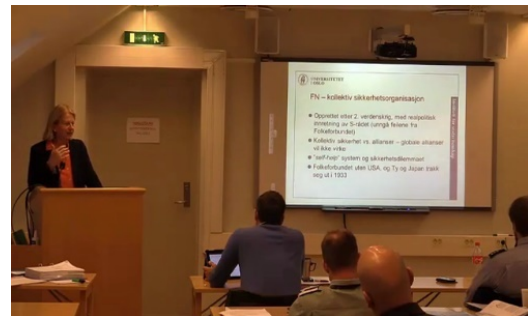


Figure 8: Classroom recording, UN course

Studio recording:

Benefits:

- Average time reduction: 45min lecture = 20min video lecture
- Little risk of technical problems
- Retake possible
- Content can be changed later.

Challenges:

- More preparation time, development of script
- Technical support for Studio recording needed
- Some editing post recording needed
- Teacher delivery even more important, engagement.



Figure 9: Studio recording, Gender

Multimedia lecture:

Benefits:

- Average time reduction: 45min lecture = 18min video
- Great flexibility in rebuilding and updating the lecture
- Not dependent of a “Talking head”
- More control to ensure a high quality (pedagogics, motivation and didactics).

Challenges:

- Even more preparation time needed, developing script and finding/building multimedia assets.
- Need support in using video editing software
- More time used on editing and multimedia development.



Figure 10: Multimedia lecture, Air Opr.

Cooperation with NDUC faculty

In 2017, Norwegian Defense Research Establishment (NDRE) conducted a survey in cooperation with NDUC, asking faculty and students about the systematic use of technology in education and training. The respondents perceived the maturity level of using technology in education to be relatively high on access to technology and ICT infrastructure and low on innovative use and level of utilization (Elstad, 2017, page 32). When faculty members were asked about their resistance against converting classroom based courses to online courses, some of the reasons stated was:

- “My subject matter is too special”
- “Will reduce learning outcome”
- “Lack the time and resources”
- “Not educationally sound” (Elstad, 2017, page 34).

Like Oxford University, use of video lectures are not mandatory at the NDUC and up until recently there have been no requirements from NDUC leadership for using online learning or video lectures. In the beginning, there was some reluctance among faculty related to producing and using video lectures. Even though more and more teachers are willing to try video lectures, there is still some skepticism to be found. Giving the alternatives of types of lectures (Different type of video lectures, page 4), those few who agrees usually require a classroom recording. It is hard to convince faculty members to try a multimedia lecture or studio recording right away. The reasons behind this are complex and probably many, but talking to faculty members over the last couple of years have given some insight behind the skepticism towards video lectures and online learning.

Even though NDUC has not conducted a survey directly targeting the use of video lectures, many of the same barriers found by others, are recognizable. The main reason why faculty report they do not engage more in developing video lectures is that it requires too much time and that the increased workload is too high. Thus, most faculty willing to try using video lectures elect to try a video lecture in a classroom setting. Many faculty members also feel that it's too much effort to learn and use new technology and that they mistrust online learning methods that in their mind, disconnect them from their students. Some teachers are not comfortable being filmed and published online and feel they need more practice in front of a camera (NDUC ADL Section, 2017).

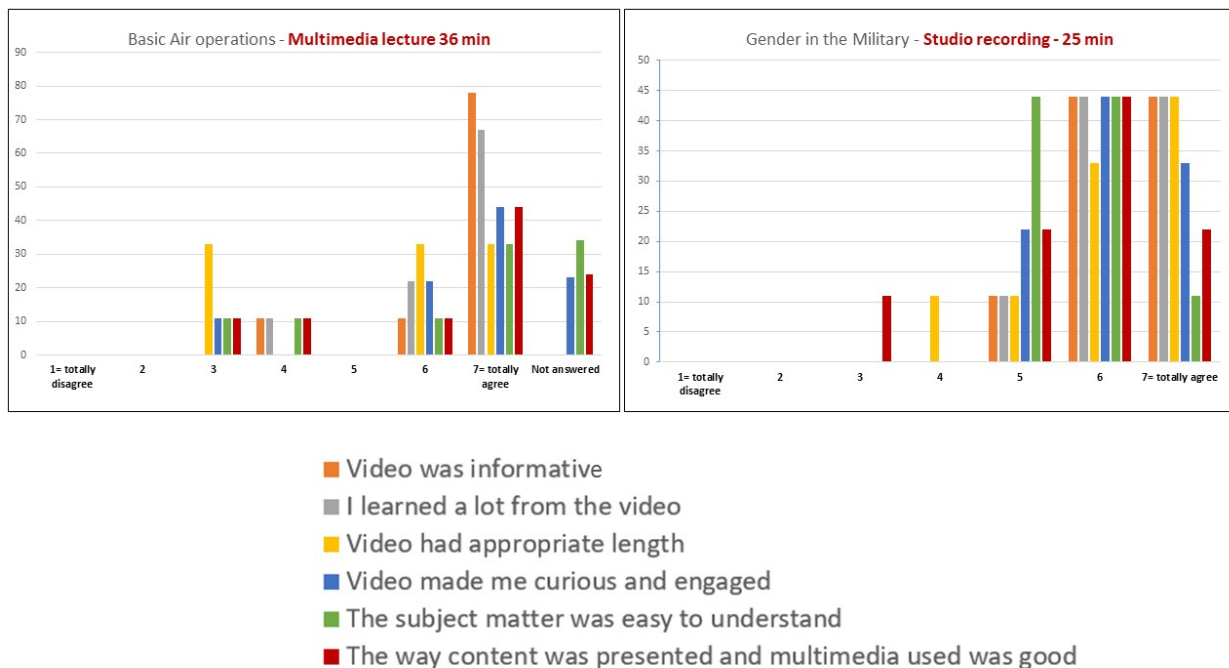


Figure 11: Example of evaluation results from the use of video lectures (NDUC ADL Section, 2017, page 4)

NDUC student feedback

In an evaluation of the use of online learning activities in the Joint Operation Module (JOM), 2017, the students were asked to mention the most important benefits of using online learning resources. The four most commonly mentioned factors were:

- Ability to self-regulate pace
- Variation in methods
- Flexibility in time and place
- Possibilities for repetition (NDUC ADL Section, 2017).

All these benefits can be found when using video lectures. Extracts from conversations with the JOM students indicates, that overall video lectures are very well received and found very useful. Some of the comments included:

- *“Positive with electronic lectures. Enables you to return to the lecture later.”*
- *“Very good on my part to use video lectures. Easier to pause, take notes, search, reflect and so on.”*
- *“Video lectures are good. Need a little more drive in the presentations.”*
- *“The video lectures gave generally a good understanding of the subject.”*
- *“Combination video lectures and presentations works fine.”*
- *“The video lectures gave me a very good introduction to the topic.”*
- *“Video lectures is good. Advantage is that we can watch trough them again if we don’t remember the whole lecture.”* (NDUC ADL Section, 2017, page 3)

Examples from the evaluation conducted of the specific video lectures used in JOM (Figure 11) show that overall the students found both the studio recordings and multimedia lectures informative, engaging, easy to understand, well produced and with an appropriate length (NDUC ADL Section, 2017, page 9). Even though the multimedia lecture in this example is only 11 minutes longer than the studio recording, more students found the multimedia lecture to be a little long. This supports findings from other research, that recommend the ideal length for a video lecture to be between 10-15 minutes (Brecht, 2012, page 203., Kaltura, 2015, page 19., Prunuska et al, 2012, page 70 and Stech, 2013, page 56).

SUMMARY

The use of video lectures in the NoAF is quite new and it’s still a learning process. Lessons learned suggests the development and use of video lectures by faculty can provide many benefits, both for universities and students. The findings in this trial is believed to be useful for other organizations, both military and civilian, and should hopefully give an easier and more effective start of using video lectures.

When the decision is made to implement the use of video lectures, it is important to do so by the full support of the leadership. It’s also very important to offer faculty training in using software, technical production support and hands on help with filming and editing, at least in the beginning. This to reduce the two most commonly cited barriers against online learning, by faculty, namely increased workload and time commitment (Table 2, page 6).

Even though research on whether to include the speaker in a video lecture or not is unclear, it seems to be an agreement that if you use a “talking head” approach, it’s important to coach teachers to be enthusiastic and engaging when talking in the lecture. Otherwise the teacher’s performance can interrupt the attention, and “steal” focus away from the learning material and the purpose of the video lecture. There seems to be no research reaffirming that the teacher/speaker must be visible all throughout a video lecture, but rather to include him/her in the beginning and at the end of a video lecture.

Like in the classroom, students will get bored and lose attention if they are overwhelmed with text on screen, if the content is perceived as less relevant or too difficult or if the (video) lecture simply does not engage them. It is therefore equally important to use appropriate pedagogical techniques, apply motivational strategies and to use multimedia elements in the best possible way, to amplify the learning outcome in video lectures.

The argument can be made that the production time of a classroom- stream or recording is faster and sometimes cheaper, than other types of video lectures and that a very good classroom lecture will also be perceived as good

online. But NDUC lessons learned is that, by using a studio recording or developing a multimedia lecture, you have more control. It's easier to avoid technical errors and by adding tailored multimedia elements and pedagogical techniques the chance of optimizing the learning process and maintaining student engagement increases. Even though the production time is longer and costs somewhat higher, indications are that it makes up for it when it comes to student's satisfaction and learning outcome (NoD ADL Section, 2017).

RECOMMENDATIONS

Based on the result of the early trials of producing and using video lectures at NDUC and research/lessons learned from other universities, the ADL section have recommended to NDUC leadership to make it mandatory to include online learning activities in future courses and to increase the use of video lectures in Norwegian Armed Forces. The aim continues to be to replace existing classroom lectures, freeing faculty time, offer more lectures online and to contribute to reduce cost of education and training in NoD.

Future video lectures are recommended to be produced after the following principles/guidelines:

1. Primarily produce video lectures as studio recordings and multimedia lectures
2. Classroom recordings is recommended to be used in exceptional cases, were NDUC have lectures given by external keynotes or other guest teachers
3. Divide video lectures in shorter modules with length of no more than 10-15 minutes
4. Make sure to apply commonly known multimedia principles and motivational strategies in video lectures.

Future support to NDUC faculty is recommended to be:

1. Establishing a "training program" for faculty to improve their ability and knowledge on how to deliver an engaging video lecture
2. Access to easy to use software to produce PC based "talking head" video lectures / demonstrations
3. Continues Technical support for studio recordings and production of multimedia lectures
4. Methodical and pedagogical support in developing video scripts and multimedia assets.

WAY AHEAD

According to findings in the Kaldura report: "*In the future, students will expect video to be part of their learning Experience*" (Kaldura, 2015, page 25) and NDUC get the same signal from our students. Even more important, demands to increase effectivity and to reduce costs in the educational sector will most likely force NDUC to continue and expand the use of video lectures and online learning activities. In the next couple of years NDUC ADL Section will continue to support the production of video lectures and increase the evaluation of the impact video lectures have on online courses, student satisfaction and learning outcome.

In 2018 NDUC will seek to conduct a trial, using a fixed classroom recording system in one of the most commonly used classrooms, to produce video lectures. This will enable NDUC to gain more experience with fixed classroom recording and to compare them with other types of video lectures.

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REFERENCES

- Brecht, D.H. (2012). Learning from Online Video Lectures. *Published in the Journal of Information Technology Education: Volume 11, 2012 Innovations in Practice*, page 227 to 250.
- C. Leor Harris (1981). *Evolution, Genesis and Revelations: With Readings from Empedocles to Wilson*. SUNY Press. ISBN 978-1-4384-0584-1.
- Christensen, C., Johnson, C.W. & Horn, M.B. (2011). *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*. Published by McGraw-Hill. www.kahnacademy.org
- Freeman, S., Eddy, S.W., McDonough, M., Smith, M.K., Okoroafor, N., Jordt, H., and Wenderoth, M.P. (2014). Active learning increases student performance in science, engineering, and mathematics. Article no. 23, vol. 111 of *Proceedings of the National Academy of Sciences*, 6 pages.
- Friesen, N. (2011). The Lecture as a Transmedial Pedagogical Form: A Historical Analysis. *Volume 102 Educational researcher*, 8 pages.
- Frisen, J. (2016). *REPLAY is now a service*. Retrieved from <http://blogs.it.ox.ac.uk/lecture-capture/2016/07/28/replay-is-now-a-service/>, April, 2016.
- Gordon, B. (2017). *Why You Need to Rethink the Talking-Head*. Retrieved from <http://tendocom.com>. Jan 2017, 7 pages
- Guo, P.J., Kim, J., Rubin, R. (2014). How Video Production Affects Student Engagement: An Empirical Study of MOOC Videos, 10 pages. *Published in the proceedings of the first ACM conference on Learning*. <http://dl.acm.org>.
- Handelshøyskolen BI. (2013). *New teaching methods and technology*. Retrieved from <http://bi.no>, January 2017. 42 pages in Norwegian.
- Kaltura Inc. (2015). The state of video in education 2015. A Kaltura report. 33 pages. *Published by Kaltura Inc*. Retrieved at <http://site.kaltura.com>, April 2017.
- Keller, J.M. (2010). *Motivational design for learning and performance*. Published by Springer, New York.
- Lloyd, S.A., Byrne, M.M., McCoy T.S. (2012). Faculty-Perceived Barriers of Online Education. 12 pages. *Published in the MERLOT Journal of Online Learning and Teaching Vol. 8, No. 1*. Retrieved from <http://jolt.merlot.org>, march 2017.
- Mayer, R. (2010). *Multimedia learning, Second edition*. Published by Cambridge University Press. 304 pages.
- McKinsey & Company. (2015). Modernization and effectivization of staff-, support- and management in the NoD sector. 109 pages.
- New Media Consortium. (2017). Horizon Report, 2017 Higher Education Edition. *Volume 1, 60 pages*.
- Nielsen, J. (2015). *Talking-Head Video Is Boring Online*. Retrieved march 2017 from <https://www.nngroup.com/articles>
- NDUC (2017). Digitalization and pedagogical innovation. Report written by NODUC ADL section, 26 pages.
- NDUC ADL Section (2017). Video lectures evaluation report, FOPS. Evaluation survey by NoDUC ADL section. Retrieved from <https://forsvaret.itslearning.com>, May 2017.
- Norwegian Ministry of Defense. (2016). *Military Combat and sustainability. IVB 2017-2018*. Retrieved February 28th 2017, from <https://www.regjeringen.no/globalassets/departementene/fd/dokumenter>.

Prunuska, A.J., Batzeli, J., Howell, E. and Miller, S. (2012). Using Online Lectures to Make Time for Active Learning. *Published by Genetics Society of America in Genetics, Vol. 192, page 67–72 September 2012.*

Stetz, T.A., Baumann, A.A. (2013). Reasons to Rethink the Use of Audio and Video Lectures in Online Courses. *Published in High. Learn. Research Community. Vol. 3, Num. 4, December 2013, page 49-58.*

Whatley, J., Ahmad, A. (2007). Using Video to Record Summary Lectures to Aid Students' Revision. *Published in Interdisciplinary Journal of Knowledge and Learning Objects, volume 3, 2007, pages 186-196.*