



**PEDAGOGICAL USE OF CANVAS**  
**Report on the use of Canvas in pilot courses**  
**at the Faculty of Educational Sciences**

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## Preface

In the autumn of 2017 University of Oslo has taken the formal decision to adopt and implement the Canvas Learning and Management System (LMS) as the sole system to be used in teaching and learning activities at this university. The university organized a pilot period involving 110 courses in the spring semester of 2018 and will implement the Canvas LMS university-wide from the fall semester of 2018. The Faculty of Educational Sciences participated in this piloting effort with 9 pilot courses, with teachers or teacher teams volunteering to try out and design their courses in Canvas.

The choice for implementing a new LMS at UiO is motivated by a need to provide teachers and students with better technological support for tailored learning designs, and with opportunities for better interactivity and connectivity course activities. With higher education now moving away from its traditional emphasis on the teacher towards a focus on learning and the learner – following principles of learning in more student-centered environments, many teacher and institutions are also attempting to move away from a standard form of the course and experiment with a variety of course models and activities. At the same time, traditionally, LMS designs have been both course- and teacher-centric. These new developments challenge the notion of LMS' whose design may be informed by one-size-fits-all assumptions about teaching and learning, and can bring about new opportunities.

This report presents examples of what could be coined 'pedagogical use' of Canvas. It argues that being mindful of LMS features and intended affordances, and the possibilities to combine these according to a thought-through pedagogical rationale, offers potential to make a difference in how students and teachers experience the system as supporting teaching and learning. Pedagogical use denotes generically how teachers envision and employ a course design that makes optimal use of available LMS functionalities in order to plan, guide, support, and enhance students' learning activities, besides using it for administrative purposes.

The report is intended to provide the leadership an insight into the preliminary use of the Canvas LMS at the Faculty of Educational Sciences in the pilot courses during the spring semester of 2018. The ultimate aim is to provide input to the implementation efforts and future pedagogical design of courses that will deploy Canvas starting with the fall semester of 2018. The report first discusses perspectives to pedagogical design with an eye on underlying epistemologies for teaching and learning and premises for design of LMS/learning technologies. It then presents a set of examples of how the pilot courses at the Faculty of Educational Sciences have used Canvas, and highlights examples of good-practice as potential sources of inspiration for future use.

We thank all the course teachers and other staff for their cooperation during the preparation of this report!

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## 1. LMS use in higher education

Learning management systems (LMS) have become a remarkable phenomenon in higher education and have seen unprecedented adoption rates. A recent survey of higher education institutions in the United States showed that 85% of faculty use an LMS, and 74% say it is a useful tool to enhance teaching. Among students, 83% use an LMS (Brown, Dehoney, & Millichap, 2015).

An LMS can be defined as “a self-contained webpage with embedded instructional tools that permit faculty to organize academic content and engage students in their learning” (Gautreau, 2011, p.2). They are intended to offer multiple teaching and learning tools, as well as a virtual mode of communication among students and teachers, and increase the speed and effectiveness of educational processes. In higher education, LMSs appear to have been successful at enabling the administration and management of teaching and learning activities but perhaps less successful in enabling learning itself. Tools such as the grade book and mechanisms for distributing materials (e.g., syllabus) are invaluable for the management of a course, but these resources contribute, at best, only indirectly to learning success. Research has focused predominantly on types of adoption and uses by teachers and students, with some studies (i.e., Dahlstrom, Books & Bichsel, 2014; Hustad & Arntzen, 2013; Jaschik & Lederman, 2014; Wilcox, Thall, & Griffin, 2016) touching upon how teachers and students experiences an LMS’ support of teaching and learning activities:

- Faculty and students value an LMS as an enhancement to their teaching and learning experiences, but relatively few use the advanced features and even fewer use it to its fullest capacity;
- Most teachers report using a limited number of LMS features and mostly use LMSs as supplements to their lectures, while the synchronous functionalities of LMSs (i.e., chat, online discussions) are seldom used;
- Although students’ general digital literacy may be well-developed, their skills and experiences do not necessarily transfer to institutionally-specific technology services and applications such as an LMS;
- There are distinct differences in the way each group uses the technology: teachers design their courses for delivery on laptops, but students typically use smartphones for LMS access;
- User satisfaction is highest for basic LMS features and lowest for features designed to foster collaboration and engagement;
- There is a clear indication that support for various types of learning tasks is valued;
- Students and teachers prefer LMSs to have enhanced features, be personalized, and use analytics to enhance learning outcomes.

These studies identify a number of aspects that seem important, especially in relation to the teachers’ (self-perceived) use and acceptance of LMSs. One aspect related to the design of the LMS itself is *usability*, characterized by accessibility, interface, navigation and interaction potential. The teachers’ *self-efficacy and attitudes* regarding technology is another. Knowledge and digital skills, the amount of additional time required to set up and facilitate courses on an LMS, having a lack of faith in technology, and having concerns about student access, among others, are viewed as important in this context. Most of the teachers emphasize that they would be motivated to learn and use an LMS more if they knew for certain that there is clear evidence of the positive impact of such technology on student learning (Fathema, Shanon & Ross, 2015).

Only a few studies have focused specifically on the effects an LMS has on students’ learning and academic achievement, and almost none examined Canvas. An Australian survey study indicated that while teachers’ responses are more focused on the technical and administrative aspects of using an LMS, student opinions appear to reflect more on the use of the technology by teaching staff; students who have experienced a well-designed unit rich with resources, timely feedback, and good interaction with staff reported a positive experience with the technology (Weaver, Spratt & Nair, 2008). Focusing on the

students' self-perceived strategic work in an LMS, Broadbent and Poon (2015) found some significant positive correlations between self-regulated learning strategies of time management, metacognition, effort regulation, and academic success, while critical thinking, organisation, and elaboration seemed to be least supported within the LMS.

Some studies (e.g., Damian, 2012; Snodin, 2013) on the use of virtual learning environments (VLE) show that students who commonly use 'resource' functionalities and engage with discussion forums often react negatively to the lack of alternate media in the presentation of resources uploaded to the VLE. With the appropriate structure provided, students work autonomously with the resources, adopt new learning roles, and are more aware of their learning goals. Generally, these studies also indicate that VLEs have capacity to more effectively encourage students to engage, if employed at their full potential.

This brief overview of findings points quite unilaterally towards the standpoint that an efficient and meaningful use of an LMS for teaching and learning is to a large extent dependent on pedagogical intentions and the way these are concretized in course designs. What this report terms as 'pedagogical use' of the LMS is of considerable importance, especially when the aim is to bolster students' learning beyond simply providing support for study management and administration.

## 2. Principles underlying the pedagogical use of LMS

Every LMS design is informed by premises that reflect ideas about the status and role of technology/LMS in the teaching and learning processes (i.e., what technology can do and what it means in relation to these processes). Depending on the theoretical perspective taken as the point of departure, technology can be perceived *as a tool* that simply helps (mediates) performing of a teaching/learning activity as planned, or it can be seen as constitutive to the processes it is used in, such as *structuring resource*. Specifically, activities and processes take place differently when digital tools are involved than when they are not (see Säljö, 2010).

These premises are translated in various ways into pedagogical course design. From the perspective of learning technology design, most LMSs are designed from an instrumental perspective of technology being a (mediating) tool. The pedagogical premises are translated generically into *types of support* for working with knowledge, social interaction, evaluation and reflection, and organizing these processes. This support is concretized into *affordances* (i.e., what the LMS and its functionalities enable or make possible for particular activities). According to Goodyear and Retalis (2010) LMSs or similar online learning technology generally provide affordances for the following: a) accessing and working with study materials; b) communicating and collaborating; c) knowledge production; d) assessment and progress; e) managing activities and materials; f) engaging with multimedia activities, such as video-based work and image processing, and g) community building. LMSs usually enable such affordances in various configurations, which can be combined and aligned through coherent pedagogical design (see Nerland & Prøitz, 2018). Examples of affordances for collaborative learning are sharing resources, co-writing, using chat to facilitate discussions, planning team work, and building shared repositories (Jeong & Hmelo-Silver, 2015). The value of an LMS is often conceived based on how it facilitates such combined tasks and activities, in addition to aspects of user friendliness, for example, navigation within the system or design attractiveness.

However, an LMS providing an array of useful technological affordances does not equal coherent pedagogical design, which makes sense to the students and is conducive for learning. Some research (González, 2012; Schoonenboom, 2014) has suggested a relationship between teachers' use of online digital technology and the epistemological viewpoint underlying their approach to teaching. Generally, epistemologies emphasizing knowledge acquisition are linked with pedagogical designs wherein knowledge transmission scenarios prevail and LMS being used for the purpose of information transfer only. Conversely, learning epistemologies highlighting knowledge construction and participation are associated with pedagogical designs where learning activities and LMS functionalities are more organically combined to address the students' needs and supporting interaction through speech or activity, knowledge production, or forms of participation of various kinds. In the latter, the LMS is usually set up to support the clarification and application of concepts, exchange and development of ideas, exploration and sharing, collaborative knowledge-creation (e.g., writing), and development of process awareness.

A recent report on studies of quality of teaching and learning in Norway and Finland points towards the different functions digital technologies served in the contexts examined, consisting of several higher education courses (Nerland & Prøitz, 2018). The functions varied from providing access to resources and increased flexibility in participation, to enhancing communication and dialogue, and to offering opportunities for (both individual and collaborative) critical and inquiry-oriented engagement in the knowledge practices of the domain. The report points out that, to arrive to situations where digital technology successfully supports such a varied range of learning activities, there is a clear need for teachers and other involved actors for understanding the pedagogical principles and opportunities that come with different tools, and the ways (digital) learning environments can/should be designed and employed also from the students' perspective.

The way technological affordances and pedagogical premises are incorporated into the LMS should, thus, be intertwined. This creates the potential for the LMS to have an accessible and user-friendly structure *and* to the possibility of creating course designs that are coherent and support teaching and learning activities with which the students can engage optimally. Making the LMS a learning space where students engage, teachers feel they (can) cater to learning is important, and student participation is dependent on bringing these two aspects (i.e., accessible user-friendly structure and coherent pedagogical design) together. Since the technology design is already established, it is often the teachers/instructors who must unify these two sides of the design. Therefore, it is important to highlight the aforementioned perspectives to understand and support teachers' efforts to create user-friendly and coherent course designs that cater to student learning and encourage participation.

Finally, new developments in the digital technology field indicate that the 'traditional' LMS is evolving (Dahlstrom et al., 2014). In response to the rather heavy workload for both teachers and students, as well as the multiple parallel commitments scattered across various sites and variegated learning needs, the need for an integrated system and compatible pedagogical approaches is paramount. From this perspective, vital features of future digital systems may need to adhere to ideas of ecosystems with integrated support solutions built into the LMS, providing students with flexible and varied means of engagement, or ecologies of tools, to paraphrase Luckin (2008). While not yet convincingly supported by empirical evidence, the notion of personalizing the LMS space for different needs, through configurations of digital (mobile) tools, or learning and tailored guidance activities based on support from analytics is gaining terrain.

Based on current knowledge on the use of LMSs and digital technologies, premises underlying the design of technological affordances, and different epistemologies of learning for teaching, we put forward a number of dimensions, or principles, to be taken into consideration when aiming to create pedagogical designs that have the potential to support meaningful learning and a user-friendly experience. Accordingly, such course designs should have the following qualities:

- have a structure that demonstrates coherence between the course elements;
- provide possibilities to access and work with (i.e., structure, organize, process, manipulate) course-relevant knowledge;
- offer opportunities and support for producing knowledge, individually or in collaboration with others;
- provide opportunities for interaction (i.e., communication with teachers and peers and for organizing collaboration);
- offer context and support for formative assessment, feedback, and reflection, prior to summative assessment moments;
- offer support for self-regulation (e.g., through analytics) and for managing learning activities;
- offer opportunities for differentiated learning trajectories students might want to follow according to their interests, needs, performance, and other important factors;
- have a user-friendly structure that enhances navigation and an attractive visual design;
- offer the possibility for configuring set(s) of tools both teachers and students may want to employ (i.e., create an ecology of tools) to engage with specific learning activities and tasks. From a technical design perspective, this implies that LMSs should offer configuration options, while the teachers need to find pedagogical solutions for including these affordances into the course design.

These principles are employed to discuss how course/pedagogical designs in the pilot courses employed Canvas functionalities to facilitate student learning and participation and identify potential uses that are mindful of the teachers' ideas of what is important in their courses/disciplines, the students' learning needs, and the type of learning activities to be supported.



### 3. Pedagogical design in Canvas pilot courses

This section of the report presents and discusses example of Canvas use at the level of the overall course design. The focus of the examples is on how Canvas (as a platform) and various functionalities are used to create a course design wherein the design components are aligned in ways that generate coherence.

#### 3.1. Coherence in course designs

Successful use of the LMS in teaching and learning seems to be dependent on the way the technologies are integrated with the other courses elements, e.g., tasks, activities, tools, knowledge resources, guidance, etc. (Goodyear, 2005), and implies an effort to create a *coherent course design*. Coherence can be understood as tying together disciplinary knowledge and course contents, materials (instructions, syllabi), learning activities and assessment forms into a clear, transparent and logical organization, that indicates clearly what students are assessed on what they have to learn, what the students need to work on to achieve the learning goals, and the resources needed in this process. These must also be successfully integrated into the affordances provided by the Canvas design, to ensure the navigability of the course space and enhance the user's experience. The following sub-sections present examples selected from the pilot courses, where the designs attempt to generate coherence in different ways.

##### 3.1.1. Aligning course components using Canvas pages

Coherence at the course level can be achieved when course components are aligned, not in a linear fashion, but in a way that connects the components with one another and makes visible to the students how, this design facilitates their learning. Canvas' affordances not only offer the possibility of structuring these components in a different way than a course manual would dictate but also make the connections between components more salient.

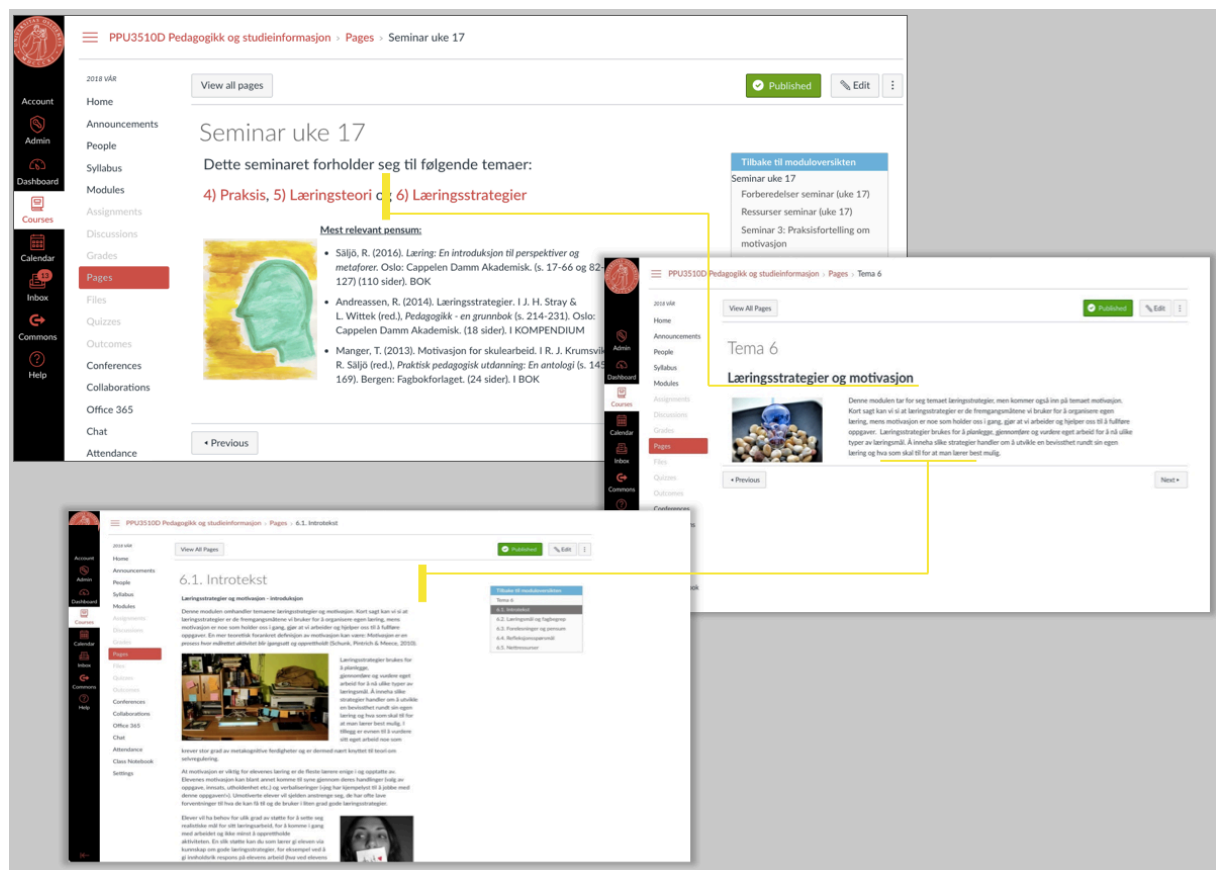


Figure 1a. Aligned course components using Canvas pages in PPU3510D

An example of how course components can be integrated to increase coherence potential (via content organization and visual cues) is provided by the course PPU3510D in the part-time programme, 'Praktisk Pedagogisk Utdanning'. Figures<sup>1</sup> 1a and 1b shows how **pedagogy seminars** in the course were connected to thematic areas (e.g., learning theories, learning strategies) through **thematic modules**.

The **thematic areas** were further described through a short executive summary, wherein elements of the syllabus were identified. On the next (connected) page of the thematic module, the **themes and core concepts** to be addressed in the course (and presented in the course syllabus) are identified and briefly explained. The next page provides a schematic overview of how the core concepts are connected to the **learning goals** in this specific course section. Then, the **overview of lectures** (and practical information) related to this thematic area, together with the **corresponding syllabus**, are systematically listed. Finally, a page containing **additional resources** is connected to the entire module. The thematic module is linked on the main seminar page with the corresponding **preparatory assignments** and **seminar resources** (see section 3.1.3 for further elaboration).

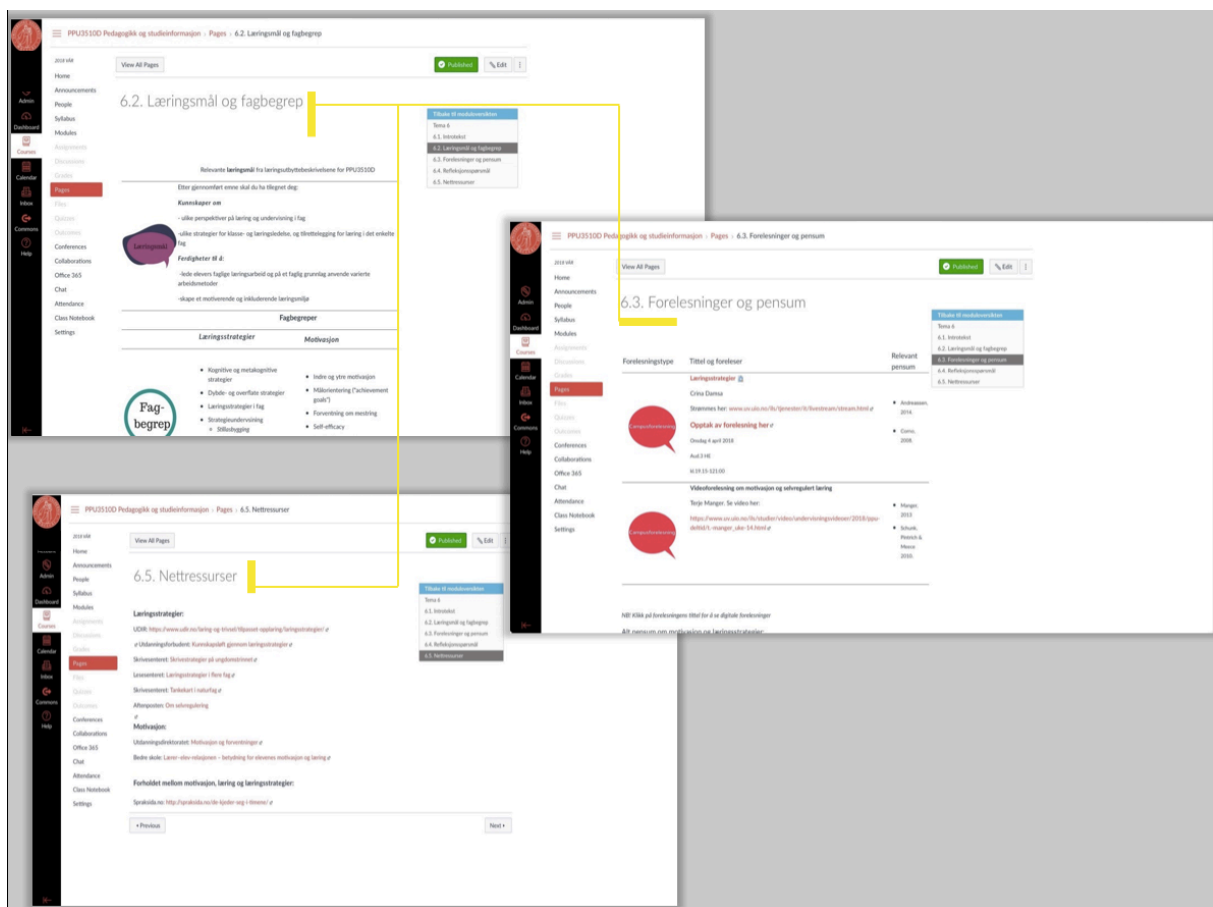


Figure 1b. Aligned course components using Canvas pages in PPU3510D

The example above illustrates how the combination of course components can be viewed both from the pedagogical design perspective and from the usability and user friendliness perspective. To an extent, this presentation of the seminar goals, themes, resources, syllabus material, and other components matches an epistemology where knowledge transmission is the primary goal. Having the course components connected at various levels also helps the students understand not only the overall pedagogical intention in this course but also how to access and engage in a meaningful way with these resources. The step

<sup>1</sup> All figures in this report are based on screenshots taken from the Canvas spaces of pilot courses, for illustrative purposes, following approval of the course teachers.

towards an engaging design is made through the embeddedness of the thematic modules in the seminar structure, which introduces preparatory assignments. The students can only engage with these assignments, meant to be discussed in the face-to-face seminar, upon having consulted lecture and syllabus materials from the thematic module. This use of Canvas provides possibilities to access and understand the course structure and knowledge contents and sets the stage for the students to engage actively with assignments and course activities.

The team of teachers in this course reported that the design was the result of iterative work and several trials in various formats. They state the design works well, in that it provides students with a connected overview and more sequenced information about each thematic area instead of combining everything on one page or module. The students report that they use these interconnected pages to navigate the thematic content of the course but also to understand the relationships between different course components (e.g., learning goals, core concepts, syllabus).

### 3.1.2. Facilitating work with knowledge contents

The design features described above show how pages and hyperlinks, combined with various visual elements, can generate coherence and continuity in the structure of course activities. Another important aspect all teachers in the pilot courses were concerned with was the way course knowledge contents could be organized to support the students in their understanding and work with these contents. In the course PED1002 'Danning og Utdanning', the course's thematic content was divided into main **units of content** (emneknagger), which made visible the relationship between topics/themes, lectures, and the syllabus. Figure 2 below shows how this structure was systematically implemented for all units of content in the course.

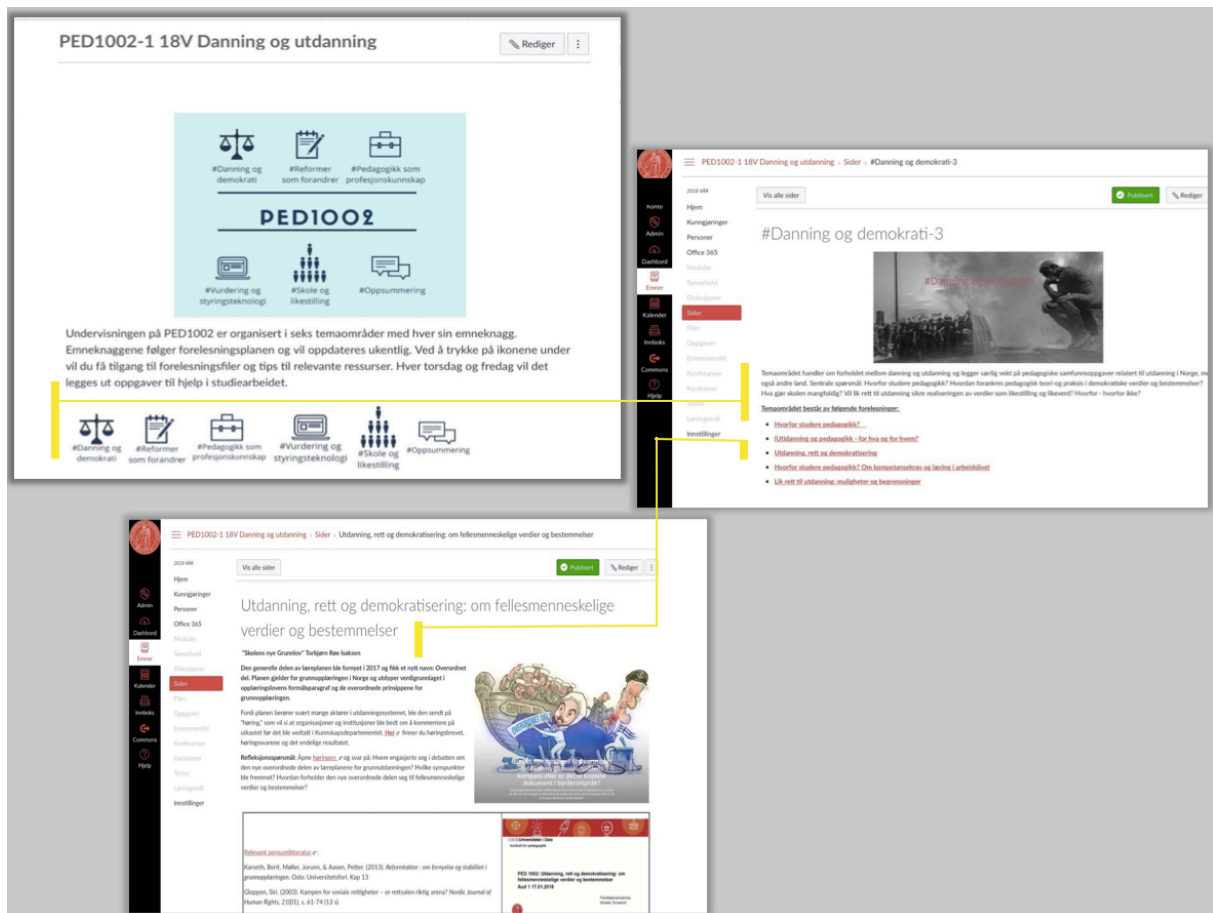


Figure 2. Facilitating work with knowledge contents in PED1002

Teachers and students in the course were both positive about this approach and structure. The teachers felt that the structure helped them present knowledge and resources needed for the students to access and engage with the knowledge content. The students (in focus group interviews) expressed positive views about the approach since it segmented new, complex and abstract knowledge content into units that were manageable, and offered the opportunity not only to interact with the content but also do so at their own pace (as they could always revisit the materials if needed).

### 3.1.3. Blending online and face-to-face learning activities

The courses PPU3510D and PROF3025 'Ledelse av elevers læring' used Canvas following a partially **flipped-classroom approach**, by providing information about the courses, knowledge content and learning activities within the Canvas course space (see also sections 3.1.1, 3.1.3, and 3.2.1). A flipped classroom is a pedagogical approach that attempts to blend traditional face-to-face teaching and learning with delivering knowledge content and learning activities outside the classroom, usually in an online space. This approach is operationalized in various ways, ranging from only delivering lectures and (syllabus) content in online spaces, to organizing almost all of the course work (i.e., lectures, discussions, assignment solving) online. The approach is easily supported in LMSs that contain both knowledge display and interactive features. The way the two courses used Canvas to implement a flipped classroom does not contain the entire range of possible activities and scenarios, but it provides a good example of how the Canvas space can be set up as a learning space, wherein envisioned activities, course materials, plans, resources, and other components are presented, interconnected (see section 3.1.2), and managed, and learning activities proposed in the online space *prior* to the course seminars are revisited, connected to, and capitalized upon in the face-to-face teaching and learning activities.

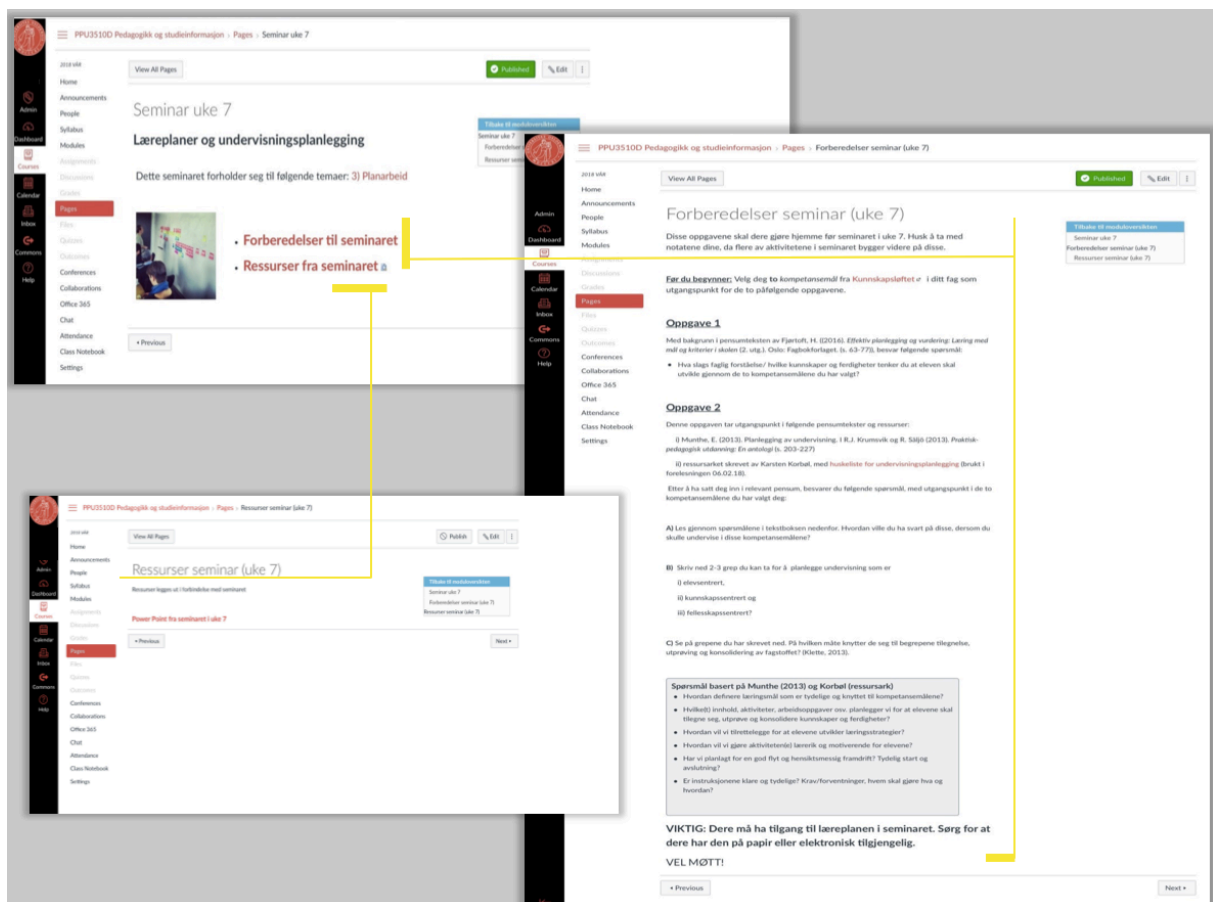


Figure 3. Preparations for seminar in Canvas

Figure 3 shows an example of assignments to be completed prior to the seminar, as they are presented and explained in the course PPU3510D. On the **seminar page**, the **thematic area** is identified (*Praksis, Læringsteori og Læringsstrategier*), and links are provided to the preparatory assignments (prior) and resources from (after) the seminar. The **preparatory assignments** are directly related to the specific thematic area, lectures, and syllabus items, which are clearly identified as resources. The assignments range from requiring reading and structuring main ideas from syllabus texts to generating ideas, watching and analyzing videos, or identifying strategies for the students' own future practice as a teacher, based on the texts read and their own experience-based knowledge. **Support material** is sometimes provided for work with the preparatory assignments.

This way of using the Canvas space offers the possibility to blend activities in the online space (assignments, knowledge contents, resources) with the activities in the seminars on campus. Connecting learning activities and experiences across settings supports continuity in the students' learning activities, offers them opportunities to engage with the knowledge content in the course, and provides them with a **coherent structure that is easy to navigate**. This continuity and coherence are supported by the fact that the preparatory activities are completed in the seminars and given meaning through discussion and problematization. This is also a form of modelling teaching for the pre-service teachers and embeds, to some extent, forms of activity that trigger engagement with the course syllabus and preparation for later work in the seminars.

The teachers designing this flipped classroom feature in Canvas reported a high level of activity by students prior to the seminar. They see this as one of the pedagogical design features that was most helpful in their course. Their ambition for the future course iteration is to make this feature more interactive and find ways to better integrate this component into the seminar activities.

#### 3.1.4. Supporting information management and course work planning

LMS design usually involves balancing affordances that support substantive activities (i.e., with knowledge content, learning tasks or assignments), and procedural aspects, such as conveying and managing information about the course, and planning and organizing study time. Canvas provides technology affordances for making **announcements** at the course level (Announcements), for **individual communication** (Email function), for following the **planned course activities** (Calendar) – with a possibility for the students to interact and add own activities. All courses used these functionalities, with most of the pilot courses using announcements frequently and some displaying **announcements on the home page**. This is done via a horizontal widget bar placed at the top of the page, under the course title (Figure 4). This most recent announcement would be visible immediately to all users when they open the course, without having to navigate to the announcements page. The students also had the possibility to subscribe and have announcements sent to their email address or subscribe to the RSS feed.

The teachers reported that they greatly valued these functionalities, which supported a more systematic approach to communicating course information. Having functionalities that support procedural/administrative aspects of the course in one space makes it easier for the students to navigate and remain up-to-date. From a learning epistemology perspective, supporting these activities at the metacognitive level is connected to the increasing emphasis on the students' need to self-regulate their learning activities. Expectations that students participate actively in course activities, organize their learning activities, and plan ahead (individually or in collaboration), among other responsibilities, all within the context of the complex design of various courses they are enrolled in, are now part of the everyday reality of higher education. Research shows that achieving self-regulation is not straightforward since it requires both effort and strategic conduct by students. Pedagogical design and LMS features support and increase the possibility that students are provided the means to self-regulate. More

importantly, such LMS features free-up time from the management of course information and activities, which happens more efficiently, for actual learning activities.

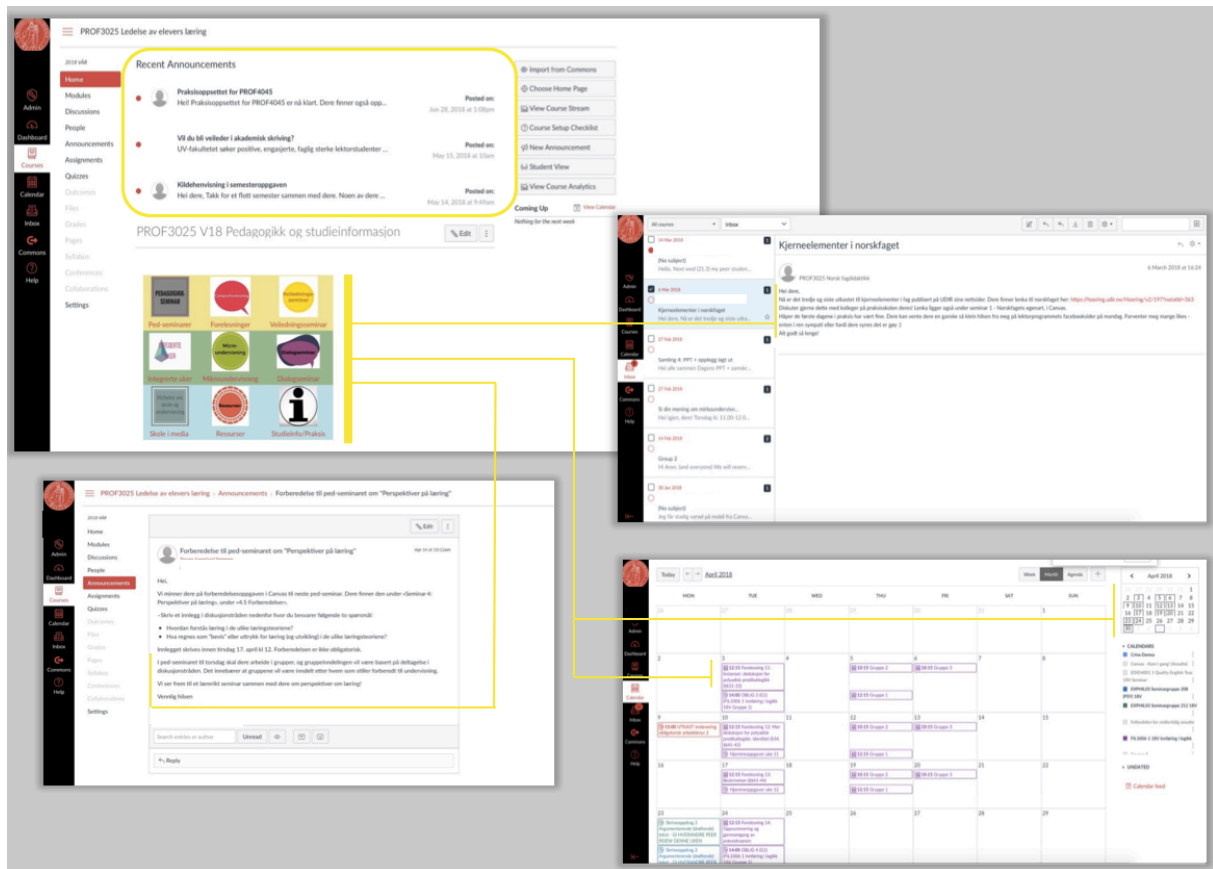


Figure 4. Information management and course work planning

### 3.2. User-friendly course design

The efficiency of LMS use, in pedagogical terms, depends not only on the way it makes available disciplinary knowledge and facilitates various types of learning activities but also on the pedagogical design's quality to provide easily accessible and clear information. This latter aspect is also related to the user-friendliness of the LMS, since such information can contribute to the students being better informed of the course/study activities and how the pedagogical design capitalizes on various technological affordances available in the system. Overall, such aspects of the design are usually intended to help students navigate the LMS course space more easily and entice them to engage with the course content and activities.

Canvas is a rather complex LMS with a large number of functionalities and alternative options for designing and organizing course content and activities, such as through modules, pages, and hyperlinks. This requires a clear approach to how the design makes *information about the course, where it can be found, how it can be accessed, what it means* available. Three ways in which the pilot courses attempted to achieve this in the pedagogical design are briefly presented below.



### 3.2.1. Providing information and facilitating navigation through an integrated design structure

The PROF3520 course, which has a main module and nine related modules in subject-matter didactics (Fagdidaktikk), contains a **comprehensive Home page** that displays general information about the course and hyperlinks to various course components (see Figure 5). The structure of the design resembles the one in PPU3510D since both courses were designed at the same department. This course uses a different thematic division across the modules, which signals the different course activities in a very clear manner (i.e., through visual organization and colour). To direct the students to more extensive information about the course and instructions for organizing participation in various course activities, the home page design includes a **'Study information' button/hyperlink**, clearly indicated visually. The **information accessible** through this design feature includes the **exam, schedule and syllabus** for various subject-matter modules, **assignments and activities, internship activities** throughout the semester, **division into seminar groups, and exceptional arrangements** for different categories of students.

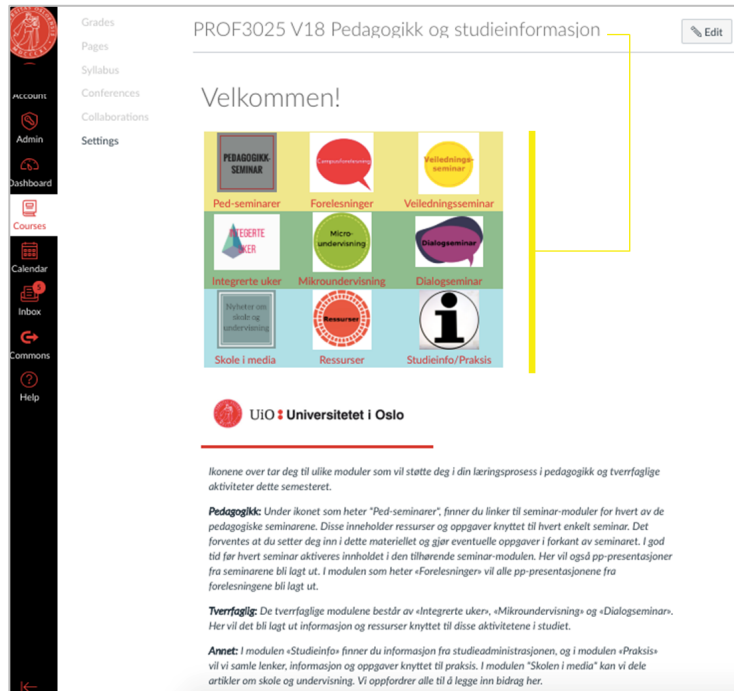


Figure 5. Organizing through an integrated design structure

This way of structuring the design supports coherence at the overall level by making the course components visible and easily accessible. The information hyperlink functions as an entrance into a space where the practical information is communicated clearly, and course requirements and organization are visible. This is a powerful design, which provides **support at the meta-cognitive level**, by structuring the information and using visual cues to highlight it. By providing this information in such a structured manner, the design increases the possibility that the students gain clarity regarding course organization and have more time and space available for engaging in actual learning activities. This also diminishes the students' need for clarification, which leads to communication overload, often unrelated to learning activities.

### 3.2.2. Providing information and facilitating navigation using module structure and content

Another strategy for communicating the course structure, activities, and use of Canvas was used in the SPED 1200 'Spesialpedagogisk forskningsmetode og forskningsbasert praksis' and SPED1300 'Læring i et livsløperspektiv' courses. The Canvas course design here is **module-based** (see Figure 6), and the very **first module introduces** the students to the course structure, activities, assignments, syllabus and exam, then to the **main theme** (learning), and finally, to **how Canvas will be used** in the course. This structure clearly sets the stage for students to have clarity regarding the course, in the same way some other pilot courses have done. However, there are two valuable features in the way this design meta-communicates both about the course and Canvas. First, it uses a **conditional path functionality**, which means the students must complete the first module before they engage with the next. Canvas provides an affordance called 'learning paths', which is aimed at differentiating learning activities and materials for students who

perform differently (i.e., certain contents or activities are not accessible before the students have engaged/performed a pre-requisite task). In this course, the 'paths' functionality was used to guide students through the necessary course-related and practical information. Second, there is a module section that explains how Canvas will be used in the Course, which contributes to the students clearly understanding where and how to find the information they need. The intended effect is the same as in the previous example, to increase clarity regarding the upcoming course work and, in this way, generate opportunities for using most of the teacher-student interaction time for on-task communication.

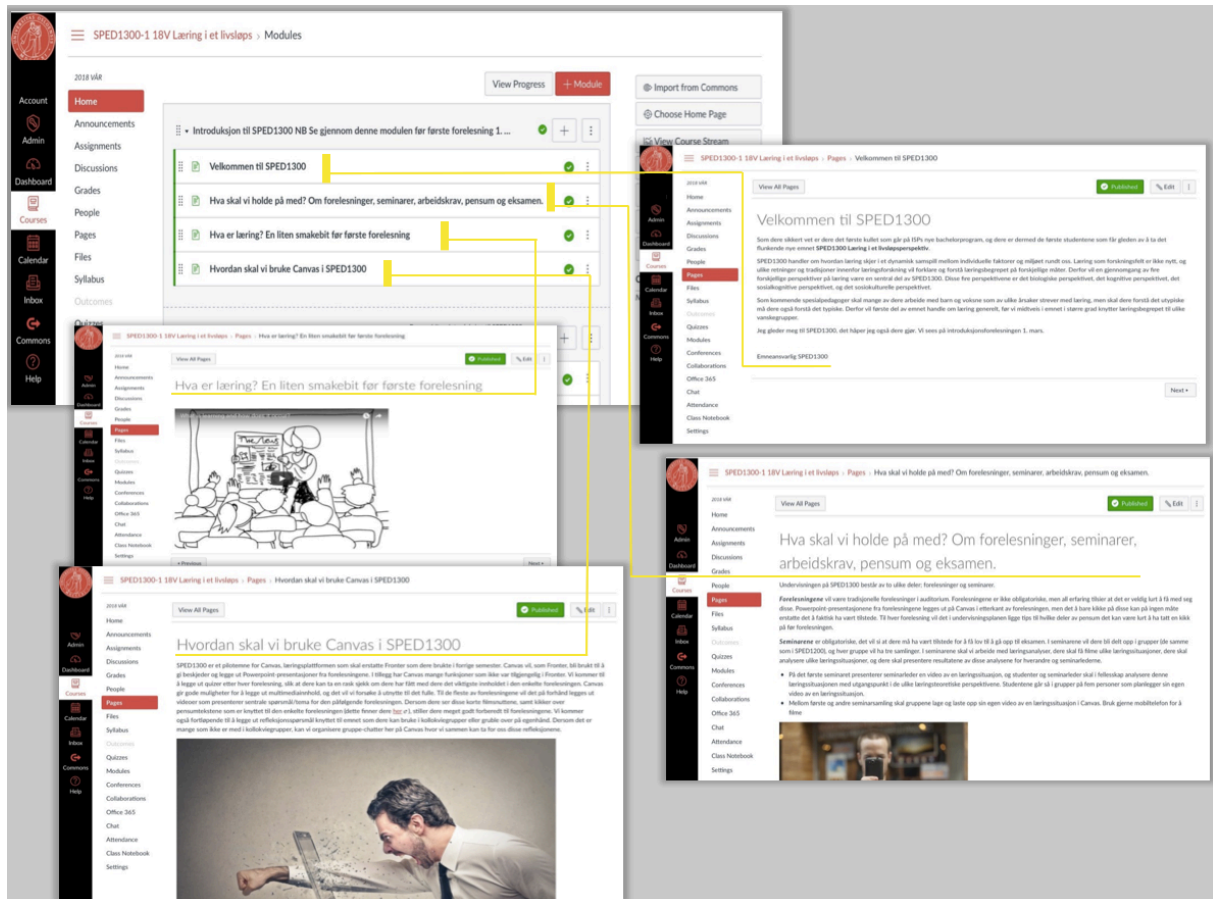


Figure 6. Providing information and facilitating navigation by using module structure and content

While this structure may appear to 'force' the students through the material, it has an instrumental value and has been, according to the teachers, very successful. They indicated that they received very few questions regarding course organization compared to previous course iterations. Also, setting up this module and providing information on the navigation of the space prepares the students for the regular practice of using Canvas in this course.

### 3.2.3. Attractive and varied design using multimedia

A clear structure, overview, coherence, and navigation in the Canvas course space are major design features that have a decisive role in how students engage with the coursework. However, an attractive design can also facilitate easier and more compelling contact with the course design and the Canvas affordances. A number of the pilot courses used different multimedia approaches to create an appealing interface that mediates the complex knowledge contents and clearly communicate the course demands, types of activities, and course organization, among other important information. **Hyperlinks** are frequently used to **connect page structures** containing materials, activities, assignments, and resources.



**Images and graphic representations** are used as icons for hyperlinks to connect to related pages, which eases the **navigation** process and provides (intently) a more enjoyable encounter with the technology.

The EDID4001 'Quality English Teaching', PED1002 and PROF3520/PFDK courses chose a visual design to enhance the presentation of the regular course design features (i.e., themes, resources) by carefully selecting content-related images (Figure 7). A number of subject-matter modules in the PPU3510D and PROF3025 courses organized their **resources as a 'toolbox'**, which was presented using a **visually attractive design**. The resources were organized thematically, and matching images were used for each category.

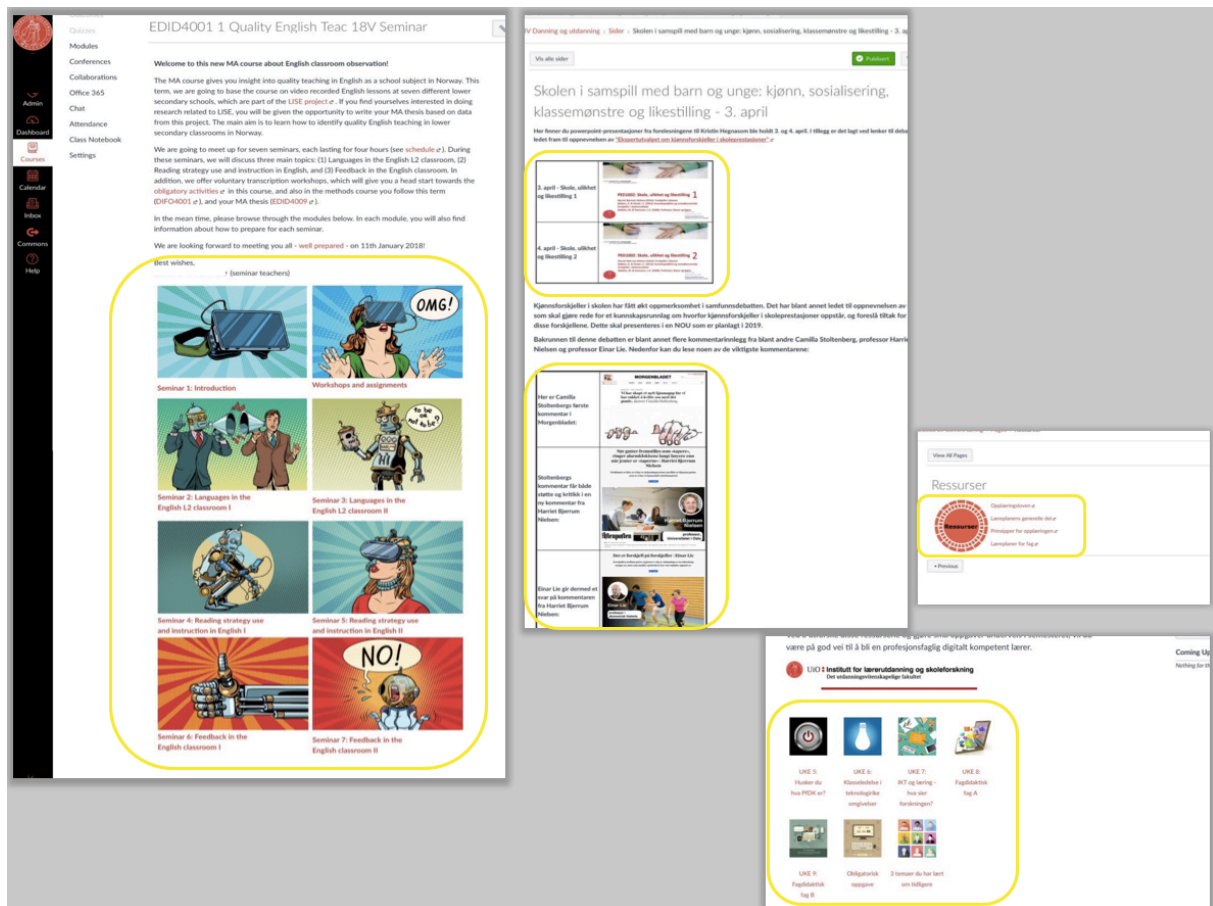


Figure 7. Attractive visual design

**Videos** are used not only for **providing practical information**, but also **to convey content knowledge, to familiarize** the students with relevant knowledge sources but also **to provide variety** in the way knowledge and information are delivered. Courses PPU3510 and PROF3520 use **embedded videos** to explain the course organization, requirements, and Canvas structure in the first module of the course, which also repeats the information provided in text format. All selected pilot courses used video to introduce students to knowledge resources relevant to the course, see screenshot (Figure 8). The videos are used in various combinations and as: teasers, resources in assignments, additional knowledge resource, or actual support for assignments (video-recorded oral presentations, uploaded and linked through Youtube).

The use of video in these various design instances increases the chance that the students engage and work with practical or content-based information; it is also a way of appealing to the students' potentially varied preferences for ways of receiving information and encountering domain knowledge. The teachers reported that images and videos make the design livelier and more appealing for the students and lead to

the student engaging more with the knowledge content and activities. Presenting the course resources in a visually appealing manner, and especially using a thematic organization, facilitates the students' access and work with these resources and other coursework according to the respective teacher. The students appreciate the use of multimedia, which leads to a more varied design that is easier to engage with than plain text.

The figure consists of three overlapping screenshots from a Canvas LMS interface, illustrating the use of video for various purposes:

- Top-left screenshot:** Shows an overview of pedagogical seminars. A sidebar on the left lists navigation options like 'Modules', 'Discussions', and 'Pages'. The main content area is titled 'Oversikt over seminarene i pedagogikk'. It includes a list of seminars (Seminar 1: Introduksjon, Seminar 2: Klasseledelse, Seminar 3: IKT, læring og undervisning, Seminar 4: Perspektiver på læring, Seminar 5: Klasseromsdialoger, Seminar 6: Motivasjon, Seminar 7: Oppsummering. Tips til videocaseeksamen, RESSURSER: Styringsdokumenter og andre nyttige ressurser, and Innløring av kompensasjonsoppgave i pedagogikk). A video player below the list shows a seminar titled 'Seminar 1: Introduksjon' with a 'VELKOMMEN!' message.
- Top-right screenshot:** Shows a video player for 'Cognitive psychology Simply Explained'. The video content features a whiteboard with the text 'CONCLUSIONS' and 'I. Mental Processes can't SHOULD be studied Scientifically'. The video player interface includes 'View all pages' and 'En liten repetisjon'.
- Bottom screenshot:** Shows an assignment page titled 'Oppgave 4: Relasjonsarbeid'. It includes a video player showing an interview with a teacher. Below the video, there are four numbered reflection questions:
  1. Hvordan blir David kjent med elevene sine?
  2. Hvordan bruker David gode lærer-elev relasjoner i sin klasseledelse?
  3. Hvordan beskriver han forskjellen mellom å det å skape relasjoner til enkeltelever og til klassefelleskapet?
  4. Hva slags elevsyn har David?

Figure 8. Use of video for various purposes

## 4. Canvas design that supports student engagement and participation

Recent developments in higher education have led to learning and teaching settings evolving towards placing students more and more at the centre of the process. The students, as well as the design of the pedagogies and technologies/LMS, are faced with a 'participation challenge'. Student engagement and participation are pedagogical aspects that materialize notions wherein learning epistemologies emphasize the co-construction of meaning and knowledge, instead of mere knowledge transfer and retention. Designing and catering to participation in various types of learning activities is claimed to be facilitated by new learning technologies. Still, engaging and activating students is often experienced as a challenge among teachers. The multitude of functionalities included in an LMS, many with the potential to support participation, interaction, and dialogue between peer-students and between students and teachers, often lead to a dense design, which often fails to be conducive of participation or to motivate students to engage with tasks and content. Research had shown that the targeted use of functionalities and carefully tailored tasks aimed at triggering and sustaining participation are effective. Also, considering pedagogical designs that have the potential to activate students not only prior to but also during, as well as after face-to-face meetings, is important. Using technology to support interaction in the classroom and support learning after a class has ended is important for the sustainability of the whole process.

### 4.1. Stimulating engagement: 'Teasers' and quiz

In the SPED1300 course, the teacher created a simple and repetitive, but efficient, module structure that aimed at enticing students to engage with the knowledge content of importance in this course. Prior to lectures, students were provided **relevant and introductory videos** on the topic of the following lecture. As noted in the above example, videos may be more appealing to students than text and are also a nice variation. The videos were embedded in Canvas, as illustrated in Figure 9, or was provided through a hyperlink.

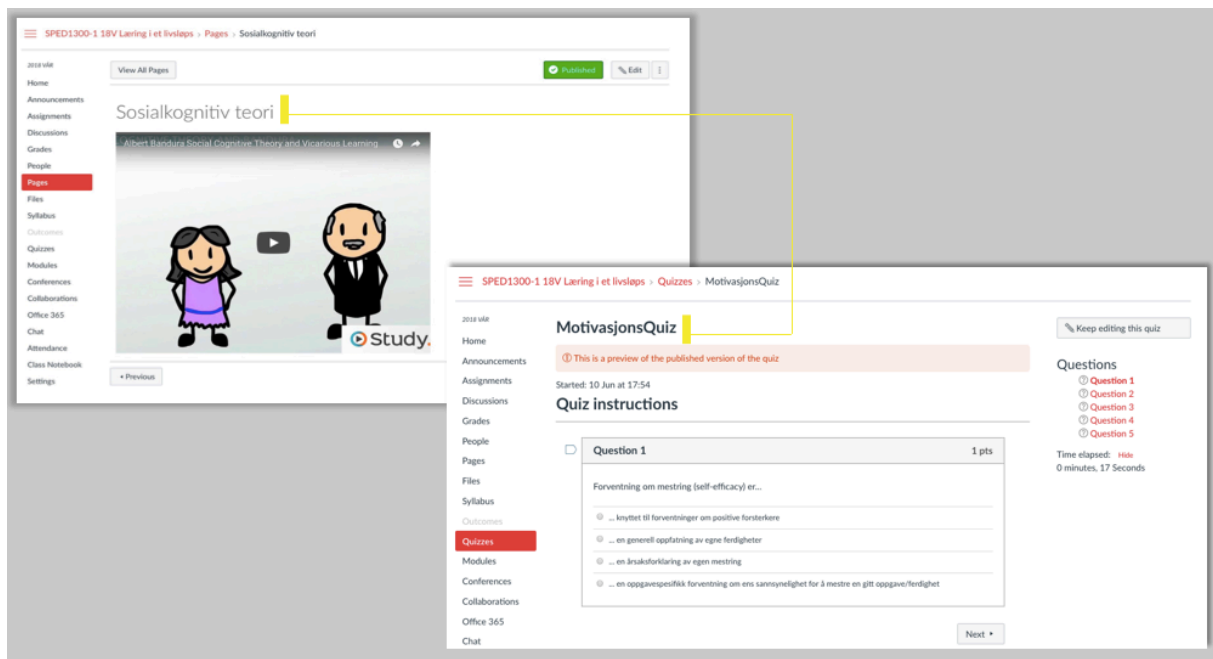


Figure 9. Quiz and video used as teaser

To further nurture engagement with the topic and provide students with opportunities for repetition, as well as test their own memory and understanding, **quiz questions** on the various topics were developed, and quizzes were created in Canvas after these topics had been taught in lectures.

While students reported that they appreciated videos and quizzes, the number of students using these resources dropped over the course of the semester. In general, the experience of this teacher was that students spent little time in Canvas until a few weeks before the exam. Finding good videos and developing quality quizzes are time consuming, but if students actually use them, it appears to be time well spent. Thus, in this teachers' experience, it is necessary to find ways to make these activities a more dynamic part of students' continuous work.

## 4.2. Content-based discussions using discussion forums

Discussions in online forums are a common feature of many LMSs. It is considered a low-threshold form of participation in written interaction and, as a technical affordance, easy to use. Discussion forums can host written exchanges of different kinds. These can take the form of simple questions requiring simple answers related to the syllabus material, or they can be set up to trigger and foster the exchange of arguments, perspectives of and argumentation related to the knowledge in the course, or joint reflection. The Canvas LMS provides **discussion forum possibilities at both the class and group level** (Figure 10). Pilot courses used the discussion forum functionality for students to **discuss knowledge/syllabus content** (PED4520), **reflect on experiences** and **present a case and generate arguments** on its relevance to the course content and goals (PPU3510D). Discussions were set at the class level (PPU3510D) and at the seminar or colloquium group level (PROF3025).

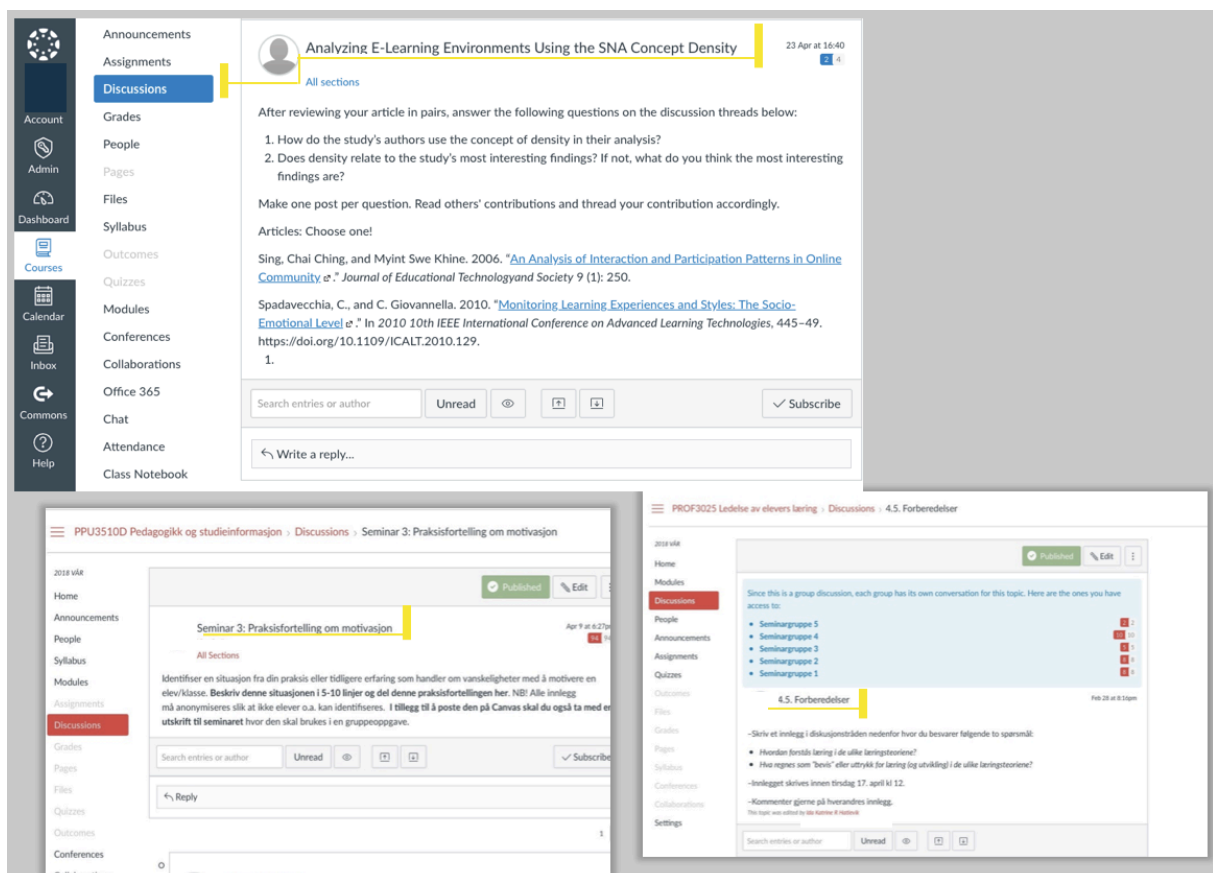


Figure 10. Content-based discussions using Canvas discussion forum

Reports by teachers who build discussion forum tasks in their pedagogical design are mixed. The teachers reflected on the types of discussion tasks they used. They concluded, in line with research findings, that the questions or tasks need to be **explicitly connected to the course's learning goals** that the students were already made aware of, **directly linked to the syllabus** material, the students' understanding of important **notions in the course**, or the **exam**. For example, in the teacher education program, discussion and reflection of cases from the teaching practice was a successful way to motivate students to engage. The teachers are aiming, in the next course iteration, to devise a way to increase the use of theoretical knowledge in the discussion and the quality of the reflection. The students expressed interest in learning from the others' shared knowledge/experiences in the forum but some were insecure about sharing their ideas online due to the fear of not providing adequate answers.

Generally, motivating students to participate in online discussions is not always a straightforward task, and it seems even more difficult to sustain interest throughout the semester. Research shows that in the case of discussions in online forums, the pedagogical underlay is the secret of students participating and contributing. Various aspects are viewed as important for setting up and sustaining a meaningful online discussion: the relevance of the discussion task/question to the students' learning, how clearly the question is formulated, and how well the discussion connects to and capitalizes on the course content, as well as timing and moderation. Hence, while accessible from a technical perspective, the discussion tasks need to be tailored carefully and supported/moderated throughout the period they are active. Additionally, it is crucial to create a culture of sharing and discussing (i.e., ideas, knowledge, experiences) in the course in general and encourage contributions that are not necessarily perfect but wherein the students engage, express, and formulate their ideas and views.

### **4.3. Designs for learning through producing knowledge**

Learning activities wherein students have to produce knowledge are used frequently in higher education courses; essays, written reports, and artefacts are the usual examples. Such productions can take the form of text, media, or software. Canvas provides support for **uploading textual productions** generated outside the LMS, but it also offers possibilities for the students **to generate text** inside the LMS. This can be in a **regular text editor window**, where students can type text and publish it as an individual contribution, as well as through the **Office 365 tools**, which allows users to access a text editor that can be used jointly with others. Canvas also has tools for **linking and uploading media files**, such as audio or video files. The functionalities supporting **text uploading and production** were used in most cases for uploading obligatory assignments, usually in text format, such as in the PED1002 and PPU3510D courses (Figure 11). In some instances, the learning task required the students to **produce and upload a production in a multimedia format**.

The functionalities supporting the **sharing of multimedia productions** have been used in PED1002; the students have to prepare and upload a Pecha Kutcha presentation and submit it in Canvas along with an audio recording of their own narrated presentation. In EDID4001, a **video product** was required from the students to demonstrate their work with research data and presentation skills. Also, in the PROF3025 and PPU3510D teacher education courses, the students were required to submit **video snapshots** of their work in the short-term internships they engaged in during the semester. In a sense, the discussion forum is also an arena where knowledge is produced through **elaborating on ideas and arguments**.

Learning activities that require students to generate knowledge place them in an active mode. They can create and engage with ideas, problems, and resources in a way that allows them to be 'makers', rather than just listeners or discussants. It is, however, not the easiest task to achieve since it requires understanding and working through the knowledge content in a critical and constructive way. Teachers often reflect on the quality of argumentation, use of (scientific) sources, or the way abstract knowledge is

translated into concrete artefacts. Technical affordances that trigger and facilitate the students to engage with such knowledge-producing tasks have the potential to enhance both the process and the quality of the product, depending on the fit between the task and the functionality provided.

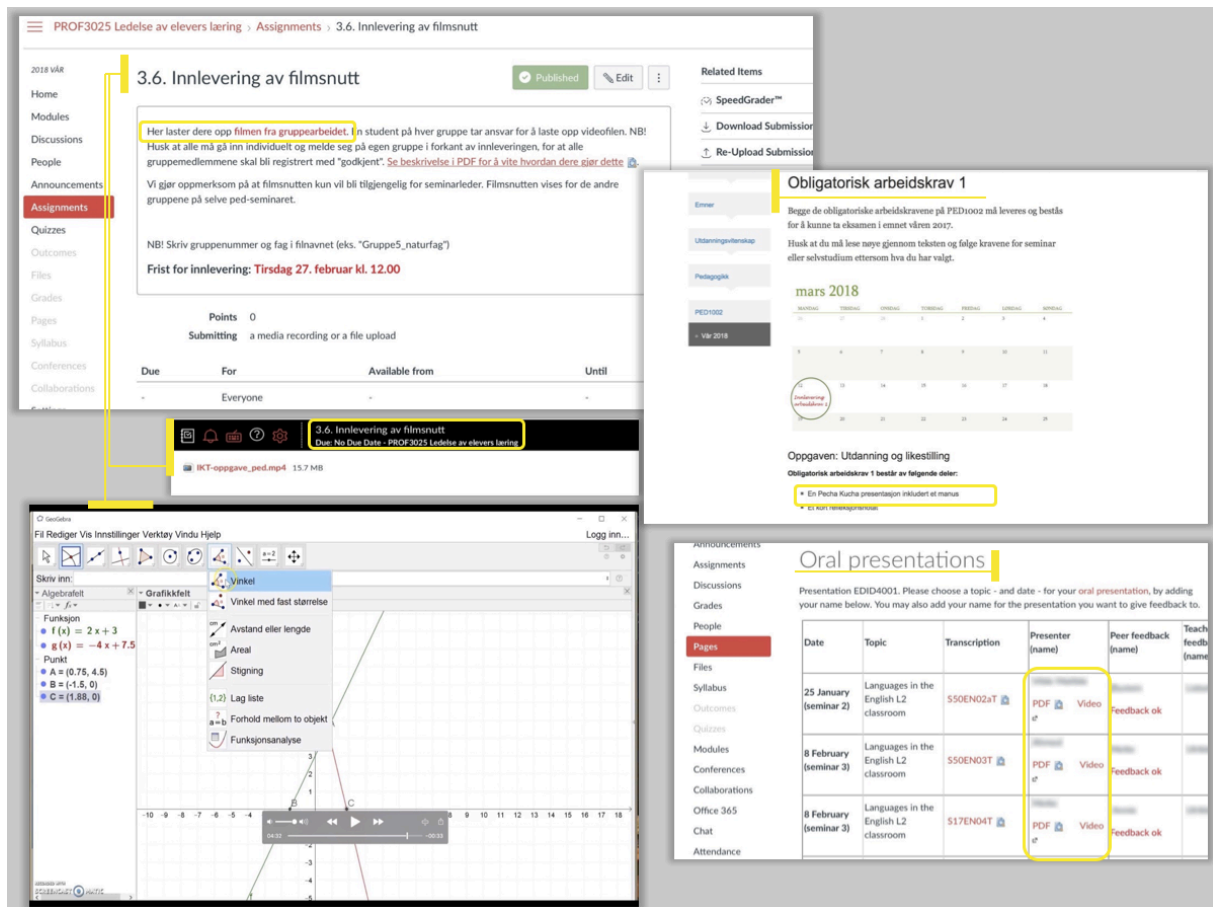


Figure 11. Learning through producing knowledge

In Canvas, such functionalities predominantly support the possibility of uploading and displaying knowledge products created outside the LMS. The text editing functionality needs especially designed tasks that prompt students to engage with creating directly in this space, where the multimedia functionalities are also available. The teachers reported the use of the regular uploading functionalities (i.e., text, video, images) and the ambition to go beyond the current use by formulating tasks that stimulate more knowledge production activities with the existing functionalities.

#### 4.4. Guidance, feedback, and peer-feedback in the Canvas space

Feedback is a pedagogical practice that can help teachers convey statements and suggestions concerning the students' learning processes and productions throughout the course or at the end (in relation to a summative assessment). However, in contemporary research, feedback is conceived of as a relational process, with the students having a more active role where they engage with, make sense of, and use feedback comments and even interact with the teacher in relation to feedback (see Esterhazy & Damşa, 2018). Also, course designs that include learning tasks where students provide feedback to each other on activities or products are being used more often. Such peer-feedback tasks not only serve the purpose of requiring students to engage with the knowledge content (through examining the peers' products or work) but also help them learn how to engage in critical but constructive discourse/ interaction with others.



The Canvas system provides technical affordances that enable **feedback** or **peer-feedback** on textual and other types of productions through the **SpeedGrader** functionality. There is, in fact, arrangement of functionalities available for providing feedback in the form of **textual comments** (either **external to the products** or **embedded in the case of textual products**), as well as **audio and video recorded feedback**. Some pilot courses used the textual commenting functionalities. In addition, this is a versatile space, which supports both the teachers and the students to engage with the feedback received.

In the academic development course 'Teaching and Learning in Higher Education', **textual feedback comments** regarding the participants' assignment drafts have been provided by the teacher via three different methods: through **in-text comments** and editing functions using the SpeedGrader functionalities; through **comments outside the document**, visible in the designated space on the right-hand side of the submitted document in SpeedGrader; and through **comments in a separate document**, uploaded in the designated space on the right-hand side of the submitted document in SpeedGrader (screenshot, Figure 12). The course participants also provided **peer-feedback to assigned peers** using the third alternative, and in the PED1002 course, guidance and peer-feedback was provided by **placing comments in a separate document and uploading** it in the designated area in Speedgrader.

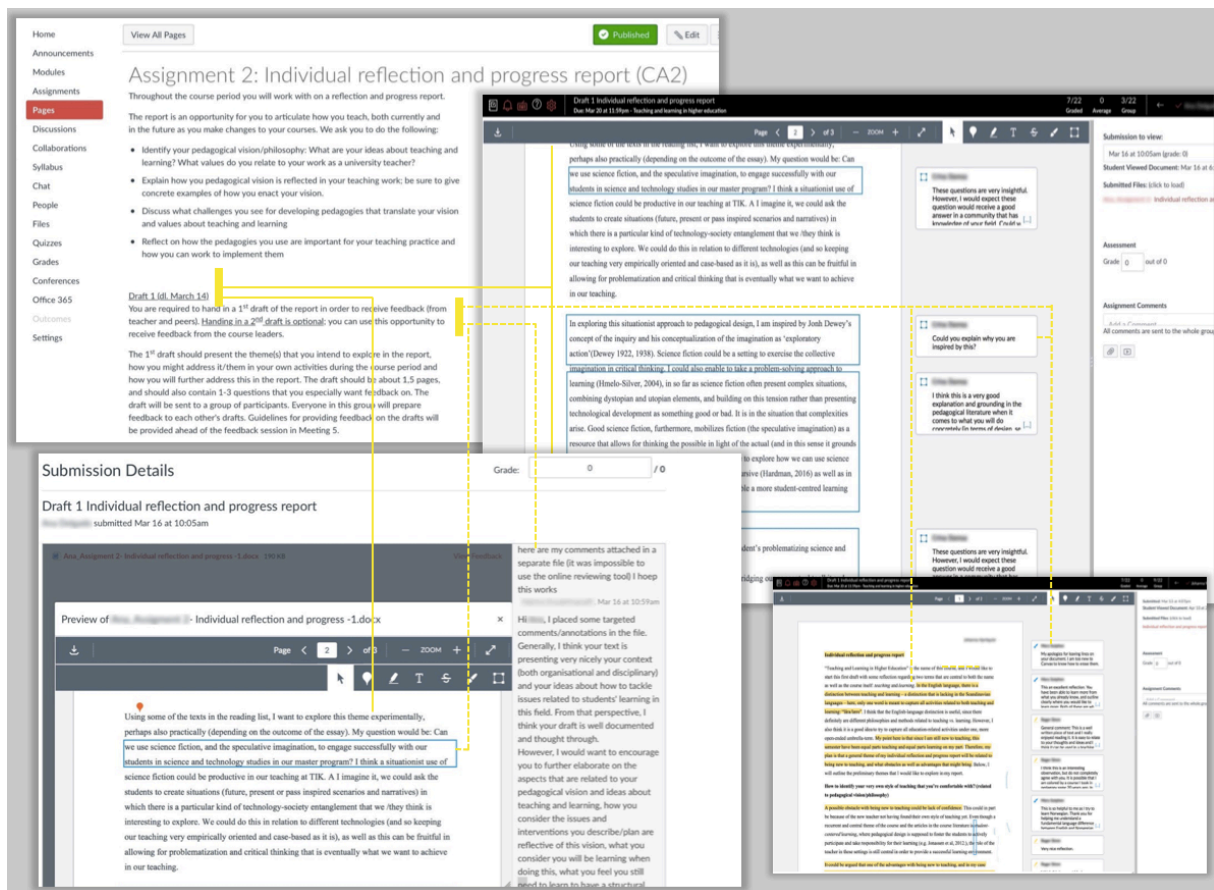


Figure 12. Providing feedback and peer-feedback through SpeedGrader

In the PROF3025 and PPU3510D courses, the feedback functionalities were used for two purposes: to **comment briefly on an introductory assignment** where the students presented themselves and to **provide guidance** in the process of formulating a problem statement for the research and development assignment, the main obligatory course assignment. For the latter purpose, a specific setup was designed for students to submit their developing problem statements and receive formative feedback from the teacher and peers. The teacher commented on assignment texts in the designated space on the right-hand side of the submitted document in SpeedGrader (see Figure 13 for an illustration). In the initial

intention, the setup included the option to receive peer-feedback from another student and to participate in an organized chat session where further questions could be asked, or the received feedback could be clarified by the teacher.

In their reflections on the use of feedback, peer-feedback, and its implementation through Canvas functionalities, the teachers expressed their wish to make systematic use of good feedback, but also frustration with the LMS not providing a smooth user experience when working with the SpeedGrader functionality. The teachers elaborate on their intentions by explaining the need to guide students throughout their learning process instead of only providing grades, summative evaluations, or merely face-to-face feedback. The different channels through which feedback could be provided (i.e., textual comments, audio or video recorded comments) were appreciated, but not all were used. All teachers indicated a wish and the need to try out these different functionalities, which they thought were to be chosen depending on the type of learning task or product submitted. The teachers viewed peer-feedback as an important activity for students to learn to formulate constructive criticism and learn practices typical to communities of learning. The students/course participants also indicated peer-feedback was a useful learning experience and a way to understand how other students work with their tasks. The need for clear guidance regarding the use of such functionalities has been expressed by both teachers and students, so the technical affordances can be used optimally.



## 5. Expansion potential for the pedagogical use of Canvas

### 5.1. Collaborative learning with Canvas functionalities

The current employment of collaborative learning activities in the Canvas space could be expanded, given the various functionalities supporting different forms of collaborative learning. The literature and practices of other faculty illustrate the use of collaborative forms of activity that go beyond regular use, as indicated in the survey findings. Discussion in online forums was the most common form of collaborative work in Canvas. Some course designs included the use of 'People' functionalities to organize student groups and discussion within these groups, and there were attempts to employ the peer-feedback functionalities. The 'Conferences' functionality has the potential to support **synchronous verbal interaction** during learning activities or tasks that require an exchange of knowledge or input 'here and now'. An example of such use (experimented with at another UiO department) is solving a mathematical problem in the context of a **group task** or during an **online seminar**, where students can follow the problem-solving step-by-step and contribute to the process directly. This can be an alternative to face-to-face seminars or colloquium groups when students cannot meet physically, or simply an activity in the context of group work.

**Collaborative learning in groups** can include various types of activities, ranging from chat conversations to comprehensive project activities. Canvas provides support for group projects within the 'People' functionality. Once activated by assigning students, this space becomes a group space where various functionalities are available for supporting collaborative work and larger tasks, such as **research projects** or **research and development tasks**, which are common in teacher education and pedagogy studies. The group space supports the construction of the group space (e.g., home pages, pages) **communication, discussion, file storage, synchronous collaboration** (conferences), and some possibilities to **create collaboratively** (e.g., text editing, power point, excel). The **planning** functionalities (e.g., calendar, notifications) are also available within the course space. Such combined functionalities can provide affordances for pedagogical design that includes varied forms of collaborative activities.

### 5.2. Learning paths for adaptive tasks

One of the main challenges reported by teachers is the heterogeneity of the student population in terms of interests, learning needs, and goals. This generates situations where a generic pedagogical design is insufficient since some students may need a differentiated approach and tasks. The original Canvas MasteryPaths feature is intended to support customized learning experiences based on students' performance. The functionality allows assignments to be assigned to different users and sections, and all assignments and pages can be created and added as conditional items before publishing the course to students. While this is an approach oriented more towards assessment, it can be employed in other ways. This report proposes, for example, to employ the feature as '**Learning paths**', with a focus on the formative value and potential of learning activities. One way of using this functionality could be to design **differentiated learning tasks for adaptive learning**; for example, tasks with varied degrees of complexity, different ways of capitalizing on the syllabus, or different optional steps. This does not mean that the work forms, contents, or assessments are differentiated; instead, it means the students who have the need or interest to work at a different pace and in different ways with the knowledge and materials in the course can do so.

This type of pedagogical design is more difficult to achieve than a regular course design where the tasks and learning activities are the same for all the students enrolled in the course. However, such differentiated learning paths align with the personalized learning epistemology, which emphasizes the

students' needs as the rationale for the learning process and pedagogical design. Generating differentiated learning designs not only serves the students' needs but also open avenue for advanced work with the knowledge content and, possibly, the development of competences that could not be achieved through a regular course design.

### 5.3. Use of course analytics

Learning analytics (LA) has become a buzzword in higher education. While it is still a controversial approach due to lack of empirical evidence and ethical concerns, LA have the potential to also serve the teaching and learning process, that is, its use for formative purposes. Analytics is the collection, analysis, measurement, and reporting of data about learners and their contexts for the purpose of understanding and optimising learning and the environments in which it occurs (ECAR, 2015). Canvas provides functionalities that generate **dashboards** (static overviews) of *all course elements* (i.e., courses, teachers, students, assignments, discussion topics, files uploaded, media recordings); **activity by date** (i.e., how everyone is participating in the course); **activity by category** (i.e., the participation for pages, assignments, modules, discussions, grades, files, collaborations, announcements, groups, conferences); and **grade distribution** (i.e., final grades and what the in-progress grades look like during the term). **Overviews of student participation** in activities and the **students' individual charts** seem most relevant for course design.

Generally, LA is also used to monitor performance. However, the **formative potential** for supporting the teaching and learning process is considered to be very high. LA could be employed without being part of the explicit pedagogical design presented to the students. Teachers could use the dashboards to keep track of students' participation and identify the need for intervention. Such use places the normative aspect of monitoring in the background (i.e., it is not aimed at assessing the students' performance) and emphasizes the way the affordance can support the teacher in adopting adaptive teaching strategies. Monitoring for formative purposes can inform the teacher about students who may need alternative learning paths or levels of participation that could indicate weaknesses in the planned learning activities. Such insights can aid the teacher in adjusting the designs accordingly. Second, LA could be integrated as part of the pedagogical design, where the students are presented themselves with their learning analytics data and prompted to reflect on the frequency and type of their activity in the LMS, assignment work, and even performance (when applicable). This can contribute to increasing students' awareness of their own learning process, which can contribute to self-regulation and students' ability to plan their coursework.

Resources and information about analytics in Canvas can be found at

<https://community.canvaslms.com/docs/DOC-10742-67952724559>

<https://community.canvaslms.com/docs/DOC-10299> (type 'Analytics' in the search window)

<https://bostoncollege.instructure.com/courses/1292000/pages/analytics-in-canvas>

<https://learn.canvas.net/courses/1208/pages/examples-of-learning-analytics>

### 5.4. Learning with configurable toolsets

Current learning in higher education is increasingly characterized by distributed resources, context, and technologies. Students learn on campus, in organized sessions, through the LMS, at internship sites, or in informal situations. Versatile digital technologies are often the means to connect these experiences, or at least the activities and people together. However, it is difficult to achieve this connectivity, continuity, and coherence, especially when there are large groups of students and learning activities taking place at external sites. In the teacher education program, for example, students are active at internship schools where they are in need of advice and supervision from their academic mentors. An envisioned solution is to use a **video annotation tool to comment and provide feedback** on students' video-recorded teaching

activities that are shared with their mentors. Such a solution can be **integrated as a plug-in tool** in Canvas, and in this way, it becomes a coherent part of the design that supports the students' learning process and development remotely.

A digital tool such as the video annotation tool can be used to provide feedback, as well as for creating tasks where **students analyze and annotate case videos** as a learning task. This is an illustration of how one such tool can be plugged-in and employed for different learning tasks that support engagement within or connect to activities outside the LMS. Arguments for considering the inclusion of affordances provided by 3<sup>rd</sup> party tools in the pedagogical design are the fact that a broader array of learning activities can be supported, and plug-in tools might be part of the students' digital repertoire, and can help them engage with tasks organized through these tools.

Canvas allows a set of designated tools to be plugged in. Examples are:

- for brainstorming and elaborating ideas (Padlet);
- knowledge structuring - mind maps (Coogoo);
- discipline-related work (Geogebra);
- feedback (ARC, Feedback Fruits);
- co-writing and co-constructing artefacts (Office Mix; EtherPad, HaikuDeck);
- polling (OpinionStage, PollEverywhere, Kahoot);
- study support (Quizlet);
- multimedia editing and production (AdobeSpark, Pixlr, Jing, Screencast)

More information about plug-in possibilities and tools is provided at:

<https://community.canvaslms.com/docs/DOC-5037-course-design-resource-index-collaboration>.

## 5.5. Work spaces for teachers

Canvas may also serve as a **platform for cooperation between teachers** as well as coordinating and supporting teacher assistants, as practiced in PED1002 (Figure 13). In this course, a 'Teachers room' was established for all teachers and teaching assistants involved in the course. The **Files** functionality can serve as a **shared storage space** for materials. The **Homepage** can be used to **share information and materials** for current activities, such as guiding examples and evaluation forms as practiced in PED1002, or as a gate to the various resources. **Modules** can also be used for systematizing materials, organized by topic or learning task. **Discussions** may be initiated by any member of the team and could serve as an important arena for **sharing ideas and experiences** as well as to ask questions other teachers could answer, while the **Conferences tool** can be used for **online meetings**.

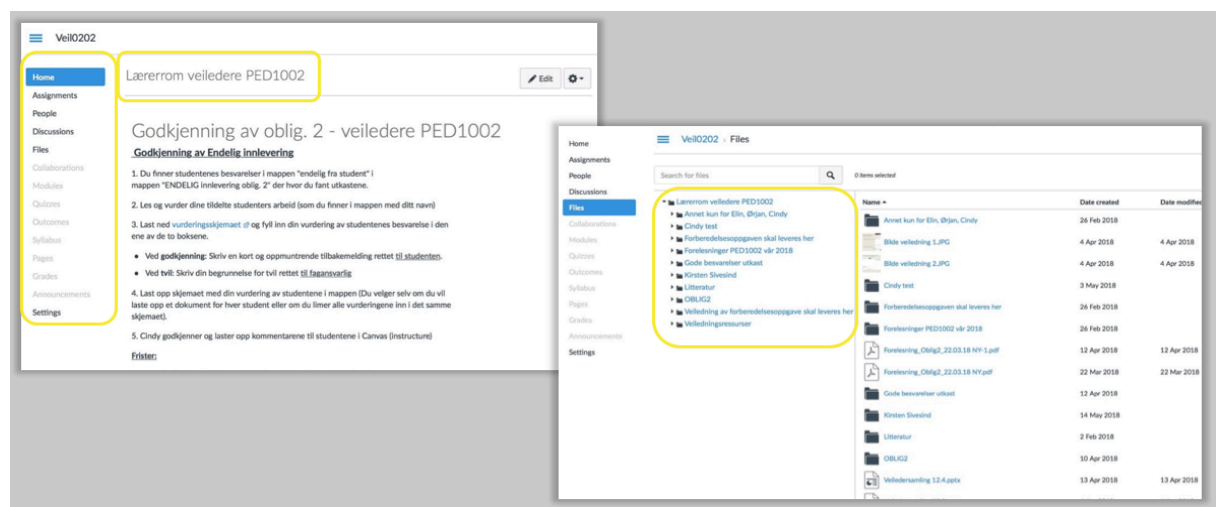


Figure 13. Teachers' work room in PED1002

Canvas' support for collaboratively creating knowledge (e.g., writing or generating teaching material together) is based on third-party tools embedded through Office365, but this functionality needs to be better supported by Canvas and local structures to actually enhance the teachers' work. The **SpeedGrader** function allows for various forms of **feedback, commenting, and annotation**.

Finally, in addition to being potential platform for collaboration in design work and preparing teaching, the Teacher room could also help **document materials, practices, and experiences**. Such documentation could be useful for the team, especially when new members join the team or take over teaching responsibilities.

## 6. Final considerations

Examples and a discussion of the pedagogical features in the Canvas LMS provide insight into how Canvas use has been initiated at the Faculty of Educational Sciences at the University of Oslo. The way the LMS was used to convey information about the course, contents and activities aligns with use and experiences from other contexts. Attention for creating an attractive design stands out in some of the cases analyzed. In addition, attempts to engage with Canvas features to create structure and opportunities for engagement (through discussions, varied assignments, etc.) indicate the teachers' awareness of the importance to generate such designs for learning, making use, gradually, of the affordances available. The examples provided have the potential to inform and possibly inspire teachers who will engage in designing new courses in the Canvas environment. Features of these designs can be replicated or expanded, depending on the type of course, content, activities, and level of participation and engagement desired. The knowledge of pedagogical design materialized in the principles listed and discussed above, information about user-friendly design, and, especially, experiences with Canvas during this first semester inform future pedagogical design work. They identify opportunities to design for participation and engagement, as well as important considerations to be taken into account, reflecting the aforementioned principles *and* the needs expressed by the teachers and students involved in the piloting process in the spring of 2018.

To start with, the way *pedagogical design and Canvas features can be combined* into *digital course design* have the potential to create (unexpected) opportunities for student learning. Canvas is a comprehensive LMS that provides several functionalities for use in teaching and learning activities, and in a sense, enable 'pedagogical configurability'. The pedagogical components of a course and the available functionalities can be organized in different constellations, depending on the type of course and aims to be achieved (thematic or methodological focus), the (theoretical) assumptions about teaching and learning underlying the design, the types of learning activities envisioned, or resources to be used. Examples from the pilot courses have shown technological affordances being pursued in the delivery of knowledge and information, but done so in a creative and targeted way, with a clearly envisioned purpose. When it comes to participation and engagement that can lead to students constructing own understanding and knowledge, these are dominant concerns when designing courses in higher education. Such activities need to be set up in accordance to the purpose of the course, type of knowledge and competences to be developed, etc., and often require an approach that helps the students create a baseline they can build upon in their more self-driven activities.

Furthermore, Canvas provides ample opportunities for flipping the classroom, which has the potential to engage and activate students, and to provide opportunities to use face-to-face-time in new ways, where students may take a more active part, such as in discussions, problem solving/-formulation, or group work. In these efforts to activate students, it is important to consider that the design furnishes *a coherent design and experience* in terms of the connections between the (online and face-to-face) learning activities, course materials, and assignments as well as how it supports smooth navigation between course components and spaces for learning. Blending online and face-to-face learning activities is not a straightforward goal to achieve, but the pilot courses demonstrated how Canvas supported the connection between preparatory work that students were to complete prior to face-to-face sessions. In this way, students experience that the design supports and facilitates their learning. Consideration for a coherent learning experience are also related to the support for *configuring constellations of digital tools* to expand the repertoire of possible activities, and to connect to the students' regular digital behavior. Not least, the use of multimedia can facilitate the creation of *attractive designs*, which not only allow for an enhanced user experience, but can also have a motivational effect. A course design characterized by

multimedia use and constellation of tools tailored for effective support of different activities may resemble the students' 'regular' digital behavior and entice them to engage.

Aligned with the efforts to mobilize different technologies to cater for learning and engagement is the consideration to create *pedagogical designs compatible to the Canvas mobile app*. Mobile devices have become ubiquitous in the hands of students, and mobile access to systems such as the LMS is becoming more common and increasingly important. Students are shown to be active users of mobile technologies, and their learning activities are not exceptions. To support this need for connectivity, Canvas provides the app version for both student and teacher use. A course design for a mobile environment requires considerations related to both pedagogical and usability aspects. This involves the organization of courses content and visual presentation of design components in a way that is compatible with mobile interfaces and creates the potential for a productive learning process and user-friendly experience.

Finally, it is important to plan for *varied design* that is conducive to *progression in the students' learning trajectories*. Blending different types of activities, materials, and learning tasks of gradually increasing complexity can prompt students' work with discipline-related questions, content, and tasks in productive ways. It can also challenge students to learn sustainable knowledge and skills, beyond the disciplinary contents, by prompting them to organize and manage their learning activities. Learning paths can be an affordance to employ in such endeavours, combined with other functionalities, such as quizzes or assignments. When pursuing such goals, the necessary meta-communication of expectations and aims, i.e., what students are expected to do and why, and how this is meant to support their learning, can also be supported in Canvas.

## References

- Broadbent, J., & Poon, W. L. (2015). Self-Regulated Learning Strategies & Academic Achievement in Online Higher Education Learning Environments. A Systematic Review. *The Internet and Higher Education*, 27, 1-13, <http://dx.doi.org/10.1016/j.iheduc.2015.04.007>
- Brown, M., Dehoney, J., & Millichap, N. (2015). The Next Generation Digital Learning Environment: A Report on Research, an ELI white paper. Retrieved on May 3<sup>rd</sup> 2018 from <https://www.uninett.no/sites/default/files/ngdle.pdf>,
- Dahlstrom, E., Brooks, D. C. & Bichsel, J. (2014). The Current Ecosystem of Learning Management Systems in Education: Student, Faculty, and IT Perspectives. Research report. Louisville, CO: ECAR. <http://www.educause.edu/ecar>.
- Demian, P.(2012) The use of virtual learning environments and their impact on academic performance, *Engineering Education*, <https://doi.org/10.11120/ened.2012.07010011>
- ECAR-ANALYTICS Working Group (2015) The Predictive Learning Analytics Revolution: Leveraging Learning Data for Student Success. ECAR working group paper. Louisville, CO: ECAR.
- Esterhazy, R., & Damşa, C. (2017). Unpacking the feedback process: an analysis of undergraduate students' interactional meaning-making of feedback comments. *Studies in Higher Education*, 1–15. <https://doi.org/10.1080/03075079.2017.1359249>
- Fathema, N., Shannon, D., Ross, M. (2016). Expanding The Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions, *Journal of Online Learning and Teaching* 11 (2), 210-233.
- Gautreau, C. (2011). Motivational factors affecting the integration of a Learning Management System by faculty. *The Journal of Educators Online*, 8(1),1-25.
- González, C. (2012). The relationship between approaches to teaching, approaches to e-teaching and perceptions of the teaching situation in relation to e-learning among higher education teachers. *Instructional Science*, 40, 975–998. <http://dx.doi.org/10.1007/s11251-011-9198-x>.
- Goodyear, P. (2015). Teaching as design. *Herdsa Review of Higher Education*, 2, 27–50.
- Goodyear, P. & Retalis, S. (2010). *Technology-Enhanced Learning: Design Patterns and Pattern Languages*, 1–27. Sense Publishers, Rotterdam.
- Hustad, E., & Arntzen, A. B. (2013). Facilitating Teaching and Learning Capabilities in Social Learning Management Systems: Challenges, Issues, and Implications for Design. *Journal Of Integrated Design & Process Science*, 17(1), 17-35. doi: 10.3233/jid-2013-0003
- Jeong, H. & Hmelo-Silver, C. E. (2016) Seven Affordances of Computer-Supported Collaborative Learning: How to Support Collaborative Learning? How Can Technologies Help?, *Educational Psychologist*, 51:2, 247-265, DOI: 10.1080/00461520.2016.1158654
- Luckin, R. (2008). The learner centric ecology of resources: A framework for using technology to scaffold learning. *Computers & Education*, 50(2), 449–462
- Nerland, M. & Prøitz, T. S. (eds.) (2018) *Pathways to quality in higher education. Case studies of educational practices in eight courses*, Technical report 2018:3, Oslo: NIFU/UiO, ISBN
- Schoonenboom, J. I. (2014). Using an adapted, task-level technology acceptance model to explain why instructors in higher education intend to use some learning management system tools more than others. *Computers and Education*, 71, 247-256. DOI: 10.1016/j.compedu.2013.09.016
- Snodin, S.N. (2013). The effects of blended learning with a CMS on the development of autonomous learning: A case study of different degrees of autonomy achieved by individual learners, *Computers & Education*, <https://doi.org/10.1016/j.compedu.2012.10.004>
- Säljö, R. (2010). Digital tools and challenges to institutional traditions of learning: Technologies, social memory and the performative nature of learning. *JCAL*, 26, 53–64. doi:10.1111/j.1365-2729.2009.00341.x
- Weaver, D., Spratt, C., & Nair, C. (2008). Academic and student use of a LMS: Implications for quality. *Australasian Journal of Educational Technology*, 24(1), 30-41
- Wilcox, D., Thall, J. & Griffin, O. (2016). One Canvas, Two Audiences: How Faculty and Students use a Newly Adopted Learning Management System. In G. Chamblee & L. Langub (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference* (pp. 1163-1168). Savannah, GA. Retrieved May 27, 2018 from <https://www.learntechlib.org/primary/p/171838/>.

## Annex 1. Overview of pilot courses spring semester 2018

### **PROF3025 Ledelse av elevers læring:** <http://www.uio.no/studier/emner/uv/ils/PROF3025/>

Studiepoeng: 20, Ca. 200 studenter.

Emnet er profesjonsorientert og integrerer pedagogikk, fagdidaktikk og praksis. Det er strukturert i to temaområder: Undervisning og læring, og Klasseledelse

Undervisning: hovedsakelig forelesninger og seminarer. Undervisningen i seminarene vektlegger studentaktive arbeidsformer som veksler mellom studentinnslag, diskusjoner, case-arbeid, oppgaver og øvelser.

I tillegg til denne felles pedagogikkdelen, består emnet i ni fagdidaktiske emner, der hver student tar to av disse. Eksamen består av to deler:

1. Semesteroppgave som integrerer pedagogikk og fagdidaktikk A
2. 5-timers videocaseeksamen som integrerer pedagogikk og fagdidaktikk B

### **PPU3510D PPU deltid del 1:** <http://www.uio.no/studier/emner/uv/ils/PPU3510D/>

Studiepoeng: 20, Ca. 200 studenter

Emnebeskrivelsen tilsvare i hovedtrekk den til PRFO3025. Imidlertid er studentgruppen en annen, og består av deltidsstudenter, gjerne med full jobb ved siden av studiet.

### **PED1002 Danning og utdanning:** <http://www.uio.no/studier/emner/uv/iped/PED1002/>

20 studiepoeng. Ca. 250 studenter.

Fokus i dette emnet er pedagogikkens samfunnsoppgaver og dens samspill med kultur og samfunn, nå og før. Emnet gir en innføring i hvordan pedagogiske oppgaver og institusjoner inngår i samfunns- og arbeidsliv, og hvordan de begrunnes i demokratiske og fellesmenneskelige verdier og bestemmelser.

Undervisningen består av forelesninger og seminarer.

Eksamen er en 3 dagers hjemmeeksamen.

### **PED4520 Sosiale medier og nettverksanalyse**

<https://www.uio.no/studier/emner/uv/iped/PED4520/>

Studiepoeng: 10, Ca. 20 studenter.

Emnet gir oversikt over ulike typer av sosiale medier og virtuelle verdener og bruksmuligheter, innføring i sosial nettverksanalyse og bruk av analyseverktøy, samt pedagogiske anvendelser og prinsipper for evaluering av sosiale medier.

Undervisningen består av forelesninger, seminarer og praktiske gruppeoppgaver (presentasjoner og PC-labarbeid).

Eksamen består av to oppgaver og muntlig eksamen.

### **SPED1200 Spesialpedagogisk forskningsmetode og forskningsbasert praksis:**

<http://www.uio.no/studier/emner/uv/isp/SPED1200/>

Studiepoeng: 10, Ca. 140 studenter

Emnet omhandler grunnleggende forskningsetiske perspektiver knyttet til spesialpedagogisk forskning, ulike forskningsdesign innenfor kvalitativ og kvantitativ forskning, vurdering av kvaliteten på forskning og hvilke type kunnskap og konklusjoner som kan trekkes fra ulike forskningsdesign, samt forskningens implikasjoner for praksis og betydning av praksis for spesialpedagogisk forskning.

Undervisning: forelesning og seminar.

Eksamen: 4-timers skriftlig individuell prøve.

### **SPED1300 Læring i et livsløpsperspektiv:** <https://www.uio.no/studier/emner/uv/isp/SPED1300/index.html>

Studiepoeng: 20, Ca. 140 studenter.

Emnet gir beskrivelse av hvordan læring skjer i et dynamisk samspill mellom individuelle og miljømessige faktorer i et livsløpsperspektiv, ulike læringsteoretiske perspektiver sees i sammenheng med endring på biologiske, kognitive, atferdsmessige og sosiale nivåer, og knyttes til spesialpedagogisk praksis.

Undervisning: forelesning og seminar

Eksamen: 6-timers skriftlig eksamen.

### **EDID4001 – Quality English Teaching:** <https://www.uio.no/studier/emner/uv/ils/EDID4001/index.html>

Studiepoeng: 10, Ca. 15-20 studenter.

Emnet inneholder 28 timer undervisning, som gir innsikt i hvordan forskningsmetoder kan brukes i undervisning og læring. Studentaktivitet inkluderer data analyse workshops og muntlig presentasjoner, og studentaktivitet er veiledet. Pensum inneholder 800 sider.



Undervisning: seminar

Eksamen: paper, prøveforelesning

**LINK kurs Pedagogisk basiskompetanse:** <http://www.uv.uio.no/iped/om/fup/oppby-gjennomf/>

Studiepoeng: N/A, Ca. 20-25 deltakere.

Emne: det reviderte kursprogrammet omfatter 120 eller 150 arbeidstimer. Kurs i universitetspedagogisk basiskompetanse inkluderer en rekke store temaer som knyttes til utdanningspraksisen til den enkelte og dennes fagmiljø.

Undervisning: 6 samlinger, gruppearbeid, observasjon an andres undervisning, tilbakemelding og hverandrevurdering av rapporter

Vurdering: essay, refleksjonsrapport, grupperapport