

Implementation of a “true” flipped classroom concept at the Norwegian Defense University College

Commander Geir Isaksen
Staff officer digitalization and pedagogy
Norwegian Defense University College, Oslo, Norway
gisaksen@fhs.mil.no

ABSTRACT

As a result of an extensive educational reform in the Norwegian armed forces, digital learning is introduced across the military system. Following a new defense educational strategy, one of the measures implemented at the Norwegian Defense University College (NoDUC) is Problem Based Learning (PBL) and flipped-classroom. The flipped classroom is one of the most well-known buzz words in education for the last 10 years at learning institutions all over the world. What does it really mean to implement flipped classroom as part of your educational strategy? Is putting PowerPoint presentations in the LMS together with digital copies of the syllabus enough to claim that flipped classroom is implemented? Is it really something totally new and is it only suitable for certain subjects? And how can PBL together with flipped classroom lay the ground for learning activities that results in deeper learning?

This paper gives an overview of what a flipped classroom concept combined with PBL really means, why it matters and how it is meant to be implemented as an educational strategy. Furthermore, both pros, cons, risks and common misunderstandings are discussed and compared to traditional learning methods used at NoDUC and still existing in many schools and universities around the world. At the end the new educational strategy based on flipped classroom and PBL are discussed and the paper will highlight lessons learnt from the rebuilding of a Master of Military subject, based on PBL and a flipped classroom strategy.

ABOUT THE AUTHOR

Commander (CDR) Geir Isaksen has more than fifteen 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 twenty 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). CDR Isaksen holds the position as a Staff Officer for digitalization and pedagogy at the NoDUC/Faculty administration, where he is responsible for leading and coordinating procurement, development, and implementation of digital learning projects and use of the defense LMS. 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 NoDUC and MoD funded international ADL capacity-building projects.

Implementation of a “true” Flipped classroom concept at the Norwegian Defense University College

Commander Geir Isaksen
Staff officer digitalization and pedagogy
Norwegian Defense University College, Oslo, Norway
gisaksen@fhs.mil.no

INTRODUCTION

In 2018 an extensive educational reform was implemented in the Norwegian Armed Forces (NoAF), resulting in less money and a reduced number of faculty. A large part of the foundation for these cuts was the digitalization of military education and training (Norwegian Ministry of Defense, 2016, p22.). The Norwegian Defense University College (NoDUC) is responsible for all accredited education in the armed forces and offers both bachelor degrees in various subjects and a master-degree in military studies. All education residing under NoDUC is overseen by a University College Board (UCB). The board consists of flag officers from each military branch, representatives from both faculty and students and are led by an external civilian chairman. The Commanding Officer (CO) and rector of NoDUC are responsible for overseeing all educational activity and report directly to the board on all matters regarding accredited education in the armed forces.

The bachelor programs are delivered within the army, air force, and navy through the branch academies and spans over a period of three years. For the first time in the history of Norwegian military education, the first semester in the bachelor programs is joint and co-located. During fall 2018, 196 students completed the first four modules together at the Military Academy in Oslo before they were sent to their weapons branches to continue their bachelor programs. The Master program in Military Studies (MoMS) runs over 2 years at the NoDUC in Oslo. All education at NoDUC is administrated and conducted through the unclassified defense Learning Management System (LMS) ItsLearning. In military education it is vital that applied theory addresses practical experiences from the operational theater. The overall goal is to build the capability/capacity of the warfighters by developing their ability of critical thinking and solving complex problems (Norwegian Defense University College, 2019, p8-9.).

CURRENT EDUCATIONAL MODEL AT NoDUC

Since the approval in 2005 NoDUC has delivered an accredited MoMS. All accredited education in Norway is approved through NOKUT (the Norwegian Agency for Quality Assurance in Education) as the independent expert body under the Ministry of Education and Research and follows the rules and definitions from the European Qualification Framework (EQF). Through the National Qualification Framework (NQR), these rules and definitions lay the ground for how universities develop and describe the different levels of accredited educations, qualifications and learning outcomes (Department of Education, 2011). For each of the MoMS subjects, a course coordinator (CC) are appointed. The CC is responsible for developing the course by identifying recommended syllabus, designing the curricula, choosing a pedagogical strategy- and building the course in the LMS. At the same time, the CC must ensure that all learning activities and learning content are relevant and cover the Learning Outcome Descriptions (LOD).

The first year of the MoMS program is a full-time residential course at the Akershus Fortress in Oslo. In general, the most common educational strategy in the MoMS is classroom-based lectures combined with pre-defined syllabus delivered online, some group activities, teacher guidance and in some cases formative assessment in the form of essays. All subjects conclude with a final written and/or oral exam. Normally about 30% of the time are used for classroom-based lectures and about 45% is reserved for self-studies (Bandits-Johansen, 2018 and Oma, 2019.).

A large portion of the time is set aside for self-study and this is meant to be used to read and process the syllabus. All subjects in the MoMS have pre-defined syllabus based on books, articles and research papers. Each classroom lecture is connected to a specific part of the syllabus and the student is expected to prepare for class by reading and processing the required material. Whether the students prepare well enough and read the syllabus is one of the biggest concerns for teachers and is one of the barriers towards online lectures. Teachers often feel that they must repeat information

from the syllabus and online resources in their lecture because they are unsure how well prepared the students are (Isaksen and Hole, 2018, p9.). At the same time, several students report through the course evaluations that reading the syllabus or watching video lectures often feels redundant because the teacher repeats or covers the same information in the lecture and therefore they often skip reading the material (NoDUC, 2018, p3.). In practice we have our selves a catch 22 situation where the teacher repeats information in their lecture because they think that the students do not prepare, and the students do not complete the predefined tasks because the teacher will cover the information in their lecture. Even though more and more of the teachers responsible for subjects included in the MoMS start to move some of their learning activities online, reading the syllabus combined with classroom-based lectures and some face to face group activities is still the dominating learning method at NoDUC.

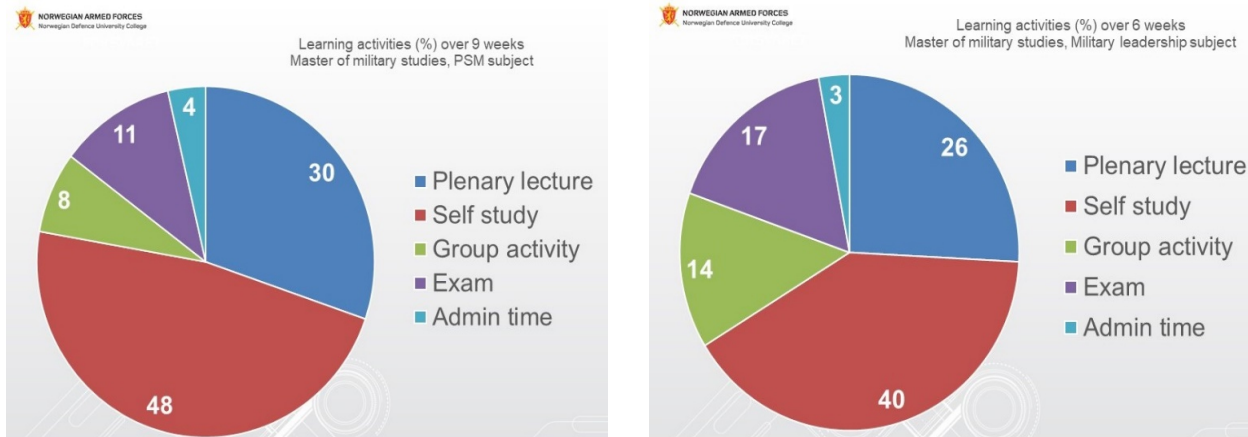


Figure 1: Example of the distribution between learning activities (%) in two Master of military studies subjects in 2019

FLIPPED CLASSROOM IN CONCEPT

The flipped classroom has been a buzz word for years and a lot of studies have been done on this topic. In their literature review from 2018, Akçayır & Akçayır found that the first study on the flipped classroom was published in 2000, but that most studies done on this subject were published between 2015 and 2016 (79%). Eighty percent of the studies focused on higher education (Akçayır & Akçayır, 2018, p 337.). The reason for this “late” bloom of flipped classroom studies is linked to increased access to computer technology and the internet among colleges and universities across the world. The widely acknowledged publication the Horizon Report first mentions the flipped classroom concept in one of their 2012 reports (NMC, 2012, p9.).

As a general principle, a flipped-classroom approach means that activities that are normally done in a classroom and what is normally done as homework outside the campus are switched or flipped (O’Flaherty & Phillips, 2015, p62., Pardo et al, 2018, p1. and Basal, 2015, p2.). Rather than attend classroom lectures and then work with tasks at home, it is turned around to make sure that students, prior to turning up on campus, have prepared by watching lectures online, taken e-learning courses and read syllabus literature. Then when meeting face to face the students can actively extend their knowledge through group work, discussions, practical exercises and/or guidance from peers or teachers (Gilboy et al, 2015, p110.).

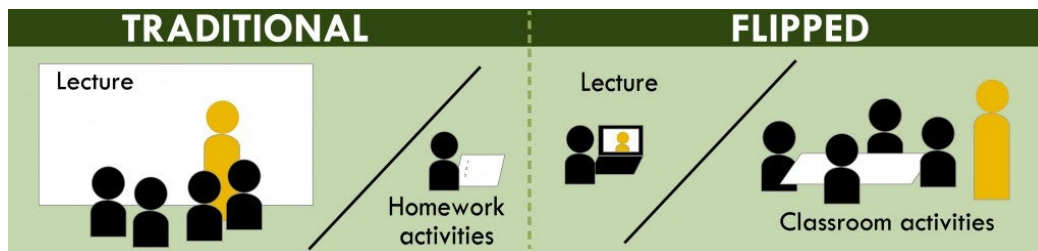


Figure 2: Flipping the Classroom (University of Washington, 2019)

According to the University of Washington: “The main goal in flipping a class is to cultivate deeper, richer learning experiences for students when the instructor is present to coach and guide them” (University of Washington, 2019,

p1.). Research indicates that in the flipped classroom model teachers facilitate the learning process instead of merely delivering information, while the students become responsible for their own learning process and through that process the students get involved more actively in the learning process and therefore have a greater chance to perform higher-order thinking activities (Akçayır & Akçayır, 2018, p334.).

The four highest-ranked advantages related to using the flipped classroom model found by Akçayır and Akçayır (2018, p338.) was the improvement in learner performance, satisfaction, engagement, and flexibility. More than half of the studies they found with results from courses using the flipped model, showed improvement in the learning performance of students when measured by Grade Point Averages (GPAs), standardized test scores, and course grades. A key factor when it comes to learner satisfaction and engagement was found to be the quality of digital tools and material, in particular video lectures. A special focus on video lectures of good learning quality and shorter length to match students' attention span and thereby ensuring more engagement is often highlighted as a key factor (Basal, p31, 2015.). This coincides with previous findings and recommendations from the NoDUC ADL office, who found that the most suitable length for a video learning resource was 5-10 minutes (Isaksen, 2017, p11.).

A major element of the flipped classroom is learning content delivered online, that the students can access anytime and anywhere. In addition, they can utilize these resources at their own pace and watch them as many times as they want. This gives much-appreciated flexibility which is highly regarded, especially by overscheduled adult learners (Kara et al, 2019, p6.). Flexibility is reported to be the main reason students and instructors are satisfied with the flipped classroom model (Akçayır and Akçayır, 2018, p339.). Some of the same benefits were found in more detail by Basal (2015) who in his study completed at a foreign language school emphasized that a flipped classroom teaching method can:

- free up time for other activities,
- give opportunities for personalized learning,
- lay the ground for more student-centered learning,
- facilitate the continuous connection between student and teacher,
- increase the motivation of students,
- provide a learning environment full of familiar tools, and
- add variety in lecture content attuned to different learning styles. (p33.).

Challenges with the flipped classroom

The top three challenges found by Akçayır and Akçayır (2018) in their research review was that a limited number of students prepared well enough before they met in class, lesser video quality and that a flipped-classroom approach is perceived to be more time consuming both from a student and teachers' perspective. One achilleas heal of the flipped classroom is unprepared students. If students do not take enough time to study at home prior to the campus activities, it potentially can diminish the learning outcome and reduce the advantages of using the flipped classroom model. Similar concerns were found by Isaksen & Hole (2018) through interviews with teachers at the NoDUC, where some responders raised the issue that one of their major concerns related to teaching and choosing active teaching methods when the students do not prepare, resulting in less effect of using learning activities that require a higher level of pre-knowledge (Isaksen & Hole, 2018, p9). The same challenge is highlighted by other studies (Basal, 2015, p4., Murphy et al, 2018, p1.; Pardo et al, 2018, p12.).

In a research project conducted by Dr. Ahmet Basal between 2012-2013, a flipped classroom model was applied in several Advanced Reading and Writing I and II courses. Some problems found after the first phase were eliminated in the second phase by implementing suitable measures. The challenge was:

- Some students came to class without watching pre-designated video lectures.
 - Solution1: Secret words were used in different segments of the videos, and students were asked to provide these words in class.
- Students complained about the late delivery of video lectures.
 - Solution2: Videos were posted via LMS at least four days before class.
- Students complained about the length of the videos.
 - Solution3: Videos were limited to 15 minutes. (Basal, 2015, p31.).

This is a good example on how to overcome some of the well-known challenges with a flipped classroom model.

PROBLEM-BASED TEACHING METHOD

To help students construct and reconstruct knowledge it is important to engage them using active learning methods. One of those methods is Problem Based Learning (PBL), often considered as a vital part of a flipped-classroom approach (Gilboy, 2015, p109; Bishop and Verleger, 2013, p4). Generally, the PBL method is considered to enable students to:

1. develop flexible knowledge,
2. develop effective problem-solving skills,
3. increase their self-directed learning skills,
4. evolve more effective collaboration skills, and
5. increase their intrinsic motivation for the learning process.

There are six characteristics of using PBL. The PBL method is student-centered, learning occurs in small groups, teachers are no longer only a provider of information but a facilitator of learning activities, it helps students to organize and thus stimulate learning, it serves as a vehicle for gaining better problem-solving skills and it lays the ground so that new information is obtained through self-directed learning (Car et al, 2019, p2., Bishop, 2013, p9.). PBL is an ongoing process and normally consisting of three phases: a problem-presentation and analysis phase, a self-directed learning phase, and a synthesis and reporting phase. In their study from 2019, Car et al (2019) found that in most cases where technology was used in combination with PBL, digital tools were used to provide context and present the problem. They also found that *“fully digitally delivered, distance-based DPBL may lead to better knowledge scores in comparison to traditional PBL”* (Car et al, 2019, p8).

NEW EDUCATIONAL MODEL AT NoDUC

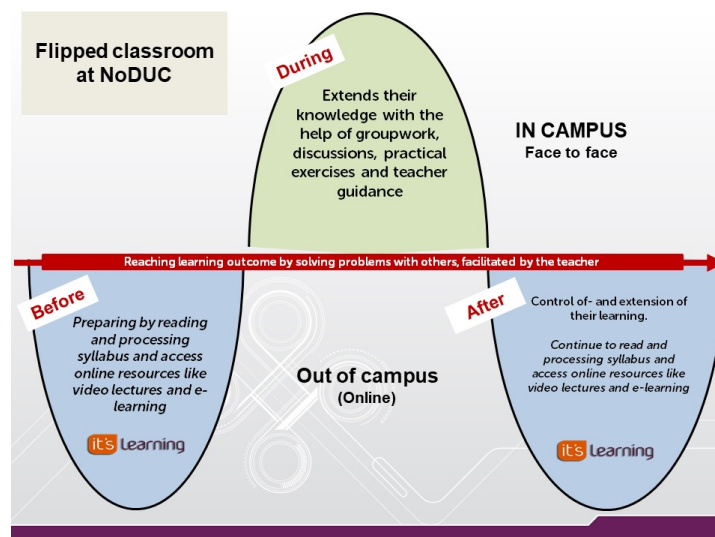


Figure 3 NoDUC Flipped classroom model 2019.

In May 2019, the NoDUC university board sanctioned the NoDUC educational strategy 2019-2022 and it states that:

“The learning vision of NoDUC is based on the fact that learning takes place through the student's own activity and not through the transfer of knowledge from a professional to a passively listening receiver. The goal is that the students themselves actively acquire relevant knowledge. It is therefore important that all practice, guidance, teaching, and education, regardless of level and accreditation, are based on a student-active and problem-solving approach, while also stimulating interaction” (Norwegian Defense University College, 2019, p7.).

Furthermore, the educational strategy points to the fact that days filled with classroom lectures, without enough time for reading and processing the specified syllabus with subsequent reflection, may lead to good listeners but do not provide professional maturation. For the learning vision to be realized, the pedagogy at NoDUC must be up-to-date, active, exploratory and problem-oriented, and aimed at specific issues in the military profession. Students must be challenged through specified requirements to be well prepared prior to face to face meetings or group learning activities. It is vital that the teachers are clear about which requirements are mandatory before the students show up in the classroom. The expectations of the students are that they understand the responsibility that is incumbent on them to actively and independently acquire the knowledge, skills, and attitudes at the level for which they are qualified and that they actively participate in developing their military profession from day one (Norwegian Defense University College, 2019, p8-9).

The intentions, orders, and goals from the educational strategy, demanding more student activity, ensuring better-prepared students and a more problem-solving approach lay the ground for implementation of the flipped classroom method and PBL. Based on the three phases of PBL, the students get access to the syllabus, video lectures, and other online resources before they meet on campus for active learning activities that will extend their knowledge through group discussion, collaboration, practical exercises, and teacher guidance. The time after the campus activities is used to enhance the learning by continuing the work with the syllabus and revisiting online resources. In addition, it is a goal to facilitate student collaboration online, enabling methods such as peer to peer review, video meetings and co-writing (Figure 3).

REBUILDING THE MASTER PROGRAM SUBJECT: MILITARY LEADERSHIP

One of the subjects in the MoMS program is the 6 weeks long course in Military Leadership (ML) that gives 10 credit points. Traditionally one week has been set aside for the exam and the rest of the time is used for a combination of classroom lectures (26%), individual reading and analysis of syllabus (40%) and group activity (14%) see Figure 1. This course has between 45 and 55 students, from all branches, both civilian and military personnel and includes a few foreign students. Following the regulations from NOKUT, the ML subject has a set of predefined learning outcome descriptions (LOD), divided in knowledge, skills and responsibility and autonomy categories as shown in Table 1 (NoDUC, 2019). The next time this module will be delivered is in December 2019.

<p>Table 1 Learning outcome description from the Military leadership module</p> <p>Knowledge. After this module the student can:</p> <ul style="list-style-type: none"> analyze the leadership and management concepts of the NoAF, as well as the defense sector’s managerial organization and forms of leadership. discuss leadership as a phenomenon, specifically in relation to military leadership and management. discuss prominent dilemmas and challenges related to the leadership and management of, and within, the NoAF discusses the importance of good leadership and the ability to follow orders within a military context, particularly at the level of middle management. explain the research, trends, and developments with consequences for military leadership and management.
<p>Skills. After this module the student can:</p> <ul style="list-style-type: none"> critically analyze issues related to effective leadership (leadership and management) within the defense sector from an individual and organizational perspective critically reflect on his/her own and others' leadership platform and behavior, with the intent of contributing to improved leadership and management at a higher level within the Norwegian Armed Forces. critically assess the relevance and effects of the Norwegian Armed Forces’ managerial and leadership concepts and approaches.
<p>Responsibility & autonomy. After this module the student can:</p> <ul style="list-style-type: none"> apply theoretical knowledge, in combination with leadership experiences, to developmental and analytical tasks. apply theoretical knowledge and experience in order to improve as well as develop good leadership processes at the middle and higher levels of the Norwegian Armed Forces.

Reduced resources, time available and the new demands in the NoDUC educational strategy, initiated rebuilding of the ML module. This was led by the professor given the CC responsibility, in cooperation with NoDUC faculty. This was conducted during the Spring of 2019 through meetings and workshops at the fortress in Oslo.

Existing course schedule and traditional pedagogical design

To meet the requirements in the new educational strategy of a more problem-oriented approach, more time for learning activities that contribute to more student activity and in the end results in deeper learning, the pedagogical design needed to be changed.

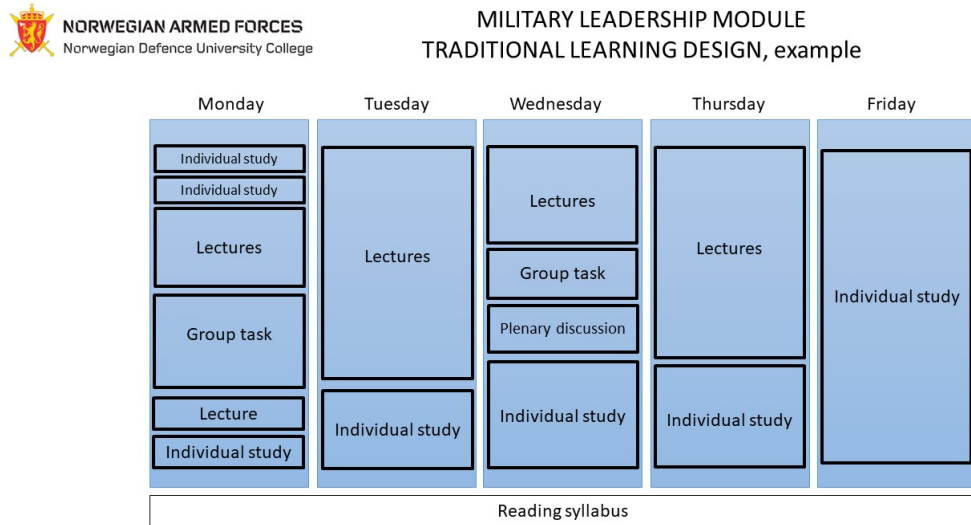


Figure 4: Example of existing learning design in the ML module. Week 1 of 6.

The ML module was last conducted in November/December 2018 and as shown in Figure 4 approximately one-third of the learning activities was classroom lectures. Thirty-one different subject matter experts gave in total 60 hours of classroom lectures on various subjects such as “Selection of leaders in the armed forces”, “Strategic competence management” and “Law as the framework factor for effective leadership in the Armed Forces” (Bandits-Johansen, 2018). Approximately 40% of the time in the course is reserved for individual studies (Figure 1). The complete module was laid out in a course schedule published in the LMS and the syllabus was about 700 pages of reading material.

In order to free up time to do more student active learning activities, the number of classroom-based lectures has to be reduced and the teachers must change from an information deliverer to facilitators of the learning process. This falls in line with a student centric learning (SCL) view and previous finding indicates that students attending courses using flipped classroom more often reported that teachers consistently encouraged student activity and learning compared to traditional classroom-based learning (Gilboy, 2015, p109.).

Traditionally SCL is defined as an approach that incorporates active learning experiences, self-paced and cooperative methods tailored to individual needs. SCL are commonly connected to terms like ‘active’ and ‘collaborative’ learning and emphasizes the importance of students’ involvement in their own learning process (Muianga et al, 2018, p47 & Baeten et al, 2010, p247.).

Replacing classroom lectures with digital resources

To be able to free up more time for problem-solving and student activity, the number of classroom-lectures must be reduced and replaced with online learning resources. It is not realistic to replace all 60 hours of instruction before the next time the module is conducted, however NoDUC faculty started the work with the teachers and professors in April 2019 to convert as many as possible. The focus was and is on two types of video lectures: (1) PowerPoint-based studio recording that aggregates the PowerPoint slides with a recording of the lecturer and (2) Power point-based PC recordings where the subject matter expert records his/her lecture using their own computer. A project conducted at NoDUC in 2017 showed that SME’s converting a classroom lecture to a video lecture, in general, reduces a 45 min classroom lecture to a 20-minute video lecture (Isaksen, 2017, p8.). Twenty minutes is over the recommended length of a learning video (Katura, 2015, p19 & Stech, 2013, p56.), therefore it is essential to divide the learning video resources into chunks of maximum 10 minutes. The SME’s are requested, based on the defined LODs, to develop a

well-formed PowerPoint presentation, accompanied by a well-timed script. NoDUC faculty offers pedagogical support and recommendations on how to develop a Power Point optimized for delivery of information to the learners. Produced videos are published in the LMS and connected to the current problem and LOD. It serves as a learning resource with a similar purpose as the syllabus and other digital learning resources.

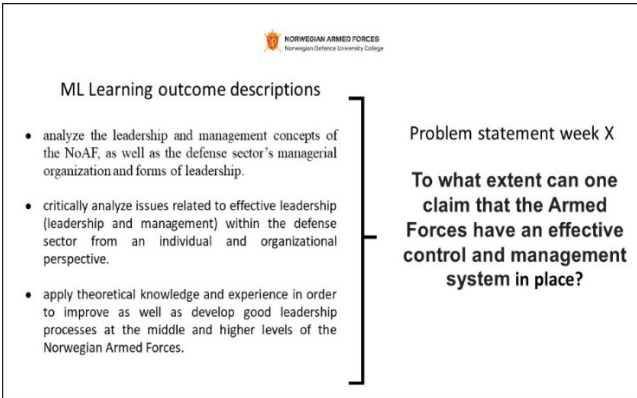


Figure 5: Conversion of LOD into a problem statement

Converting learning outcome descriptions to problem statements

An essential part of a new problem-oriented learning strategy is to convert the LOD's into relevant problem statements that together covers all LODs. This process was demanding and challenging both for the Subject Matter Experts (SME) and faculty. Good problem statements have the parameters of the problem specified in the problem statement and directs the learner to relevant information and research. It was also a goal that these problems should be suitable to solve in small groups and possible to answer during the oral exam. The aim was to develop five (5) different problem statements, one for every week of the course

(the sixth week is still used for the exam) that together covered all 10 LOD's. For some of the weeks, it is still under consideration to let the students themselves define a problem statement. Figure 5 gives an example of a problem statement composed of several LODs.

Tracking students' activities and learning results

As previously discussed in this paper, one major concern in connection with a flipped classroom model is unprepared students. To lay the ground for deeper learning activities the student must prepare well before showing up in class for group activities. To ensure that the students prepare well enough the following measures are planned:

- Tracking of student's usage of the online material in LMS.
- Assigning pre-tasks, in the form of the designated syllabus to read and analyze.
- Develop formative assessment resources that cover an especially significant part of the syllabus; and
- Use of reflection questions or significant words/phrases in the videos that will be highlighted and used in the face to face training.

The planner functionality in the LMS will be used to connect learning resources (for example syllabus and video lectures) and learning activities (for example learning path, assessments and peer to peer review) to the problem statements and LOD s. All administration, tasks and submissions will be managed through LMS.

New pedagogical design and learning model

The new pedagogical model applied on the ML subject will follow the basic phases of the flipped classroom model. The phases are (1) **Before**, (2) **During** and (3) **After** active face to face learning activities. The establishment of pre-defined student groups will be set up prior to the first phase in the LMS. The students will be divided into 6 groups of 8-9 students. Each group will have members from each weapons branch, both civilian and military personnel. Before attending face to face learning activities on campus, the students will be requested to prepare themselves by reading and processing the syllabus and accessing online resources. Also included in the "before" phase is the presentation of the "problem" predefined by the teacher. Some lectures are challenging to convert to an online lecture due to limited access to external SMEs or the fact that they are classified. For that reason, time is reserved for some traditional classroom lectures in the first phase. At the end of the **Before**-phase, a task for the week is laid out for the students. The task aims at answering the problem highlighted for that week. To ensure that the students come well prepared to the next phase, formative assessment targeting information from key online lectures and syllabus will be conducted through the LMS. This will hopefully ensure better-prepared students and make the teachers more confident that the students have prepared adequately.

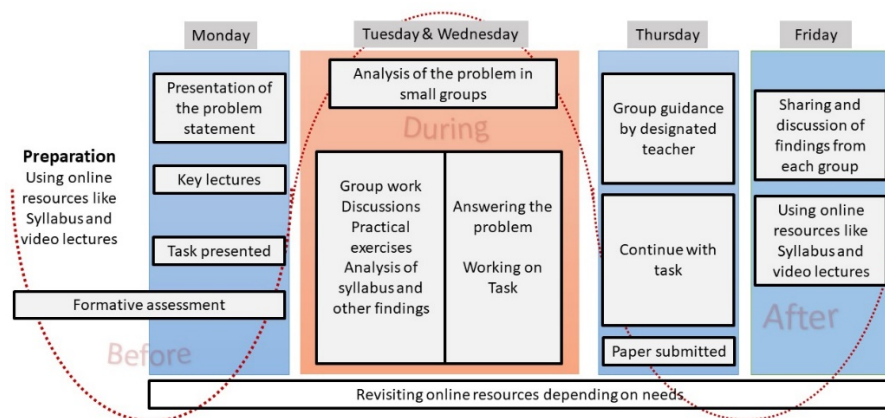


Figure 6: New pedagogical model in the ML module. example of a week

In the **During**-phase, the learning activities will be facilitated around the established groups and each group will be assigned an SME supervisor. The groups of students will cooperate during learning activities, to analyze the syllabus, engaging in discussions and solving the problem-oriented task. The online resource will always be available online to revisit. The last part of the week will be used for the **After**-phase where the groups will get the chance to get feedback and guidance from a teacher before they submit the task through the LMS. The last day of the week is going to be used to share and process the group's findings and prepare for the following week.

Not every week is planned to be the same. Sometimes there might be more classroom lectures than other weeks and sometimes the tasks will be different. However, the overall methodology is a problem-oriented one, with a flipped-classroom approach. A key point will be that teachers make sure they do not cover material in the lecture, previously covered in the syllabus, but uses their lecture, either online or in the classroom and the campus-based learning activities to build upon it and enhance the information already given in the **Before**-phase and thus contributing to deeper learning.

SUMMATIVE ASSESSMENT

For this subject, an oral exam is planned. Each student will get to select one of 5 topics each based on one of the weekly problem statements used in the course. This will ensure that the exam covers what has been taught and is aligned with the LODs. Knowing this the students will have a better chance to prepare themselves for the exam using all the material they have used and developed during the course. Irrespective of the students working in groups through the course, an individual exam will document the learning outcome for each of the students.

EVALUATION OF THE PEDAGOGICAL MODEL

After the completion of the next ML module, an evaluation covering all aspects of the new pedagogical model will be conducted and compared to experiences and data from teachers and students and be compared to the evaluation results from 2018. As an example, the evaluation report from 2018 showed that 90% of the students never used the video resources available and that most of the students spent 4-8 hours studying outside the scheduled learning activities (figure 7). Some of the research questions will, based on earlier evaluation results, aim at answering:

1. If the implementation of PBL methods secured deeper learning compared to previous years?
2. If the flipped classroom approach released more time for face to face learning activities?
3. If the implementation of flipped classroom and PBL is more time consuming for teachers and students?
4. If the use of requirements, assessment and tracking helped to ensure better-prepared students? and
5. What was the experienced pros and cons with the new pedagogical method for teachers and students.

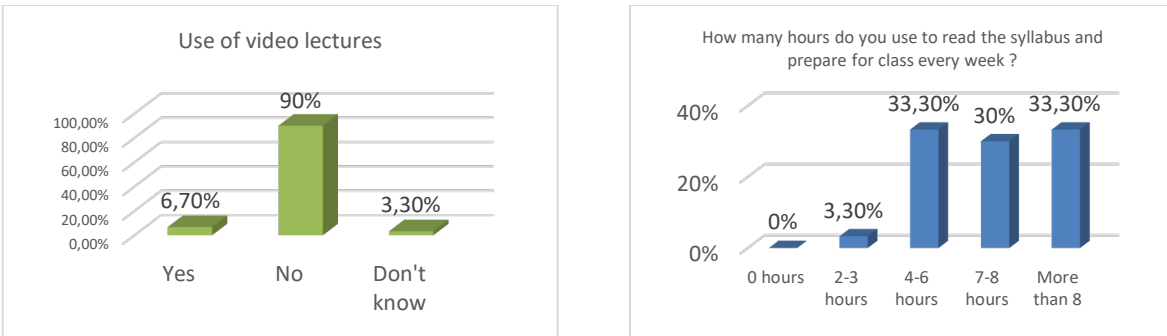


Figure 7: Selection of evaluation results from the ML subject 2018 (NoDUC, 2018, p1.).

SUMMARY

To convert learning theories, models and pedagogical concepts into the practice field of education is always challenging. The implementation of the educational reform in 2018, that depended on digitalization of education and training, initiated an overdue need to look at NoDUC educational strategy. The traditional educational method will no longer serve its purpose. A more modern approach that ensures student activity and deeper learning means that the students need to be more involved in their own learning process and not remain as passive spectators to the courses they attend. It is a clearly stated goal that:

It is crucial that planned lectures, group work, and seminars are builds upon the knowledge the students have gained through initial self-work and that projects, seminars, group work, and guidance are problem-oriented, and that the connection between the activities and the specific learning outcomes is clear to the students (Norwegian Defense University College, 2019, p8.).

This points in the direction of a problem-based methodology, more active learning methods, enhancement of the use of digital resources and documentation of learner's progress and results. The need to gain more experiences from implementing PBL in higher military education sparked the restructuring of the ML subject. Due to the willingness of the course coordinator (responsible SME) a new pedagogical method has been developed during the first part of 2019 implementing elements of PBL and flipped classroom.

The time leading up to the implementation of the "new" ML module in December 2019, will be used to support the SMEs in the effort to produce as many online lectures as practicable. Furthermore, the faculty will support restructuring of the course in the LMS, ensuring that learning activities and learning resources are connected to the relevant LOD's. The planned functionality in the LMS will be used to connect online resources to the relevant problem statement. It will be paramount to make sure that information given online is not duplicated in the face to face activities, but that the time in campus is used for active learning methods that enhances the knowledge previously obtained in the **Before**-phase.

As discussed, in last year's paper about how to get teachers online: how courses are conducted at NoDUC is up to the CC (responsible teacher) who under the tradition of academic freedom decides themselves on which pedagogical method they will apply on their course. Higher military education has in general been conducted in the same way for the last fifty years, leaning heavily on classroom lectures and working with an extensive syllabus (Isaksen, 2018, p10.). A change in the role of the teacher from a deliverer of information to a facilitator of learning activities will be something completely new for most of them. Implementing PBL, the flipped classroom and increase the use of technology will certainly disrupt the existing tradition of education and training at the NoDUC and create the need for new knowledge and skills not only for the teachers but also for the whole organization.

The plan is to use the findings and results from this project as a basis for a practical course on how to implement PBL and the flipped classroom model across NoDUC for all higher education, including in all the bachelor programs. The aim of implementing PBL, is to enhance the warfighter through fulfilling the overall goal of enabling the Norwegian officer's capability to independently analyze and solve military-related (both practical and theoretical) problems in the context of military history, traditions, distinctiveness and the armed forces place in society (NoDUC, 2019, p1.).

REFERENCES

- Akçayır, G., & Akçayır, M. (2018). The flipped classroom: A review of its advantages and challenges. *Computers & Education*, 126, 334-345.
- Baeten, M., Kyndt, E., Struyven, K., & Dochy, F. (2010). Using student-centred learning environments to stimulate deep approaches to learning: Factors encouraging or discouraging their effectiveness. *Educational Research Review*, 5(3), 243-260.
- Bandits-Johansen, R (2018). Pamphlet and time schedule for the subject Military leadership, 2018. Retrieved April 25th, 2019 from NoDUC Learning Management System, <https://forsvaret.itslearning.com/>.
- Basal, A. (2015). The implementation of a flipped classroom in foreign language teaching. *Turkish Online Journal of Distance Education*, 16(4), 28-37.
- Bishop, J. L., & Verleger, M. A. (2013, June). The flipped classroom: A survey of the research. In ASEE national conference proceedings, Atlanta, GA (Vol. 30, No. 9, pp. 1-18).
- Car, L. T., Kyaw, B. M., Dunleavy, G., Smart, N. A., Semwal, M., Rotgans, J. I., ... & Campbell, J. (2019). Digital problem-based learning in health professions: Systematic review and meta-analysis by the Digital Health Education Collaboration. *Journal of Medical Internet Research*, 21(2), e12945.
- Department of Education (2011). Nasjonalt kvalifikasjonsrammeverk for livslang læring (NKR). Published by the Department of Education on December 15th, 2011.
- Gilboy, M. B., Heinerichs, S., & Pazzaglia, G. (2015). Enhancing student engagement using the flipped classroom. *Journal of nutrition education and behavior*, 47(1), 109-114.
- Hoffman, E. S. (2014). Beyond the Flipped Classroom: Redesigning a Research Methods Course for [superscript3] Instruction. *Contemporary Issues in Education Research*, 7(1), 51-62.
- Isaksen, G. (2017). How Video Lectures Can Free Up Time for Other Learning Activities. Published in the IITSEC proceeding 2017.
- Isaksen, G., & Hole, S. F. (2018). Hey, This Is What Your Teacher Needs to Start With Online Lectures. Published in the IITSEC proceedings 2018.
- 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.
- Kara, M., Erdoğan, F., Kokoç, M., & Cagiltay, K. (2019). Challenges Faced by Adult Learners in Online Distance Education: A Literature Review. *Open Praxis*, 11(1), 5-22.
- Muianga, X., Klomsri, T., Tedre, M., & Mutimucuo, I. (2018). From Teacher-Oriented to Student-Centred Learning: Developing an ICT-Supported Learning Approach at the Eduardo Mondlane University, Mozambique. *Turkish Online Journal of Educational Technology-TOJET*, 17(2), 46-54.
- Murphy, N., Jones, G., & Strong, C. (2018). Democratizing NP Student Education: Promoting Student and Faculty Participation in Flipped Learning.
- NMC. (2012): Horizon Report > 2012 K-12 Edition. Retrieved on April 11th from https://id.iste.org/docs/documents/2012-horizon-report_k12.pdf
- NoDUC. (2018). Course evaluation aggregated on subject level, Master of Military studies 2018.

NoDUC. (2019). Education at Norwegian Defense University College, curricula and course descriptions. Retrieved from <https://utdanning.forsvaret.no/nb/studieplaner/2018/Master%20i%20milit%C3%A6re%20studier> , in February 2019.

Norwegian Defense University College. (2019). NoDUC educational strategy 2019-2022. Approved May 27th, 2019.

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>.

O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *The internet and higher education*, 25, 85-95.

Oma, I.M., & Larsdotter, K. (2019). Teaching plan for the subject Politics, Strategy and Military force. Retrieved April 25th, 2019 from NoDUC Learning Management System, <https://forsvaret.itslearning.com/>.

Pardo, A., Gašević, D., Jovanovic, J. M., Dawson, S., & Mirriahi, N. (2018). Exploring Student Interactions with Preparation Activities in a Flipped Classroom Experience. *IEEE Transactions on Learning Technologies*.

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.*

University of Washington (2019). Flipping the classroom. Published by the Center for Teaching and Learning. Retrieved from <https://www.washington.edu/> April 29th, 2019.