

Digital Learning Resources Will Not Make Teachers Obsolete, But What About the Classroom Lecture?

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ABSTRACT

The pandemic haunting the world since March 2020, has forced schools and universities to increase their use of, or for some finally start using online learning methods. Both live lectures using online video meeting applications and the use of in-house produced video resources have increased and have been used to facilitate online learning. In too many cases technology is used to continue traditional teaching methods online, while some institutions are more innovative in their approach of using video lectures as a part of for example a flipped classroom concept.

Norwegian Defense University College (NDUC) updated strategy of learning, emphasizes the need to move away from teaching methods making the students passive receivers of information. Instead, NDUC faculty is tasked to implement more student-active methods that lay the groundwork for the students to collectively work with problems close to their areas of practice. These principles also apply to online- modules and courses.

The NDUC digital strategy and the implementation of flipped classroom call for more use of online learning resources instead of spending most of the time in the classroom following traditional lectures. The production and use of digital learning resources is met with many prejudices. They are too hard to make, the students will not use them, how can the students ask questions, they are too long, and it will make the teachers obsolete.

This paper will present the findings from an R&D project conducted at NDUC during the fall of 2020, where all classroom lectures were replaced with mainly video lectures in a bachelor's in military studies course with more than 230 military students. The result from this project will, together with existing research, form the basis for the discussion around the question: If digital learning resources can and should replace the traditional classroom lecture in the future, to meet the demands for more flexible learning methods and more innovative use of learning technology. It is a set goal for NDUC to continually develop and enhance (online) teaching methods.

ABOUT THE AUTHOR

Commander (SG) Geir Isaksen has more than 19 years in the field of Advanced Distributed Learning (ADL) and is responsible for more than 30 Defense projects in the field of digital learning methods and learning technology. He has published more than 20 papers covering different aspects of digital learning methods like mobile learning, student motivation, cognitive overload in e-learning, and the use of video lectures.

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). His military background is from the Navy, serving on submarines for six years as an electro officer and he is also responsible for international ADL cooperation at the NDUC and MoD-funded international ADL capacity-building projects.

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INTRODUCTION

“Learning is not a spectator sport” a phrase first stated by Chickering & Ehrmann in 1996, summarizes the importance of active participation by students in the learning process. This statement has been emphasized in many research projects (Colvin, 1998., Koedinger, 2015 & Tasker, 2017.) with the same focus on the fact that the least effective way for students to learn is just sitting in a classroom listening to teachers. According to Chickering (1996) *“they must talk about what they are learning, write reflectively about it, relate it to past experiences, and apply it to their daily lives”* (Chickering, 1996, p.3).

Student activity in effective learning has been a focus for a long time, often being connected to John Dewey’s research around learning by doing. In both pedagogical teaching principles and motivational learning methodologies, student’s active participation is often highlighted as one of the most important factors, even in the use of online learning material (Mayer, 2020, p.5. & Colomer, 2020, p.4.). This stands in contrast to the classroom lecture, often criticized of being a more passive learning activity, where students are often reduced to being receivers of information rather than active participants in their learning process (El Sadik, 2020, p.3 & Holte, 2020, p.2).

The Norwegian Defence University College (NDUC) learning strategy and the implementation of flipped classroom call for more use of online learning resources instead of spending most of the time in the classroom using traditional lecture (NDUC, 2018, p.9). The production and use of digital learning resources are met with many prejudices and notions of it being bad learning. Being under the heel of a pandemic for the last 16 months has shown the world the usefulness of online learning and has resulted in increased use of online learning materials, like video lectures. The question is can video lectures do the job and make the traditional classroom lectures obsolete or is the classroom lectures so important that we must go back in the classroom as soon as COVID 19 is history? During the fall of 2020, all classroom lectures in a course with more than 230 students in a bachelor’s in military studies course were replaced by pre-recorded video lectures and live Microsoft Teams lectures. Based on the results from a survey, the evaluation report, and existing research, this paper will discuss the question above.

QUALITY OF DIGITAL LECTURES

For a lecture to be effective as a learning activity it must be able to maintain student’s motivation and attention and at the same time ideally create engagement and facilitate student activity. From a cognitive learning perspective, sustained student attention is a key element for effective learning (El Sadik, 2018, p.3., Petroski, 2020, p.7., Robinson, 2018, p.5. & Tasker, 2017, p.32.). It is paramount that online learning activities and digital learning content like video lectures facilitate these four elements, to establish the best possible conditions for the student to grasp the message and thus reach the learning outcome.

According to Robinson and Cook (2018), a sign of quality regarding digital instructional content is its level of stickiness. Stickiness in this case refers to the ability of online learning content to maintain the attention of students and nurture their motivation to frequently return to the learning content. They argue that online content's ability to maintain the attention of the students and the absence of distraction indicates the learning content’s stickiness (Robinson, 2018, p.4). They summarize this stating that: *“In an ideal world one wants the “Velcro” sort of relationship, where both the student and the activity each provide the relevant surface to which to adhere; for the student to stick to the learning and the learning to “stick” to the student”* (Robinson, 2018, p.5).

Traditionally a student's attendance and engagement in the classroom can be monitored. The teacher may call upon students or some of them to raise their hand to offer their ideas, or they may through their physical interactions with the lesson show their interest and engagement in the subject matter. In the online learning environment, participation is more difficult to observe as a student may log off or switch off their camera and as a result fail to engage with the materials at all (Robinson, 2018, p.3). The importance of teacher engagement is not to be forgotten. At NDUC both master's and bachelor's students highlighted teacher engagement among the top two factors most influencing their learning outcome in a survey done in August 2020. The other top factor mentioned by the students was group collaboration. (NDUC, 2020, p.3).

Robinson (2018) argues that developers of online learning can learn much from measuring "sticky" indicators of produced online content. Teachers should assess the "stickiness" of their learning content by monitoring both the attention their content generates and the extent to which it spurs action by the students (Robinson, 2018, p.11). It's a continuous challenge how teachers as providers of online content, can be sure if the students are engaged by their learning content.

Mistrust Towards Video Learning Resources

In a research paper from 2019 Isaksen found that in NDUC courses where teachers used a flipped classroom concept, combining pre-recorded videos with classroom learning activities, the teachers found themselves in a bit of a catch 22 dilemma. The students didn't watch the videos because they knew that the teachers traditionally addressed the same topics in the classroom lecture, while the teachers argued that they had to cover topics from the videos in their lecture because the students didn't watch the videos anyway (Isaksen, 2019, p.3). This finding indicates a certain mistrust from teachers and lecturers towards the use and effectiveness of providing videos and seems to influence their willingness to pre-develop video assets for their courses. According to Robinson (2018, p.9), attention tracking may provide useful feedback for evaluating student engagement with online- courses and resources, counteracting the mistrust towards the use of online learning assets.

The Traditional Teacher Role

Anderson et al (2001) point out the three roles of a traditional teacher to be:

1. Designer of the learning experience, where they are planning and administering instruction in addition to evaluate the learning outcome.
2. Facilitator and co-creator of a social environment facilitating student active and successful learning; and
3. Subject matter expert who knows more about the subject matter than the learners and is thus in a position to 'scaffold' learning experiences by providing direct instruction and feedback (Anderson et al, 2001, p.2).

In their research, they found that some teachers in various ways included the students in facilitating the learning activities for the whole class, which lead to their decision to use the term "teaching presence" rather than "teacher presence," because they found that individuals who are not teachers often collaborate in carrying out some of the roles traditionally done by teachers. They defined teaching presence as: *"the design, facilitation, and direction of cognitive and social processes to realize personally meaningful and educationally worthwhile learning outcomes"* (Anderson et al, 2001, p.5).

The importance of teaching presence for perceived learning and satisfaction has consistently been reported by a multiplicity of research studies (Anderson et al, 2001, p.7, Tasker, 2011, p.11 & Akyol, 2008, p.3). They argue that teaching presence is always implicit in the instructional design and the organization of an online course is highlighted by the presence of the instructor in videos and audio recordings.

Engagement Attention, Activity & Motivation

Attending lectures enhanced with presentation software remains a relatively passive instructional activity and the most common application used in (video) lectures at NDUC is PowerPoint (PPT). Even though PPT has a somewhat bad reputation, some research found students to have positive perceptions about the use of PPT in lectures. In a research project at the University of Pittsburg, they asked 160 undergraduate students to complete a survey and two open-ended questions regarding the use of PPT. Sixty-nine percent (69%) of the students either strongly agreed or agreed that PowerPoint presentations held their attention. The students also perceived teachers who delivered their lectures with PowerPoint as being more organized. (Frey, 2002, p.2)

Professor Richard Mayer has pointed out the importance of carefully developing PPT presentations in a way that prevents cognitive overload. By avoiding a cognitive overload among the students watching a video lecture, the chance of maintaining their attention and motivation is better. His multimedia principles and recommendations are implemented at NDUC and the results are previously published in an IITSEC paper (Isaksen, 2014).

The importance of maintaining a high level of motivation in any kind of lecturing is highlighted by Professor John Keller in his work with motivation and the ARCS model. According to his research, it is important to focus on students Attention, Relevance of the content, nurture students Confidence, and Satisfaction with the content and learning experience (Keller, 2010, p.5). This is also supported by Rosenthal & Walker (2020) who state that “*there is sufficient data to suggest online learning works well when it is designed well*” (Rosenthal, 2020, p.3). They also claim that the live composite format is superior to voiceover and picture-in-picture VL formats when it comes to attention, positive emotion, attitude, preference, perceived quality, and instructor social presence (Rosenthal, 2020, s2).

Scagnoli et al (2019) found that students satisfaction with video lectures has a strong relationship with a positive overall learning experience and perception of the impact of video on learning. Video lectures have become widely used in education since advances in technology have made video more affordable and accessible. Furthermore, they found that students with previous experience with video lectures found them more useful, but that research findings on video lectures are inconsistent in terms of the relationship with students’ satisfaction and the influence on learning outcome. (Scagnoli, 2019. p1). In recent years students across the world are getting more familiar and comfortable with informing and educating themselves via online videos. Most of us can certainly relate to going on YouTube to find instruction or help to solve a certain problem. Video learning resources have gained popularity not only as supplemental material to traditional face-to-face instruction but also as a key component of online courses, especially in courses relaying on a flipped classroom concept (Isaksen, 2019, p.3).

Scagnoli et al study (2019) revealed three factors that predict students’ satisfaction rate and their perception of the relevance of video lectures in their learning. These factors are (1) familiarity with the media, (2) experience using video in learning, and (3) educational level or academic status. Additional findings highlight the importance of a good balance of video lectures with other course materials and learning activities. They highlighted examples where relevant findings are presented first using the research questions that guided the study as a framework, followed by a discussion of implications of these findings. (Scagnoli, 2019. p.9)

Student activity remains a challenge when it comes to using video lectures. Koedinger et al (2015) point out that: "in contrast to the passive form of learning characterized by watching video lectures or reading text, adversity of learning theorists has recommended more active learning by doing" (Koedinger et al, 2015, p.2). To remedy this one of the measures implemented at NDUC is not to produce video learning resources longer than 10-15 minutes (Isaksen, 2017, p.10). Another measure is to seek to include reflective questions and written tasks in video lectures used to prepare the students for discussions and group work.

In a research project done by Roncetti (2011) recorded videos of traditional classroom lectures were used to prepare students for classroom activities. In the evaluation survey, the students responded to several claims about the classroom lecture compared with the use of video. Just over fifty-two percent (52,6%) disagreed that the workload of watching videos in advance was too much, half (50%) disagreed that it was better to discuss in the classroom and that watching video resources is boring. However, the students agreed on the claims that traditional lectures lay the ground for getting deeper into concepts (50%) and have better participation. Forty-four percent (44%) of the students also strongly agreed that discussions in the classroom must follow the same line as from the video lectures (Roncetti, 2011, p.2-3).

FINDINGS FROM THE COURSE OFFICER & WAR

The Officer & War (O&W) course is a joint four week long module for all the bachelor’s in military studies programs at NDUC. As a result of the huge educational reform in 2018, the first three modules in the military bachelor programs are conducted jointly and in October 2020, 238 students attended the O&W course. Seventy of the students were situated at the Naval Academy in Bergen, while the remaining 168 students were attending from the Army War College in Oslo. After a chaotic ending of the school year in the summer of 2020 where COVID 19 had forced NDUC to send all students home and continue the courses online without much time for planning and preparation, the story

was a bit different for the students starting in August 2020. After a semi-normal summer in most parts of Norway, a somewhat expected spike in COVID cases erupted during the fall of 2020. The responsible teacher for the O&W course had thankfully planned for this and had already before the summer begun to record video lectures as a replacement for the classroom lectures completed in the previous course. Due to the pandemic, the O&W course was planned without any learning activities requiring the student to be physically present in a classroom. The teaching method was carried out following the NDUC strategy and was based on the principles of a flipped classroom and problem-based learning. All traditional classroom lectures were replaced by video resources, online Q&A sessions, online student presentations, and problem-based group work. In addition to individual work by each student, the course used teaching methods like plenary and Q&A sessions in Microsoft Teams and group discussions. The subject booklet defined which video lectures and syllabus that the students should watch and read, to prepare for the online face-to-face learning activities. As the students were quarantined on campus during this course, they could meet face to face in their small cohorts (squads) for group collaboration in addition to online meetings.

The Students

As a preparation for the new school year, a didactical survey was conducted in August 2020 among the undergraduate class of 2020. Among the group of students answering the survey, the largest group of students were between the age of 19 to 22 years old (80%), with the remaining students being between 23-26 years old (20%) (NDUC, 2002-1, p.2). The general academic requirement to be admitted to a bachelor's in military studies program is completed upper secondary school with study specialization. There is no requirement of previous military experience although 84% of the students had served as conscripts. Figure 1 summarizes the most relevant experiences of using digital tools and methods in their previous education. Interestingly enough majority of the young students stated that they preferred classroom lectures combined with the possibility of asking questions to the teacher and group collaboration (77%). The most used online meeting software was Skype (58%) but surprisingly 26% of the students had never participated in a video meeting. Most of the students had previously written essays online (76%) and had either good or very good experiences with collaboration with other students in the learning process (65%). Although the students were divided down the middle when it comes to how they prefer to take notes (50% on paper and 50% on a PC), 63% of them preferred to get the syllabus in digital formats (NDUC, 2020-1, p.3).

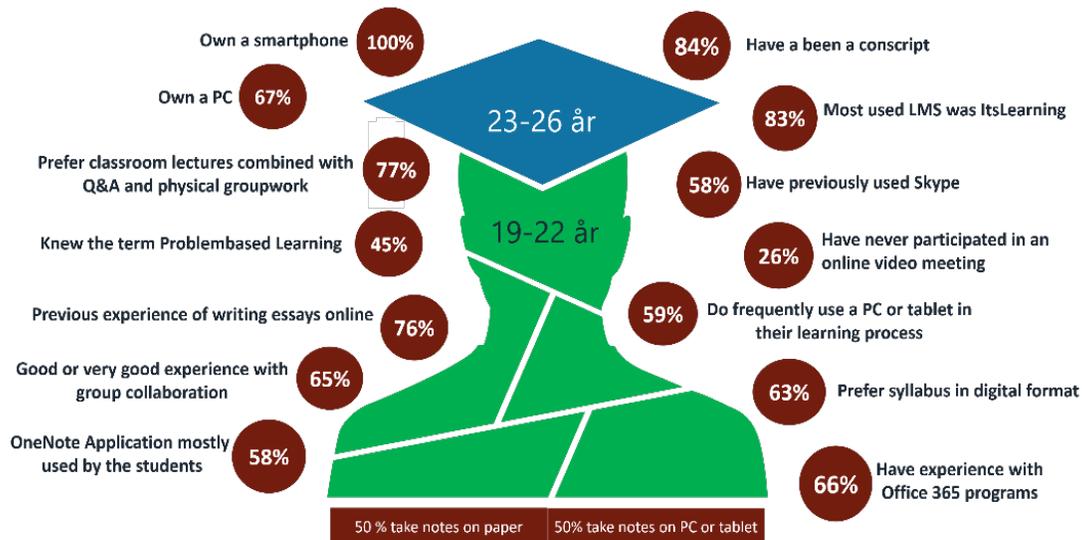


Figure 1: The Military Bachelor's Student 2020

Digital Resources Used In the O&W Course

All lectures used in the course were either a prerecorded video lecture or a live lecture conducted in Microsoft Teams. Most of the lectures were followed by live Q&A sessions in Teams, where the students got the opportunity to ask questions to the teachers. Through the planner in the Learning Management System (LMS), each student was tasked to prepare for the Q&A sessions by watching prerecorded lectures. All recordings of live sessions (lectures, Q&A

sessions, and meetings) were made available for the students in the LMS ItsLearning. Four types of video resources were used in the course:

- 10 prerecorded video lectures from NDUC film studio.
- 7 recordings of live lectures conducted in Teams.
- 3 recordings of live Q&A sessions conducted in Teams and,
- 11 recordings of group presentations and subject introductions conducted in Teams.

The Use of Video Learning Resources



Figure 2: Screenshots From VIMEO

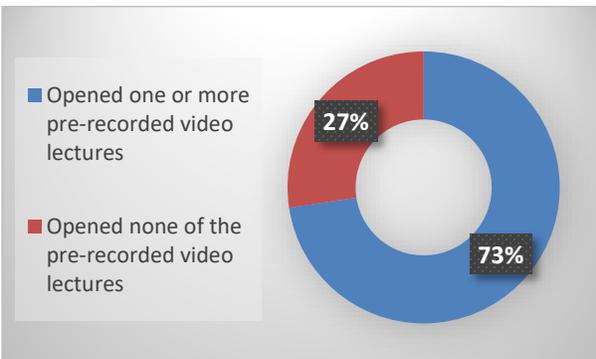


Figure 3: Students Watching Pre-recorded Video Lectures

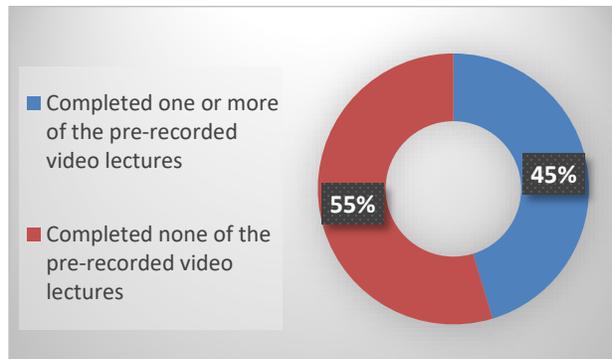


Figure 4: Students Completing Pre-recorded Video Lectures

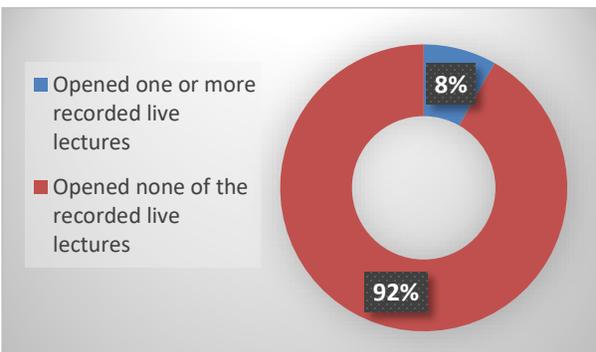


Figure 5: Students Watching One or More of the Recorded Live Lectures

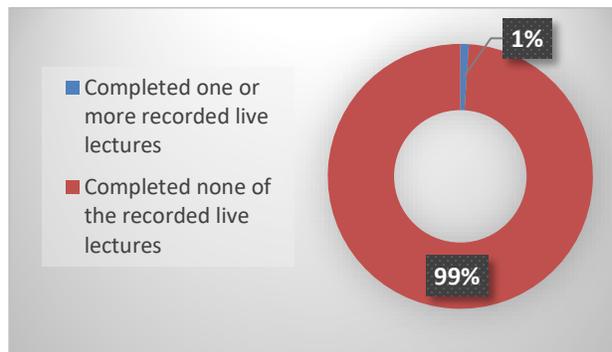


Figure 6: Students Completing One or More of the Recorded Live Lectures

All of the video resources used in this course were linked to the LMS (ItsLearning) from the online video application service VIMEO. This allowed NDUC faculty to track students' use of the videos in more detail, combining data from

both the LMS and VIMEO. By tracking the student's interaction with each video, it was possible to identify how many of the videos and how much of each video each student watched. Figure 2 shows how VIMEO visualizes the interaction of each video and when the viewers (students) are "lost". This gave NDUC some indication of each video's stickiness and its ability to maintain the viewers' attention and focus.

Figure 3-6 shows the results from the aggregated data retrieved from the LMS and VIMEO regarding the actual use of the video learning resources (Isaksen, 2020, p.3). Figure 3 and 4 aggregates data from the use of pre-recorded videos, while figure 5 and 6 aggregates data from video recordings of the live events. The data show that 73% of the students open one or more of the pre-recorded videos (figure 3) and 45% completed one or more of the same videos (figure 4). This stands in contrast with the video recordings of the live teams' lectures, online Q&A sessions, and online meetings, where only 8% of the students opened one or more of these recordings (figure 5) and only 1% completed one or more of the recorded live sessions (figure 6). This means that 26% of the students didn't watch any of pre-recorded videos and that 92% of the students abstained from watching one or more of the recorded live sessions. Through the course evaluation, some students indicated that they watched some of the videos together with students from their cohort through one student's individual LMS account. Taking that into consideration it is likely that the percentage of students watching one or more of the videos might be even higher (NDUC, 2020-2, p.4).

Student Feedback On the Quality of Pre-recorded Video Lectures

As a part of the evaluation of the O&W course, students were asked their opinion of the quality of the pre-recorded video lectures. All the 10 videos were produced in the NDUC film studio at Akershus fortress, Oslo, Norway. All the videos were developed based on the pedagogical principles from the NDUC strategy and edited by Faculty staff personnel responsible for the film studio. NDUC graphical designer (Faculty staff) supported the lecturers in the planning process and the development of PowerPoints used in the videos. Special emphasis was placed on incorporating the multimedia principles for Professor Mayer (2020) and the motivational methodology from Professor Keller (2010), both previously covered in other NDUC research projects (Isaksen, 2014 & Isaksen, 2017).

The students were asked to evaluate each of the 10 pre-recorded video lectures based on elements like video length, variation, how it met the learning outcome, ability to maintain their attention, motivation, language, and how the subject matter was presented. The survey allowed the students to click on the statements (figure 7) they agreed with for each of the 10 pre-recorded videos. An aggregation of the results from all 10 videos, shows that the students overall were very satisfied with the quality of the pre-recorded video lectures.

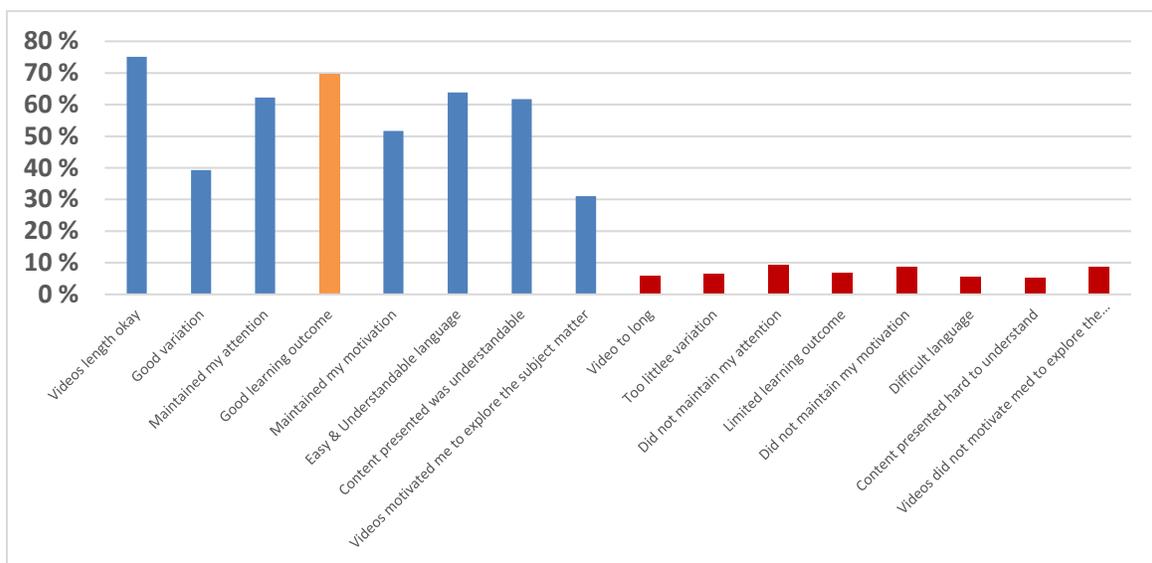


Figure 7: Student Feedback of Pre-recorded Video Quality (Aggregated) n=195

The pre-recorded videos vary from 17 to 76 minutes (average 35-5 minutes), but the overall general feedback was that 75% of the students found that to be acceptable. Sixty-Nine percent (69%) found the video lectures to give a good

learning outcome and over 60% of the students found the videos to maintain their attention, understandably presented the content, and used easy and understandable language (figure 7). Half of the students responding to the survey found the video lectures to be motivating (51%) and 39% thought the content presented used good variation in multimedia and graphics. About 30% found the videos to motivate them to explore more about the subject presented. Only 10% or below had negative feedback regarding the categories mentioned above. The three negative statements close to 10% were linked to lack of maintaining- motivation and attention in some lectures.

Most importantly (highlighted in orange in figure 7) is the overall feedback on how the pre-recorded videos met the learning outcomes defined for this course. In general, 70% of the students felt that the video lectures in question covered aspects and information related to the learning outcome. The lowest number related to learning outcomes in the pre-recorded videos was 52% and the highest number was 82%. In terms of the video's ability to motivate the students to explore the subject at hand, only 30% generally felt that the videos were able to do that (Isaksen, 2020, p.3-6).

Academic Result From 2019 and 2020 In the O&W Course

The Officer & War course has since 2018 been the second out of four joint courses for all students accepted in one of the bachelor's in military studies programs, all under the NDUC umbrella. In 2019, 221 students were accepted into the undergraduate programs, with a small increase in 2020 to 238 students. The small increase in 2020 resulted in a physical separation of the students, with about 168 students located at the Army Academy in Oslo and 70 students at the Naval academy in Bergen. Both courses were four weeks long and had the same learning outcome descriptions.

The principle of Flipped classroom was applied in both courses. In 2019 the student prepared themselves for the practical group work, by working with the digital syllabus and attending classroom lectures. This was changed, completely in 2020 where all classroom lectures were replaced by pre-recorded video lectures and live meetings, meaning that the students prepared themselves for group work by accessing the digital syllabus and watching video lectures. Both courses contained mandatory group assignments and a final home exam, graded from A-F. Getting an F meant failing the exam. Comparing the result from 2019 and 2020 shows an increase in B's (from 29.9% to 32.8%) and A's (from 4.5% to 8.4%) and an equivalent decrease in C, D, and E's.

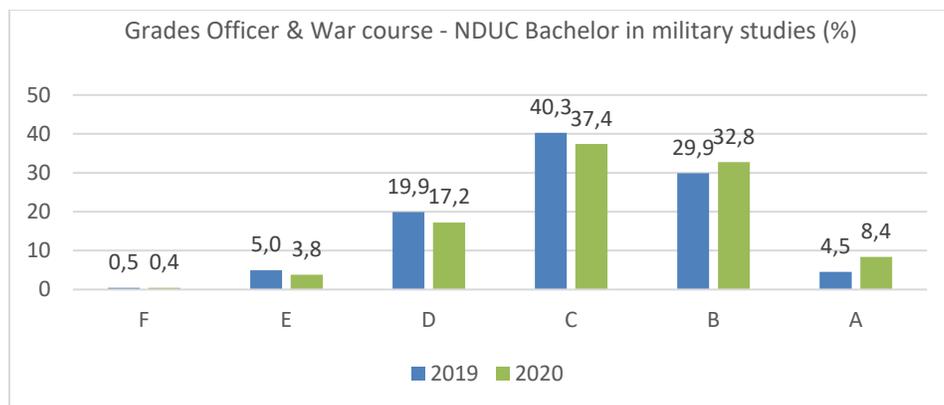


Figure 8: Aggregate of Grades O&W Course

Students Feedback On the Learning Concept

As part of the course evaluation, each student could add their comments, insights, and feedback to the O&W course in an open question. Aggregation of these comments (N= 195) shows that the overall thought was that the use of video lectures worked surprisingly well and was a good replacement for classroom lectures. What differentiated the quality of the videos in their opinion as to what degree the teacher was perceived as engaged (NDUC, 2020-2, p.9). One student wrote: *"I get more motivated when the lectures are engaged"* (NDUC, 2020, p.10). Several students pointed out that teachers reading directly from a script, appeared less engaged compared to the lecturers speaking more freely.

The benefit of having the possibility to watch the (video) lectures several times was highlighted by several of the students and they also regarded the pre-recorded videos to have better pedagogical quality compared to the live online

lectures. To link Q&A sessions with the lectures from the pre-recorded videos was also highlighted by many of the students. One said: *"Video lessons with follow-up Q&A are ingenious. It gives the room for preparation and reflection and at the same time giving you time to think before you ask questions"* (NDUC, 2020-2, p.9).

Some students reported that they found it harder to be focused when watching video lectures comparing with a classroom lecture and that it was harder to focus and take notes during a live online lecture compared with a pre-recorded lecture. A few comments also focused on the challenge of replicating the "natural" flow of a discussion normally occurring in a classroom, to an online environment. Some of the PPT used in the video lectures got some critique of being too text-heavy and that some students would have liked to have even more variation of interactivity in the lectures. Some of the live lectures where the teachers spoke more freely, were by many students perceived as too long and with a pace too fast for effective learning (NDCU, 2020-2, p.11-12). Going forward some of the students suggested incorporating reflective questions into the video lectures and adding a feedback segment at the end of each video. A small number of students regarded the video lectures as a substitute for the classroom lectures until they could return to the classroom. Most of the students preferred pre-recorded video lectures over live online lectures (NDUC, 2020, p.12).

DISCUSSION

The removal of all classroom lectures and replacing them with video lectures and other digital resources in the O&W course was met with some skepticism among faculty and teachers. Primarily based on the assumption that the students would not watch the videos and be unprepared for the plenary discussions and group work. The teachers would lose control over student engagement and the level of attention they normally could observe in the classroom. In their latest Horizon report, EDUCAUSE pointed at several projects using learning analytics to monitor student retention and to keep students engaged and make sure they graduate (EDUCAUSE, 2021, p.20). Learning analytics were used for the same purpose in this project as well.

Tracking learning analytics and results from VIMEO and LMS was a good way of getting sufficient data on students' use of the digital learning resource. The learning analytics from this course shows that the fear of students not watching the videos was an unnecessary concern. Over 173 students (73%) watched one or more of the pre-recorded videos (figure 3) and the evaluation report indicated that the number was even higher because some students watch the videos together in their cohort (NDUC, 2020-2, p-4). Almost half of the students completed one or more of the pre-recorded videos (figure 4). When it comes to the recording of the live learning activities the story is different. The students needed to attend the live sessions with the result that this recording was very little used. Only 8% opened one or more of the recorded sessions and only 1% completed one or more of the same videos. This indicates that using a lot of resources on recording live sessions might not be necessary or highly beneficial for faculty and school. In addition, many students found the live lectures generally to be too long and harder to follow. This is an interesting comment given the fact that live online lectures are more like the traditional classroom lecture than the recorded ones and that 77% of the students initially stated that they preferred the traditional lecture format combined with Q&A sessions (figure 1), (NDUC, 2002-2).

Even though the pre-recorded videos varied greatly in length, this didn't seem to have a great influence on attention, motivation, or learning outcome (table 1). This contradicts earlier findings suggesting that video lectures should not be more than 15 minutes (Isaksen, 2014, p.4). Several students emphasized through the evaluation survey, that teacher's engagement in the videos, being enthusiastic about their subject and the design of the video lectures had the biggest influence on students' ability to maintain attention and motivation (NDUC, 2020-2, p.6). This was also found in the didactical survey conducted among the bachelor's and master's students in 2020 (NDUC 2020-1, p.2). Both student groups had engaged teachers as their top two factors that had a positive influence on the learning outcome. This aligns well with Rosenthal & Walker's conclusion from 2020 that online learning resources work well when they are designed well (Rosenthal, 2020, p.3).

The learning analytics also shows that all the pre-recorded videos had more total viewings than unique viewers (students) (Isaksen, 2020, p.3-10). This indicates that the students revisited the video lectures to repeat or to prepare for the exam. The benefit of having the opportunity to watch the videos again if they want to be well prepared (Isaksen, 2014, p.3, Mukthar et al, 2020, p.3 & Roncetti, 2011, p.1). The 2019 and 2020 courses in O&W had the same defined learning outcomes, same syllabus, same teacher, the same number of students, the same type of group tasks, and finally the same type of home exam. The difference in 2020 was that a large group of students was situated in another city and that all classroom activity was replaced by video resources and live learning activities using Microsoft Teams.

Table 1: Comparison of Three O&W Subjects Based on Video Length (% Students Agreeing in a Statement)

Video subject	Ok Length	Maintained attention	Maintained motivation	Met the learning outcome
Jomini (17min)	79%	62%	50%	72%
Humanitarian interventions (50min)	77%	53%	39%	79%
Laws of armed conflicts (76min).	67%	59%	51%	66%

Even though all classroom lectures from 2019 were replaced the grades from 2020 improved compared with 2019. The results from the exam show a higher number of A & B's and a reduction in C, D, and E's. In the course survey, the students highlighted group collaboration as the most important learning activity that had the most influence on helping them reaching the learning outcome (NDUC 2020-2, p.3). But interestingly the removal of the traditional classroom lectures seemed to have no negative impact on the learning outcome and grades.

Looking at how much the pre-recorded videos were used and the positive feedback they got related to attention and motivation it is fair to assume that they had a high degree of stickiness. If we also add the fact that the grades improved compared with 2019 you may argue that the students got what Robinson and Cook (2018) describe as a Velcro kind of relationship with the learning content from the pre-recorded video lectures.

Even though the use of video lectures can't claim to enforce a more student active learning method, it is another matter when they are combined with Q&A sessions with the teachers and group collaboration, where the student work with job-related problems. According to El Sadik & Al Abdulmonem (2020), the students in their flipped classroom project claimed that active learning and peer-tutoring encouraged them to do more critical thinking, reasoning, and problem-solving and thus making them more active (El Sadik, 2020, p.5). By tasking the O&W students with job-related problems they were "forced" to be more active in their learning process and tutor each other within their cohort. Freeing up time from the fixed time and place of the classroom lecture gave them more time to do just that (NDUC, 2020-2, p.11).

SUMMARY & CONCLUSION

During fall 2020, the ongoing pandemic forced the responsible teacher to replace all classroom lectures and activities in the joint O&W course with pre-recorded video lectures and online learning activities. Despite some skepticism among faculty and staff, it seems that using only digital learning resources and facilitating learning activities had no negative effect on the student's ability to reach the learning outcomes. The overall grades also improved compared with the O&W course conducted in 2019. In general, the students were more satisfied with the pre-recorded videos, compared with the live online lectures. Even though it took a lot of effort to record all live learning activities, learning analytics show that these recordings were very little used by the students. This stands in contrast with the pre-recorded video lectures that were highly used. The students regarded the video where the teacher appeared to be more engaged to be most motivating and got them engaged.

The fact that removing all classroom lectures and replacing them with online lectures and pre-recorded lectures seems to have had no negative impact on the learning outcome or grades, indicates that it is both possible and probably beneficial to replace classroom lectures with video lectures, thus making the traditional classroom lectures somewhat obsolete in the future. Using pre-recorded videos to allow students to prepare for more active and practical learning activities in the classroom frees up time for the teachers and allows them to spend more time facilitating practical learning sessions.

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