Pathways to quality in higher education

Case studies of educational practices in eight courses

Edited by Monika Nerland and Tine S. Prøitz

NIFU

UiO : **University of Oslo**

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Preface

This report is produced in the framework of the project "Quality of Norwegian Higher Education: Pathways, Practices and Performances", funded through the program Research and Innovation in the Educational Sector (FINNUT), Research Council Norway (RCN). The focus of the study is on exploring quality issues related to the educational provision of higher education. The overarching questions in the project are: What factors and mechanisms are important for realizing the aims of quality work in Norwegian higher education? What is the relationship between structural/systemic and institutional conditions, and educational practices? This report presents findings from one of the sub-projects with focus on educational practices. The report presents eight in depth case studies focusing on teaching and learning practices at the course level. These studies were designed to focus on aspects that matter for the quality of education in course design that employ student-centred approaches.

The report has been written by project members from five institutions: the Department of Education at University of Oslo (IPED/UiO), Inland Norway University of Applied Sciences (INN), Nordic Institute for Studies in Innovation, Research and Education (NIFU), University of Tromsø, The Arctic University of Norway (UiT) and the University of Helsinki. The following researchers have contributed to the report: Crina Damşa, Rachelle Esterhazy, Thomas de Lange, Anne Line Wittek (all IPED/UiO), Trine Fossland (RESULT/UiT), Yngve T. Nordkvelle and Odd Rune Stalheim (INN), Heidi Hyytinen and Anne Haarala-Muhonen (University of Helsinki), and Cathrine Tømte (NIFU). Monika B. Nerland (IPED/UiO) and Tine S. Prøitz (NIFU) have been project managers for the subproject on educational practices and this report.

Mari Elken (NIFU) provided support in finalizing this report and is the project leader of the overall project, while Peter Maassen (IPED/UiO) has been leading the overall project at UiO.

Oslo, January 2018

Sveinung Skule   Nicoline Frølich
Director   Head of research

Editors' preface

This report presents main findings from eight case studies in higher education, focusing on educational practices at the course level. The case studies were designed to investigate aspects that matters for the quality of educational practices in course designs that employ student-centred approaches. Whilst ways of engaging students more actively in their learning processes are high on the political agenda and a variety of pedagogical approaches are developed for these purposes, less is known about how such approaches are enacted in practice and the challenges teachers and students face in this regard. The cases presented here illustrate different pedagogical designs and approaches and how they play out in different domains and program contexts. Each case study addresses three research questions:

- What characterizes the teaching approaches and ways of engaging students in the course?
- What challenges do students and teachers face with the given pedagogical approaches and learning activities?
- What can we learn from this case about issues that matter for quality of educational practices?

This multiple case study draws on several methodological approaches, among other participant observation and interviews. The methods employed in this study require a well-functioning team of researchers engaged in time-consuming fieldwork and detailed handling of a range of data from varied sources. Whilst individual researchers have been responsible for each case study, as expressed in the authorship of the chapters, the development of instruments and discussions of analyses and interpretations has been a collaborative endeavour. Thus, this report is the result of the combined efforts of a team of highly committed researchers. The project leaders want to thank all project members for their contributions.

The members of the project group want to express their gratitude to all teachers and students that have been so kind to allow us to enter into their various educational settings and activities. Without your interest and willingness to participate these studies had simply not been possible. Thank you! It is our sincere hope that the experiences and insights we present in this report will be useful for the further work of teachers, programme leaders and students in Norwegian higher education.

This report can be read in several ways. It can be read as a whole by those interested in quality issues related to teaching and learning in large and as a pressing issue in higher education. Those who want a quick overview can read the introductory chapter and the final chapter, and then continue with selected chapters they take interest in. The report can also

be read more selectively by theme, either defined by interest in particular teaching and learning approaches and/or by academic field of study. In any case it is our hope that the report will serve as a source for reflection or inspiration on how different elements and activities of teaching and learning environments represent potential drivers or barriers for quality in educational practices and the way they foster opportunities for student learning.

Monika Nerland (University of Oslo) and Tine S. Prøitz (NIFU)

Oslo, January 2018

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Sammendrag

En viktig side ved kvalitet i høyere utdanning handler om hvordan undervisningsformer og læringsaktiviteter i emner/kurs kan bidra til å fremme studentenes læring. Det er et sterkt fokus på å engasjere studenter i utforsking og utvikling av kunnskap samt å forberede dem på fremtidige arbeidssituasjoner preget av komplekse problemer, skiftende samarbeidsforhold og nye kompetansekrav. Mer varierte læringsaktiviteter og vurderingsformer, mer systematisk og konstruktiv tilbakemelding, utvikling av gode læringsmiljøer gjennom teknologibruk, og involvering av studenter i forskningsaktiviteter eller i læring gjennom utforskning blir fremhevet som viktig for å utvikle kvalitet på program og emnenivå. Vi har imidlertid begrenset kunnskap om hvordan slike intensjoner realiseres i praksis, hvilke utfordringer lærere og studenter møter i arbeidet eller hvordan disse ideene tilpasses til ulike kunnskapsfelt og deres læringsutfordringer. Formålet med rapporten er derfor å undersøke hvordan undervisnings- og læringsaktiviteter organiseres, praktiseres og erfares i ulike fag og programmer, med et overordnet fokus på hvordan såkalte "studentsentrerte" undervisningsformer brukes til å fremme studentengasjement og læring.

Forskningsdesign og metoder

Undersøkelsen bygger på casestudier av åtte studieemner som gir innsikt i bruken av ulike studentsentrerte tilnærminger i ulike fag og studieprogrammer. Utvalget av undervisnings- og arbeidsformer inkluderte forelesninger kombinert med seminarer, prosjektbasert læring, problembasert læring, case-basert læring, simuleringsøvelser med og uten bruk av teknologi, feltarbeid, mappevurdering og online aktiviteter. Casestudiene gir innsikt i hvordan lærere og studenter arbeider med disse ulike arbeidsformene. Sammen bidrar de også til å identifisere aspekter som har betydning for kvaliteten på utdanningspraksis. Hvert casestudie adresserer tre forskningsspørsmål: 1) Hva kjennetegner undervisningsformene i kurset og måtene studentene engasjeres på? 2) Hvilke utfordringer møter studenter og faglærere i arbeidet med de ulike pedagogiske tilnærmingene og læringsaktivitetene? 3) Hva kan vi lære av casestudien om aspekter som har betydning for kvaliteten på utdanningspraksis?

Metodene for datainnsamling inkluderer deltakende observasjon av undervisnings- og læringsaktiviteter i emnene, intervjuer med faglærere før og etter observasjonsperioden, gruppeintervjuer med studenter, og innsamling av kursdokumenter, arbeidskrav, kunnskapsressurser og annet materiale. Et spørreskjema ble også distribuert til studentene for å få informasjon om deres erfaringer med undervisningsdesignet og aktivitetene. Analysene kombinerer innholdsanalyser av undervisnings-og læringsaktiviteter med prosessanalyser av måten

de forskjellige elementene (undervisningsformer, læringsaktiviteter, oppgaver, vurderings-kriterier etc.) samvirker i gjennomføringen av emnet, samt analyser av deltakernes erfaringer. For å identifisere og diskutere muligheter og utfordringer som oppstod i de ulike undervisnings- og læringsmiljøene, trekker vi på teoretiske perspektiver og begreper om studentenes læring og former for engasjement, pedagogiske design og relasjoner mellom læreplanelementer, og kunnskapsformer og læringsutfordringer i ulike fag.

Sentrale innsikter

Når det gjelder kjennetegn ved undervisningsformene og måter å engasjere studenter på, viste analysene at alle emnene hadde komplekse design som inkluderte flere typer aktiviteter og pedagogiske tilnærminger. Ingen av emnene var helt konsistente når det gjelder underliggende ideer om undervisning, læring og tilnærminger til kunnskap. For eksempel kunne et emne inneholde noen aktiviteter som primært rettet seg mot å utvikle studenters forståelse av gitt kunnskap innenfor faste rammer, og andre aktiviteter som forutsatte åpen kunnskapsutforsking og kunnskapsbygging. Denne variasjonen kan være fruktbar hvis aktivitetene samvirker i læringen, og dersom studentene er klar over hva som kreves i ulike situasjoner. Variasjonen kan også gi rom for studenters ulike måter å engasjere seg i faget. Samtidig krever slik variasjon at faglærer(e) er bevisst på den underliggende logikken i emnets ulike aktiviteter for å vurdere hvordan de kan samspille og understøtte læring på produktive måter. Slike overveielser kan forhindre at emneplanene blir overbelastet med aktiviteter og vanskelig å realisere i praksis. De kan også gjøre forholdene mellom elementene mer eksplisitte for både studenter og lærere.

Når det gjelder utfordringene studenter og faglærere møter i arbeidet, viste analysene utfordringer knyttet til å etablere en felles forståelse av formålet med aktivitetene og hva som forventes av de som er involvert. Spesielt ved utforskende arbeidsformer, der studentene jobber aktivt med å undersøke eller generere kunnskap, viste analysene utfordringer knyttet til læring i en mangfoldig studentgruppe med ulike forutsetninger. Det var til dels stor variasjon både i studentens forkunnskaper og i deres deltakelse i aktivitetene. For eksempel varierte det mye om studentene deltok på valgfrie aktiviteter som plenumsforelesninger og ved tilbud om tilbakemeldinger og veiledning, hvordan de benyttet seg av tilbakemeldinger på arbeidet, og også hvordan de engasjerte seg i samarbeid og gruppebaserte aktiviteter. Læring gjennom utforskning har potensial til å imøtekomme ulike studenters forutsetninger og behov, men slike aktiviteter er samtidig sterkt avhengige av studentenes deltakelse. Analysene indikerer at aktiviteter som strekker seg over tid og som er organisert på måter som inkluderer instruksjon og veiledning i flere faser, gir bedre muligheter for aktiv kunnskapsutvikling og for å gjøre sentrale kunnskapspraksiser i faget tilgjengelige for studentene. Aktiviteter som involverer studentene i utvikling av produkter (for eksempel, hvor studentene utvikler tekster, løsninger, modeller eller noe som materialiseres) gir også bedre muligheter for å synliggjøre læringsprosessen og utviklingen for både studenter og lærere.

Vi så også utfordringer knyttet til det å legge til rette for diskusjoner mellom studentene og i læreres forsøk på å stimulere til diskusjon. Et interessant funn var at studentene gjennomgående ser ut til å foretrekke andre sosiale medier og teknologier for å samarbeide, framfor de arenaene som tilbys i emnet eller i studieprogrammet. For eksempel dannet mange

studenter Facebook-grupper for slike formål, og verktøy som Google Docs ble brukt til samarbeid om oppgaver. Selv i det nettbaserte kurset som inngikk i denne studien syntes studentene å foretrekke andre sosiale medier for å dele ressurser, stille spørsmål og diskutere problemer knyttet til læringsarbeidet. Disse funnene er i tråd med andre studier som har vist hvordan digitale verktøy nå er integrert i studenters livsstil og omgangsform. Samtidig peker det på det åpenbare, men likevel viktige forhold, at vi ikke kan sette likhetstegn mellom studenters teknologibruk for studieformål og den teknologibruken som organiseres av faglærere eller studieprogrammet. I sin tur reiser dette spørsmål om hvordan lærere kan ta høyde for og understøtte de læringsprosessene som foregår i sosiale rom utenfor det organiserte læringsmiljøet.

Flere av casestudiene viste at faglærere, studenter og andre involverte hadde ulik forståelse av hensikten med ulike undervisnings- og læringsaktiviteter. Dette tyder på at formål og begrunnelser for et undervisningsdesign og dets ulike aktiviteter ikke bør tas for gitt. Med andre ord, det som er nøye planlagt og tenkt av ansvarlig faglærer er ikke nødvendigvis like tydelig for studenter og medlærere i emnet. Undervisningsdesign og dets begrunnelser må kommuniseres og gjøres eksplisitt for ulike aktører for å kunne bli realisert. Dette omfatter også tydelig kommunikasjon av hvilket ansvar som hviler på lærere, studenter og andre som medvirker i kurset, og hva som forventes av de involverte aktørene.

Hva har studien lært oss om utdanningskvalitet på praksisnivå?

En sentral innsikt er at studentsentrerte tilnærminger ikke er generiske. De bør snarere forstås som et sett av pedagogiske prinsipper som må tilpasses fagets karakter og til det spesifikke emnets formål og plassering i studieprogrammet. Problemløsing vil for eksempel bety forskjellige ting og ha forskjellige kriterier for god utøvelse i ingeniørfag, sammenlignet med kritiske litteraturstudier. Mulighetene for at studentene kan ta del i reelle yrkessituasjoner eller i forskning vil også variere mellom kunnskapsfelt. Casestudiene illustrerte også utfordringer i form av brudd og konflikter som oppstår mellom ulike emner innenfor et program, men også mellom ulike elementer og aktiviteter innenfor et emne. Dette gjelder plasseringen av emner og kunnskapsinnhold i den overordnede programstrukturen, som for eksempel hvordan emnet bygger på tidligere emner eller forbereder studentene for hva som skal komme. Noen av aktivitetene som ble studert i casestudiene var basert på klare progresjonsprinsipper for både innhold og arbeidsformer i studieprogrammet, mens dette ikke var like tydelig i andre case. Konflikter kunne også oppstå mellom parallelle emner i studentenes hverdag, for eksempel når flere emner toppet seg i arbeidsbelastning samtidig og mange studenter valgte bort aktiviteter som ikke var obligatoriske. Studien understreker viktigheten av å se undervisningsoppleggene fra studentenes perspektiv. Den fremhever også viktigheten av å skape progresjon både i fagets innhold og i måter å jobbe på, innenfor et emne og over flere emner. Dette krever i sin tur samarbeid på tvers av emner og samarbeid mellom faglærere i studiets og emnenes planleggingsfaser.

Samlet sett viser casestudiene som presenteres i denne rapporten at studentsentrerte tilnærminger blir møtt med interesse av faglærere i høyere utdanning, og at slike tilnærminger gir en rekke muligheter for studenters læring. Samtidig bringer de med seg utfordringer og dilemmaer som ikke er tilstrekkelig tatt høyde for i politiske og institusjonelle føringer for

kvalitetsarbeid på emne- og praksisnivå. Disse dilemmaene inkluderer å finne en god balanse mellom obligatoriske og frivillige aktiviteter, å håndtere spenninger mellom å gi studenter faglige utfordringer og å holde alle studenter ombord, de gjelder valg som må tas mellom mer styrte og mer åpne prosesser i læring basert på utforskning, og å balansere forventninger mellom det å "vite på forhånd" hva et kurs vil tilby og beholde fleksibilitet for justeringer og ikke-planlagt læring. Dette innebærer at det er viktig å holde planer og læringsutbyttebeskrivelser tilstrekkelig åpne til at faglærere og studenter har nødvendig fleksibilitet i gjennomføringen, samtidig som slike planer må være spesifikke nok til å gi retning for arbeidet. Videre bør det legges vekt på hvordan kurs og aktiviteter står i sammenheng med studieprogrammets overordnede struktur og til fagspesifikke utfordringer.

Rapporten avsluttes med å sammenfatte disse innsiktene i en liste med anbefalinger for utvikling av emneplaner og studieprogrammer. Den gir dermed svært relevante innspill til dagens debatter om kvalitet i høyere utdanning og om hvordan kvalitet kan fremmes på praksisnivå. Vi gir også anbefalinger for videre forskning.

Summary

The eight case studies presented in this report were undertaken for identifying issues that matter for the quality of educational practices in higher education. They consisted of doing close-up research on how different 'student-centred' pedagogical approaches are used and experienced in different course contexts. An overall aim was to learn more about the opportunities and challenges teachers and students face in their everyday educational activities. Across the case studies we have seen how a range of activities and pedagogical approaches were combined in courses, forming complex environments for teaching and learning. The case studies illustrate the importance of course designs that are well planned but also flexible enough to be adapted to students' emergent activities. Another insight is that pedagogical approaches are not generic, but rather form a set of principles and guidelines that need to be adapted to the specific discipline and course setting. The analyses undertaken illustrate challenges in the form of gaps and conflicts that arise between course elements and activities in which students are engaged. We conclude that higher education practices, and especially their more student-activating modes, are imbued with a range of dilemmas and challenges that cannot be resolved once and for all. Recommendations are provided for the development of course designs and study programmes, as well as for further research.

A key issue for the quality of educational practices in higher education is how the teaching and learning approaches that are used in courses affect student learning. This issue is addressed in higher education policies as well as in academic research through a strong focus on engaging students in processes of knowledge construction and preparing them for future work situations characterized by open-ended problems, shifting contexts of collaboration and new demands for expertise. Consequently, calls for more variegated activities and assessment forms, for providing more systematic and constructive feedback to students, for creating more supportive learning environments through technology use and for involving students in research and research-like activities, are frequently brought to the fore as ways of enhancing the quality of higher education at the study programme and course levels. However, there is limited knowledge on what these calls mean in practice, that is, the extent to which these ideas are realized in practice, which challenges teachers and students face that might impede their realization, or which roles the structures and learning challenges of different knowledge domains play in their implementation. Therefore, this report discusses how educational practices are organized, enacted and perceived in different domains and programme contexts, with an overall focus on how 'student-centred' pedagogical approaches are used to enhance student engagement and learning.

Research design and methods

In the underlying research project, a multiple-case design comprised of eight higher education courses was employed. The cases were selected to provide insights into the use of different pedagogical approaches within various types of programmes and knowledge domains. Following the categories from the literature review presented in a previous project report (Damsa et al., 2015) the approaches addressed in the case studies included larger lectures combined with seminars; project-based learning in smaller groups; problem-based learning, case-based learning; simulation exercises with and without technology use; field work; portfolio work; and online activities. In each case study three research questions were addressed: *1) What characterizes the teaching approaches and ways of engaging students in the course? 2) What challenges do students and teachers face with the given pedagogical approaches and learning activities? 3) What can we learn from this case about issues that matter for the quality of educational practices?* Rather than serving as a comparative analysis, together the cases contribute to identifying aspects that matter for the quality of educational practices.

The methods for data collection include participant observation of teaching and learning activities in the courses, interviews with teachers before and after the course/observation periods, group interviews with students, and collection of course documents, assignments, knowledge resources and other materials. A questionnaire was also distributed to the students to get information about their experiences with the course and the course design. The analytical strategy aimed at revealing both content dimensions of the course designs and activities, and the way the different course elements (types of instruction, learning activities, assignments, assessment criteria, etc.) worked together in the enactment of the course. In order to make sense of the participants' conceptions and experiences, and to identify and discuss differences and challenges that emerged in the various teaching-learning environments, the project team has drawn on theoretical notions and concepts that relate to student learning and forms of engagement, course designs and relations between curriculum elements, and the disciplinary context and learning challenges of different domains.

Key findings

When it comes to *characteristics of the teaching approaches and ways of engaging students*, in all the courses studied several activities and pedagogical approaches were combined. Strikingly, none of the courses was fully consistent with respect to the underlying rationales for teaching, learning and knowledge engagement related to different activities. For instance, a course could include some activities that primarily addressed students' understanding of given knowledge within restricted frames for interpretation, and other activities that encouraged students' open-ended exploration and knowledge construction. This variation might be fruitful if the activities support rather than contradict one another, and it might offer space for different ways of student engagement. At the same time, such a variation requires that the teacher(s) pay attention to the rationales involved in the various activities in order to consider how they can interplay and support learning in productive ways. Such insights may prevent course designs from becoming overloaded and difficult to realise in practice, and they may contribute to making the relations among course elements more explicit.

In terms of the *challenges students and teachers face* with the given pedagogical approaches and learning activities, the case studies revealed challenges related to establishing a shared understanding of the purpose of the activities and of what is expected from the participants. Especially in forms of inquiry-based learning, the analyses revealed challenges related to supporting learning in a diverse group of students. Diversity was manifested both in the students' prior knowledge and in forms of engagement. For instance, it varied extensively whether students attended optional activities, such as lectures and supervision sessions, how they took advantage of feedback opportunities, and also how they invested in collaborative activities. Inquiry activities have the potential of accommodating various students' needs, but they are at the same time heavily dependent on the participation of students. The analyses indicated that activities that stretch over time and that are sequenced in ways that include greater teacher support across several phases provide better opportunities for active knowledge construction and for making ways of 'doing knowledge' in the discipline explicit to the students. Moreover, activities that involve the construction of products, that is, students creating or making something that is materialised, offer opportunities to explicate the learning process and monitor achievements for students and teachers alike.

We also identified challenges with respect to facilitating productive discussions among students and the teachers' support of such discussions. An interesting finding in this regard was a tendency of students to prefer other and/or supplemental social media, and generic technologies for sharing and communicating around their work, rather than the spaces offered by the courses in the Learning Management Systems or elsewhere. For example, many students formed Facebook groups for these purposes, and technologies such as Google Docs were used for collaborative writing and work on assignments. Even in the course activities provided online, students seemed to prefer social media for sharing resources, asking questions and discussing issues related to their learning. These findings are in line with other studies that have shown how digital tools are becoming integral to students' way of life, while simultaneously pointing to the obvious, yet important fact that students' use of digital technologies for learning is not equal to that offered by the course or study programme. In turn, this raises the question how teachers can account for, and support, learning processes that take place in social spaces beyond the course settings.

Several cases showed that the rationale for a design and its various activities should not be taken for granted; in other words, what is carefully planned and understood by one teacher is not necessarily transparent for students and fellow teachers. Hence, this, too, needs to be communicated and made explicit for different actors, with a clear delineation of the division of responsibilities among teachers, students and any other participants in the course, and an outline of what is expected from the various actors involved.

What is learned about the quality of educational practices?

In terms of *what can we learn from the case studies about issues that matter for the quality of educational practices*, one central insight is that pedagogical approaches are not generic, but rather a set of pedagogical principles that need to be adapted to the characteristics of the knowledge domain and the specific course setting. For instance, problem solving will mean

different things and comes with different criteria for good performance in engineering compared with critical literature studies, and the opportunities for students to take part in 'real-world' practices or inquiry processes that resemble research will vary across knowledge domains. Further, the cases also illustrate challenges in the form of gaps and conflicts that arise between courses and activities in which students are engaged. This relates to the placement of a course and its knowledge content in the overall programme structure, such as how the course builds on previous courses and prepares for what comes next. Conflicts may also arise between parallel courses in the students' life worlds, for instance, when several courses have leaps in work load at the same time. The overall study underscores the importance of seeing the course activities from the students' perspective and of creating progression in ways of working across courses. This, in turn, requires collaboration across courses and collaborative investments in the planning phase.

In sum, the case studies presented in this report indicate that student-centred approaches are embraced by higher education teachers and provide a range of opportunities for student learning, but also involve challenges and dilemmas that have not been sufficiently accounted for in current policies and guidelines for quality work in practice, that is, at programme and course levels. These dilemmas include the balance between mandatory and voluntary activities, tensions between challenging students and keeping everyone on board, choices between more steered and more open-ended explorative processes, and expectations between the need for 'knowing in advance' what a course will offer and leaving space for unexpected learning. In this regard, it is important to keep plans and intended learning outcomes sufficiently open to allow courses to have the necessary flexibility in their enactment, but simultaneously specific enough to direct participants' engagement. Moreover, attention should be given to the ways in which courses and activities relate to the overall structure of the study programme and to the characteristics of the knowledge domain.

The report ends with crystallizing these insights in a list of recommendations for the development of course designs and study programmes, which are highly relevant in today's debates about quality in higher education. We also provide recommendations for further research.

1 Introduction

Monika Nerland and Tine S. Prøitz

1.1 Background and aims

This report is written as part of the larger project *Quality of Norwegian Higher Education: Pathways, practices and performances*, which is funded by the Research Council of Norway through the FINNUT programme (2014–2017). The project is jointly conducted by the research institute NIFU and the Department of Education, University of Oslo, with collaborative partners at the University of Tromsø, The Arctic University of Norway (UiT) and Inland Norway University of Applied Sciences (INN), as well as international partners at the University of Helsinki and CFA at Aarhus University. The project has a multi-level and multi-case design, in which quality aspects and strategies are investigated on institutional, programme and course levels, respectively, in different institutions and knowledge domains. The project as a whole pays special attention to study programmes as a key unit where regulations and efforts to develop educational quality meet and relates this to policies and practices at national, institutional and course levels. The overall project structure is illustrated in Figure 1. More information about the project is available through the project webpage: www.qnhe.no.

The report we present here concerns analyses of educational practices at the course level,
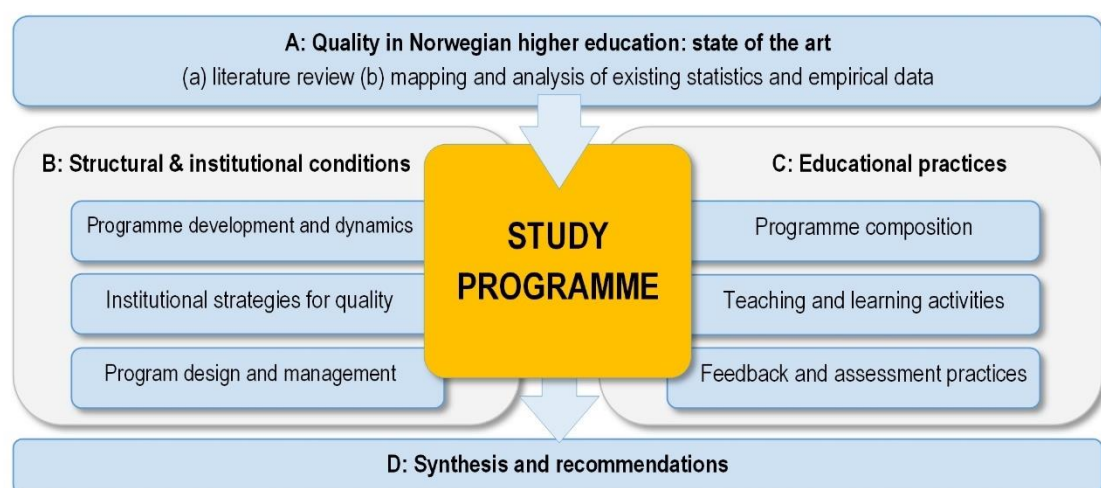
Figure 1 Overview of the QNHE project

located in Part C of the project. A critical issue for the quality of educational practices involves how the teaching approaches and learning activities that are used in courses may enhance

student learning. In policies as well as in research on higher education, there is a strong focus on engaging students in processes of knowledge construction and preparing them for future work situations characterized by open-ended problems, shifting contexts of collaboration and new demands for expertise. Calls for more variegated activities and assessment forms, for providing more systematic and constructive feedback to students, for creating more supportive learning environments through technology use and for involving students in research and research-like activities are frequently brought to the fore as ways of developing the quality of higher education at the programme and course levels. However, there is limited knowledge on how such intentions are realized in practice, what challenges teachers and students face that might impede their realization or how these ideas interplay with the structures and learning challenges of different knowledge domains. Current knowledge of Norwegian higher education, as of higher education more generally, relies to a large extent on output measures and on self-reported data where teachers and students report on educational activities in retrospect (Haggis, 2009; Lodge & Bosanquet, 2013; Nerland & Jensen, 2014; Damsa et al., 2015). This has provided useful insights into how programmes and courses are experienced and how this varies across groups and institutions. Less is known about how education is done in everyday practice in the interactions between teachers, students and the wider instructional environment.

Taking a process view on educational quality (Gibbs, 2010) activities in part C of the QNHE project therefore examine how educational practices are organized, enacted and perceived in different domains and programme contexts, with an overall focus on how so-called student-centred pedagogical approaches are used to foster student engagement and learning. The aim was to identify aspects that matter for educational quality and ways of supporting learning in different types of course designs and pedagogical approaches that intend to engage students in knowledge construction, in the creation of products, and/or in activities where disciplinary knowledge can be applied to practical situations. As such, this report is primarily directed towards teachers, course leaders, programme leaders and students in higher education as the key actors who are involved in developing quality teaching and learning in their everyday work. However, by providing insights into these practices, the report is also useful for actors and stakeholders involved in creating framework conditions for teaching and learning as well as in monitoring the quality of such practices.

To learn more about the opportunities and challenges related to different course designs and learning activities, and about how this plays out in different knowledge domains, we conducted eight case studies of selected higher education courses, six in Norway and two in Finland. The multiple case design allowed us to investigate the relations between the course design and pedagogical intentions, the enactment of teaching and learning activities and the experiences of teachers and students. Moreover, it provided a basis for exploring relationships between domain-specific features and more generic criteria affiliated with the pedagogical approaches. The courses we have studied are embedded in different programmes and institutions and included both bachelor's and master's levels. They were selected to provide a variety of commonly used approaches to engage students in knowledge construction and inquiry, such as problem-based learning, case-based learning, project work, portfolio-organized

work, field work and different types of simulation exercises. At the same time, they also included more traditional lectures and seminar activities. We looked for well-functioning cases to learn from, and included cases that exemplify different kinds of technology use. The two Finnish cases were studied in domains parallel to two of the Norwegian cases; besides providing a stronger empirical basis, this allowed us to consider the way in which varieties in the educational systems and regulations may influence educational practices on the production floor.

The research questions we addressed in the case studies are as follows:

- What characterizes the teaching approaches and ways of engaging students in the course?
- What challenges do students and teachers face with the given pedagogical approaches and learning activities?
- What can we learn from this case about issues that matter for quality of educational practices?

To investigate these questions, we used methods combining participant observation, interviews with teachers and students, document analysis of course documents, and a questionnaire given to the students with items targeting their course participation and experiences. The selection of cases as well as the methodological approach are described in detail in section 1.3.

The findings from the case studies are used to discuss the overall question regarding the important quality aspects and challenges in educational practices at the course level in higher education, and how these aspects and challenges relate to course designs and disciplinary contexts. We commence, however, by outlining how we understand quality aspects of educational practices.

1.2   Quality aspects of educational practices

The relationship of teaching to student learning is a key to educational quality, although not of a linear or direct kind. Research has shown that teachers' approaches to teaching are related to the way in which students engage in learning activities (Trigwell, Prosser & Waterhouse, 1999; Baeten et al., 2010) and that the internal coherence in a course between learning activities, anticipated outcomes and assessment forms matter for the quality of student learning (Biggs & Tang, 2011). Hence, to investigate quality aspects of educational practices we need to see the instructional environment and students' engagement in learning activities as interrelated. Moreover, the role of teaching in student learning has changed in many ways during the last decades. From a situation in which lectures and teacher-led activities served as significant access points to information and knowledge, the learning challenge of today is not about access to information but rather about making sense of increasingly specialized knowledge from a multitude of sources. Furthermore, knowledge is not understood as a stable entity, but rather as unfolding and as changing over time as it is employed, adapted and further developed in different contexts of practice. It is therefore widely acknowledged that learning is related to performative actions and to students' active construction of knowledge, through which the achieved insights become consequential for further action (Säljö, 2010).

Attention should thus be given to what the students are doing with knowledge, the intended course content and what potentials for learning these processes entail, rather than focusing solely on what is conveyed by the teacher.

These developments have led to a call for creating student-centred learning environments and on organizing educational practices among scholars in education sciences as well as in education policy. Ways of engaging students in explorative activities, in open-ended problem-solving, in the construction of knowledge products and in critical reasoning are seen as the main components of learning activities in such environments. At the same time, such activities may be challenging for both teachers and students. They alter traditional roles of students and teachers, and in some cases contribute to increasing both teachers´ and students´ work-load as well as differences in student achievements. Such newer trends in teaching and learning approaches require shifts in teachers' understandings of how the various elements of learning environments may work to enhance student learning and alter often longstanding traditions for teaching practice that take time. For example, students will need different kinds of support to engage in productive ways, and even more so if we take into account that many programmes now accommodate a more heterogeneous group of students. Further, whilst students generally may learn more from taking an active role in exploring and constructing knowledge, such activities may be less beneficial for students who do not have a high level of prior knowledge about the topic (see, for instance, Gil et al., 2010). Questions of quality in teaching and learning processes are thus not only related to how student engagement and opportunities for learning are supported through specific instructional approaches, but also to how feedback and assessment provide supportive learning situations for students.

In a previous report from the QNHE project, we reviewed research focusing on pedagogical approaches and assessment in higher education, with emphasis given to student-centred approaches and how they may foster learning (Damsa et al., 2015). The review showed that different pedagogical approaches such as problem-based learning, case-based learning, project-based learning and inquiry-based learning have different strengths and that all have potential to engage students in exploration and knowledge construction in productive ways, depending on how they are enacted. Group discussions and peer interaction show positive effects on student understanding and motivation; interactions that involve collaborative exploration and require justified arguments from the participants are particularly beneficial to develop students' conceptual understanding. At the same time, the students often report that the most productive discussions are organized and guided by the teacher. In activities that involve students in collaborative problem solving and knowledge production, the pedagogical support provided from teachers and the instructional environment is crucial. This concerns the importance of providing support in both the framing and solving of problems, monitoring student-led processes and intervening when necessary, encouraging the materialization of outcomes of discussions so that the learning process become visible and interim products can be further explored and developed, and supporting the social organization of collaborative processes.

Across pedagogical designs, the forms of feedback and assessment are essential for the learning environment and how it supports student learning. Previously labelled 'the Achilles heel of quality' in higher education (Knight, 2002), assessment has gained extensive attention

in efforts to develop educational practices. Ways of providing students with more formative assessment and regular feedback on their work has been emphasized, for instance through peer assessment and portfolio-based course designs. The review presented in the abovementioned report (Damsa et al., 2015) identified different ways of conceptualizing feedback, assessment and 'assessment feedback' in the literature and emphasized the importance of 'feeding forward' to support students in making use of feedback in their further learning process. It also showed that neither giving nor taking advantage of feedback is a straightforward, but rather demanding process that needs to be learned.

Quality in educational practices is dependent on productive relations between various curricular elements in the course design. A common notion is that pedagogical approaches and activities should be 'constructively aligned' with intended learning objectives, assignments and assessment forms (Biggs & Tang, 2011), to ensure that the course elements support each other and work in the same direction. Moreover, the intended outcomes and assessment criteria should be clear to the students to enhance their engagement and motivation. Employing these principles in course design has been found to improve student experiences as well as their academic grades (Larkin & Richardson, 2013; Wang et al., 2013; Reaburn et al., 2009). At the same time, it has been argued that excessively-detailed learning outcomes may undermine flexibility to adjust activities to students' emerging needs and prevent unplanned but productive forms of engagement from being recognized (Allan, 1996; Eisner, 2005; Havnes & Prøitz, 2016).

One of the main purposes of higher education courses is to support students' learning of domain-specific knowledge and skills. In a wider context, activities should also support their development of generic skills and competencies needed for work in the 21st century, including problem-solving, creativity, ethical understanding, collaboration, information-handling and digital literacies. Strategic use of ICT for educational purposes is often assumed to enhance such development. However, technology-rich environments can take very different forms and include a variety of purposes and practices. How technologies are used in educational practice should therefore best be seen as an aspect of the overall course design. The review pointed to different ways in which digital tools and resources can support student engagement and learning, for instance through simulations, online discussions, digital storytelling, digital cases and so forth. Courses may also be more or less extensive in their technology use, ranging from technology as an integral part of campus-based activities, to blended models and purely online environments. The ways in which technologies are used seem in part to be related to the participants' conceptions of teaching and learning. Hence, careful incorporation of digital tools and technologies in the course design is an issue for the quality of educational practice.

In sum, we regard the following characteristics as denoting the quality of educational practices at the course level:

- Learning activities that engage students in the exploration and construction of knowledge, such as through forms of inquiry-based learning, or tasks that require the integration of knowledge forms and critical reflection;
- Course design that allows students to employ conceptual knowledge in new contexts and makes learning explicit through the performance and/or the construction of products;

- Pedagogical support and feedback that are aligned with the learning challenges and progression principles in the domain, and which also feed forward in students' learning process;
- Coherence in how the different activities and elements of the course support each other, such as through the constructive alignment of objectives, activities and assessment, or through other clear principles for the integration of learning activities and achievements;
- Activities that link students to their wider prospective disciplinary or professional knowledge culture;
- Balance between the underlying curriculum logic, the course elements, teaching and learning activities and assessment and opportunities for adaptation to student groups and emerging needs

In the case reports, we take these aspects as points of departure in examining and discussing characteristics of the course designs and the use of pedagogical approaches. The overall aim is to learn more about how student-centred approaches are used to facilitate student learning in higher education and about the dilemmas and challenges teachers and students face in this regard. The emphasis given to the different aspects will depend on the overall purpose and intentions with the courses, as will the specific forms of teacher and student engagement. Section 1.4 provides more information about the analytical lenses and concepts we employ to examine characteristics of the course activities and approaches and to interpret participants' experiences and challenges. Before this, the next section presents the overall research design and methodology.

1.3 Research design and methodology

As pointed out above, quality in educational practices is processual and relational, and therefore different to measure based on fixed, specific criteria. In consequence, the topic rather calls for qualitative approaches to investigate how practices are organized and enacted, how their various elements relate to each other and how they are perceived by participants. To investigate these issues, we employed a multiple-case design (Stake 2006) comprised of eight higher education courses. These cases were understood as settings for the organization and enactment of educational practice and selected to provide variation in the sense that they offered opportunities to study educational practices in relation to different pedagogical approaches, in different types of programmes and knowledge domains (see below). Rather than serving as a comparative analysis, the cases provide exemplary cases that together contribute to answering the overall research question of aspects that matter for the quality of educational practices.

As displayed in Figure 1, the key elements of educational practices are course designs, teaching and learning activities, and feedback and assessment. In line with a practice-focused perspective (e.g. Trowler, 2014), educational practices incorporate artefacts and tools as well as institutional rules and regulations. Such artefacts and tools concern, for instance, the type of texts and tools with which teachers and students engage, technologies that are used in teach-

ing or in students' learning activities, assignment texts, evaluation criteria and discipline-specific concepts and methods. Practices are developed based on how these elements are related, and such relations are partly formed in the planning of the course design and partly emergent in the situated enactments of the course activities. In the research design, we therefore emphasized the collection of information about the intended, the enacted and the experienced dimensions of the courses. In addition, we were concerned to understand the cases as embedded in larger programme contexts and disciplinary contexts to account for how these contexts matter for how student-centred approaches are employed.

1.3.1 The contexts of higher education in Norway and Finland

The report consists of six Norwegian cases and two Finnish cases. The combination of Norwegian and Finnish cases has been selected based on the similarities and differences between the higher education systems of the two countries. Relevant for our study are the similarities in terms of how both Norway and Finland have implemented the degree structure agreed upon in the Bologna process, consisting of three-year bachelor's programmes (180 ECTS) and two-year master's programmes (120 ECTS). Both countries have also adopted wider European curriculum frameworks in their higher education policies, which include expectations to state intended learning outcomes in curriculum documents at course and programme levels and to align these with national and European qualification frameworks.

At the same time, there are interesting differences between the countries that may have an impact on how to work with quality in teaching at the course level. For example, this can be seen in how the higher education systems are organized and in the characteristics of the student body. One difference between the educational systems is how the Finnish divide their higher education system into scientific universities (yliopisto) and universities of applied sciences (polytechnics, ammattikorkeakoulu). The dual system leads to two different higher institution profiles where the universities focus on scientific research and education, whereas universities of applied sciences adopt a more practical and professional-oriented approach. The institutional profile is also reflected in different student selection criteria decided by the autonomous universities. There were altogether 182,000 applicants to higher education in the academic year 2013–2014; 90,000 applied to universities, 122,000 to polytechnics and 30,000 to both sectors. Around 35 per cent of the applicants were selected, but there is great variation in the admission rates between different higher education institutions and fields of study[1]. Student admission is highly competitive, and recruitment is based on matriculation examinations and merits in entrance examinations[2].

In Norway, the institutional landscape is currently in transformation, as several institutions are merging and at least two university colleges have applied to become full-fledged universities. In the moment of writing the public HE sector comprises nine universities, seven university colleges and five specialized schools and university colleges within e.g. the areas of business studies, sports, arts and architecture. In addition, there are private colleges that also

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[1] All numbers come from the EuroEducation.net The European Education Directory, retrieved 21.12.17 http://www.euroeducation.net/prof/finco.htm

[2] Ministry of Education and Culture, http://minedu.fi/en/higher-education-and-degrees , and Finnish National Agency for Education http://www.oph.fi/english/education_system/higher_education , both retrieved 21.12.17.

receive public funding and that are regulated by national law. Admission to higher education requires fulfilling three years of upper secondary school with a general university admissions certification. Admission is coordinated through the Norwegian Universities and Colleges Admission Service based on a point scale, with the highest ranking students offered admission. During the last decade, the number of students in Norwegian higher education has increased by 51,000 students, especially on the master's level where the number of students has increased by 52% since 2006, compared to 27% on the bachelor's level[3]. This is accompanied by growth in the number of offered study programmes and a more diverse student body. What this growth implies for quality work and challenges to quality in the design and enactments of educational practices is a topic in need of more research.

When it comes to educational programmes and practices, we find similarities in how education is organized and in experienced challenges. In Norway, the Bologna framework was implemented in parallel with the 'Quality Reform' in 2003. In addition to changes in the degree structure, this reform requested that students should be followed up more regularly through more feedback during courses, more frequent assessment and more learning-oriented forms of assessment. An evaluation of the reform showed that, according to academics' self-reports, the use of seminar-organized teaching increased, and more time was spent on supervision and assessment. Teaching in the former larger lectures decreased in the university colleges, but not necessarily in the universities. The number of assignments given to students as well as the feedback on their work also increased (Aamodt et al., 2005; Dysthe et al., 2006). Despite this, challenges related to throughput continue. Students in both bachelor's and master's programmes tend to be delayed, with 43% completing on time and about 60% completing one year after the scheduled time per 2015. Whilst the amount of feedback provided on students' work apparently has increased, students still report needs for more feedback as well as more thorough and constructive feedback (see, for instance, the reports from the national student survey Studiebarometeret[4]). This is in line with findings in international studies (McLean et al., 2015; Evans, 2013), and calls for more research into how and what such feedback processes actually entail in practice.

In Finland, polytechnics and universities design their own instruction according to national statutes and their own degree regulations, and teachers and lecturers have full autonomy regarding their teaching, as well as the materials and methods used. There is a tradition of frequently using the results of evaluations to develop study programmes and instructional practices, and students' routes through higher education are followed through the use of common research instruments that serve the dual function of monitoring their experiences and providing a basis for targeted support (see, for instance, Parpala and Lindblom-Ylänne, 2012). Alongside the traditional forms of teaching – lectures, demonstrations and examinations based on lectures and literature – a stronger emphasis on instructional approaches has increased the use of other methods, such as essays, projects, seminars and group work. The use of new information technologies in instruction has also increased. In recent years, both poly-

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[3] All numbers relate to 2015, and are taken from 'Tilstandsrapport for høyere utdanning 2016' (Statistics Norway 2016).
[4] http://www.studiebarometeret.no/en/

technics and universities have strongly developed their instruction. The aim has been to increase students' independent and self-motivated study. There are various forms of projects and teamwork, and studies have also increasingly been transferred outside the institution[5].

The knowledge we have about educational practices in both country contexts, as for higher education more generally, is largely based on self-reported data from academics and students through survey research. This means that the very processes of teaching, ways of engaging students in learning activities, and assessment practices are more or less black-boxed. Targeted studies on different topics such as academic writing, formative assessment and inquiry-based learning have been conducted in selected disciplinary and professional contexts (see Damsa et al., 2015), but few studies have conducted an in-depth examination of how higher education courses are composed and enacted by teachers and students. An overall aim of this project was therefore to learn more about the opportunities and challenges teachers and students face in their everyday work in higher education, within the context of increased emphasis on student-centred learning environments. By including two cases from Finnish higher education, we obtain a richer empirical base and gain opportunities to investigate similar phenomena in a country context in which the quality of higher education practices has been an issue for strategic development over time.

1.3.2 Selection of cases

In line with the resources of the overall project, we decided to include eight in-depth cases on the course level in the project. The selection of cases was based on the following criteria:

- The courses should complement each other in their types of pedagogical approaches utilized, and include common approaches to activating students in knowledge construction
- The courses should give insight in different kinds of technology use
- The courses should be selected from different institutions and disciplines and be distributed on bachelor's and master's levels
- The selection of cases should include courses in programmes that are common and accommodate many students in the higher education sector
- Cases to learn from: We looked for well-functioning courses that could provide rich information on important quality aspects, opportunities and challenges in educational practices at the course level in higher education, rather than 'typical' cases in their provision.

Assuming that quality aspects may be more pressing on the bachelor's level and that this level accommodates a majority of today's students, we decided to include more courses from bachelor programmes. However, as more programmes are organized as five-year integrated programmes and some courses are offered both to bachelor's and master's students, these boundaries are not clear cut. We decided to stay with the public higher education sector, as the majority of HEIs are public in Norway.

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[5] EuroEducation.net The European Education Directory, http://www.euroeducation.net/prof/finco.htm , retrieved 21.12.17

Following the main categories from the literature review report (Damsa et al., 2015), the pedagogical approaches we have analysed were traditional formats of larger lectures combined with seminars, project-based learning in smaller groups, problem-based learning, case-based learning and simulation exercises. We also aimed to include one case relying heavily on online activities to account for the distinct aspects of such learning environments and were concerned that the set of cases would give rich information of feedback and assessment practices.

The six Norwegian cases included in the project are as follows:

Table 1 - Overview of the Norwegian cases

Course	Level	Programme context	Key pedagogical approaches
Programme development	BA	Computer Engineering, Oslo and Akershus University College	*Project-based learning*
Ecology	BA/MA	Biology, University of Bergen	*Portfolio-based* course, comprising different assignments
Personnel management	BA	Organisation and Management, Inland Norway University of Applied Sciences	*Case-based learning* and *Role play simulations*
Supervised practice in nursing	BA	Nursing education, NTNU-Gjøvik	*Technology-based simulation*
Criminal law	MA	5-year integrated master programme in law, Arctic University Norway	*Moot courts*, collaboration with the professional field
Economic management and financial analysis	MA	Experience-based Master of Business Administration, Arctic University Norway	*Online teaching and learning*, combined with campus activities

In line with the overall project design, parallel cases were studied by one of the international partners in the project. Two cases were included from the University of Helsinki, from programmes in biology and law, respectively:

Table 2 - Overview of the Finnish cases

Course	Level	Programme context	Key pedagogical approaches
Field course in ecology research	BA	Biological and environmental sciences, University of Helsinki	*Problem-based learning,* in collaborative research projects
Research methods in Law	MA	Law, University of Helsinki	Lectures and essay writing

For the last decade, the University of Helsinki has had a strategic focus on developing the quality of teaching and study programmes (University of Helsinki, 2006), and the selected cases involve experienced teachers who take interest in developing their teaching and course designs. The domains of law and biology are both large, discipline-based university programmes that experience different challenges in their educational practices. The Finnish cases are conducted in parallel domains to two of the Norwegian cases and provide opportunities for exploring variation in educational practices within related programme contexts.

For all the cases, participants were recruited based on interest in the project and informed consent. Course teachers were contacted on the advice of study programme leaders and invited to participate. We received positive responses from all teachers who were contacted. Students in the selected courses were then collectively informed about the project and invited to sign up for active participation in the research. Groups of students who volunteered for this were followed more closely in their activities, through observation of group processes and interviews. The empirical strategy was approved by the Data Protection Official for Research at NSD. The cases and their participants are further described in the reports from each case that follow in the next chapters.

1.3.3   Methods for data collection

The methods for data collection include participant observation of teaching and learning activities in the courses, interviews with teachers before and after the course/observation periods, group interviews with students and the collection of course documents, assignments, knowledge resources and other materials. In addition, a questionnaire was distributed to the students in most courses towards the end of their course/semester. These data sources allowed us to obtain information about the intentions of the course design as well as how it was enacted and experienced by students and teachers; they also provided opportunities for data triangulation in relation to the research questions.

Teacher interviews were conducted in the beginning and towards the end of the course periods. The first interview aimed at gaining information about the intended course design and focused on aims, purposes and planned activities. It was also used to agree upon a strategy for informing and recruiting students to participate and to gain access to more information through course documents, teaching materials and other resources. The end interview focused on teachers' experiences of the course and the various activities. Teachers were in most cases interviewed individually; however, in courses that were collaboratively offered by a team of teachers, or included teaching assistants, these participants were also included. Interviews were recorded and transcribed verbatim.

Participant observation was used to collect information about the first research question: 'What characterizes the teaching approaches and ways of engaging students in the course?' The minimum time span of the observation period was 2–3 weeks, or around 12 hours in each course, but this varied as it was adapted to course design. We aimed at observing different kinds of activities that were central in the course. Within these frames, we selected some activities for in-depth examination that were significant in the course design and followed these from a starting point (i.e. introduction of new knowledge content or an assignment) through students' work with the content/assignment and to a completion in the form of an assessment. The form of these processes varied between the courses, but it could, for instance, be a group assignment, a simulation exercise or a PBL session. Due to the different organization of the courses and activities, the time span of these activities varied. The observations were registered by way of filling joint observation protocols for teacher-led and student-driven seminars (see appendix 3 for information about observation categories). The protocol for teacher-led activities was designed to register pedagogical strategies employed by the teacher, ways

of activating students, forms of feedback given, knowledge resources that were used or re-ferred to and types of technologies in use. For student-driven, but organized activities, the main categories in the protocol were the type of knowledge content addressed, student activities, questions raised, types of instruction, guidance and support provided, forms of feedback, forms of communication and social-relational aspects, knowledge resources used by teachers and/or students and technology use. The protocols were tested out in different teaching situations before the observation period, and ways of registering information in the protocols were aligned by comparing several researchers' test filling.

Observation data were also collected through video recordings of selected activities that were highly interactive, such as feedback events or peer discussions of tasks. Such data were collected from students who had given their informed consent only, which comprised 10–20 students in each case.

Student interviews were conducted in groups towards the end of the course period. We interviewed groups who had given their consent to be observed in the course, and who had been followed more closely in their work with (group) assignments. The aim was to obtain information about how the course design, its activities and elements were experienced by the teachers. The interviews followed a joint thematic guide, but questions were adapted to the types of activities that had been observed in the course. In addition, these interviews were recorded and transcribed verbatim.

A *questionnaire* was distributed to students in most cases[6] towards the end of the course period, which targeted their course experiences and learning strategies. This was based on the 'How U Learn' questionnaire developed at the University of Helsinki as a means for following up with students and developing the quality of educational programmes (Parpala and Lindblom-Ylänne, 2012). The questionnaire was translated to Norwegian based on existing English, Swedish and Danish versions, and adapted to the course level. Due to challenges with the response rate in several courses, and because the number of enrolled students in some courses was very small, it was not possible to conduct statistical analysis of the data for all courses. In this report, we therefore base our analysis on the qualitative data, supported by information from the survey when feasible.

The interview themes and observation categories are included as appendices (1-3), and detailed information about the datasets in the respective cases is provided in the chapters that follow.

1.4   Analytical approaches

1.4.1   Examining relations in educational practices: Analytical lenses and concepts

In line with an overall practice-oriented perspective and the notions of educational quality described above, our analytical strategy aimed at revealing both the content dimensions of

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[6] For several reasons, it was not feasible to distribute the questionnaire to students in the MBA case targeting online activities in economic management and financial analysis.

the course design and activities and the way in which the different course elements (types of instruction, learning activities, assignments, assessment criteria etc.) worked together in the enactment of the course. To make sense of the participants' conceptions and experiences, and to identify and discuss differences and challenges that emerged in the various teaching-learning environments, we draw on theoretical notions and concepts that relate to student learning and forms of engagement, course designs and relations between curriculum elements, and to the disciplinary content and learning challenges of different domains.

First, student-centred approaches assume an active role of students in learning processes, which involves participation in knowledge construction and exploration. Furthermore, such processes take place in the interaction between individuals, the tools and knowledge sources they have at hand, and the wider social and instructional environment. As highlighted in our review of student-centred approaches and their learning potentials (Damsa et al., 2015,) peer discussions and interaction with others are important in exploring and making sense of disciplinary knowledge as well as in trying out and justifying arguments. In this regard, learning is understood from a sociocultural perspective, which underscores the ways in which students participate in activities and how the activities stimulate productive interactions and knowledge construction (Säljö, 2009). In relation to the teaching-learning environments and course designs, this brings attention to how teachers go about engaging students, to the kinds of participation different activities require and afford, and to how tasks and tools stimulate collaborative knowledge construction.

At the same time, learning is a lifelong process, and the ways in which students engage may vary both according to their previous experiences and their interests in the current topic or task. Activating previous experiences in learning activities and relating new information to what the students already know is important for learning more generally (Brandsford et al., 2005). Hence, a central relation in education practices concerns how the teaching and tasks may account for, and activate, students' variegated experiences. Students also differ in their approaches to learning, and how they experience their teaching-learning environment varies as to whether they activate deep approaches to critically engage with and examine the knowledge content, or whether they stay with surface approaches and treat knowledge more at face value (Parpala et al., 2009). Their approaches are, however, not stable, and the course design and teaching approaches may support deeper engagement when the tasks and assessment forms encourage exploration, critical inquiries and collaborative knowledge construction. Hence, these perspectives can be used to explain differences in student experiences within a course environment, and to interpret experienced challenges in the course designs.

This also brings us to a second issue that concerns the relation between different elements in the course design and how they are aligned. In section 1.2, we mentioned the idea of constructive alignment, which highlights the importance of clarifying the intended learning outcomes of a course and securing that the types of activities, assignments and assessment forms are well aligned with these (Biggs and Tang, 2011). If, for instance, the learning activities encourage critical inquiries and collaborative knowledge construction whilst the assessment forms only recognize individual students' capacity to memorize established facts, this may explain why students perhaps are not too eager to participate in collaborative activities and engage more critically. One focus of the case analyses is thus on how the different elements of

the course design work together. The ways in which feedback and assessment are provided to support learning and the relation between formative and summative assessment in the course design are important parts of such relations.

Other concepts to examine coherence in the course design are related to principles for knowledge organization. Here, a distinction can be made between designs that predominantly take the cumulative structure of the discipline and its scientific concepts as its organizing structure, and designs that emphasize the relation to work practices and the relevance of activities for the students' prospective professional contexts (Muller, 2009). The first type of design emphasizes conceptual coherence, while the second emphasizes contextual coherence (ibid). In addition, we can imagine course designs that foreground specific types of activities as their organizing principles, such as students' building a portfolio of assignments and products that count in the final examination, and courses organized around a project that develops throughout the course. These examples reflect different logics of course organization and how the curricular elements are related to each other. Courses as well as programmes may cultivate one of these logics or combine them, and by revealing the type of curricular logics in play we may analyse issues of alignment as well as tensions that arise if different logics simultaneously (and perhaps accidently) are at play.

Finally, the type of content to be learned in the course and the forms of knowledge this involves are important to consider. The relationship between learning activities and the character of the knowledge in the domain is key in educational practices. In many programmes, and especially the profession-oriented ones, learning challenges are related to ways of integrating conceptual and procedural knowledge, or 'theoretical knowledge' and 'practical skills' in everyday terms. Learning activities may be planned and enacted in different ways to support knowledge integration, and they may have different aims as to whether their primary purpose is to support the development of practical skills and bodily knowledge, to challenge and develop conceptual understanding within the domain or to move beyond disciplinary boundaries to e.g. interact with other types of professionals or clients (Markauskaite & Goodyear, 2016). In all higher education courses, some kind of knowledge integration and adaptation is needed, which can be supported by the teaching and learning environment in different ways. By distinguishing between different forms of knowledge and consider how knowledge can become 'actionable' in various learning activities, we can reveal relations between teaching-learning activities and knowledge challenges in the respective domains.

1.4.2 Steps in the analysis

Following strategies for multiple-case studies (Stake, 2006; Yin, 2009), we analysed the data from each case separately through a joint strategy to develop case reports for the different cases. This served as a basis for cross-case discussion of selected themes that emerged as important for the quality of educational practices.

The analysis of the datasets took place in several steps. First, the information from course documents, completed observation forms and the interviews in each course were condensed through a joint protocol. This protocol followed the main categories of the observation forms. By way of a content analysis, they generated an overview of characteristics of the activities in

the course and how they were enacted, types of assignments with respect to how they were planned and enacted, and the experiences of students and teachers related to assignments and course activities.

A second step was to do a process-oriented analysis of selected activities in the course that were central to the course design and represented ways of engaging students actively in the course. The framing of such activities could, for instance, be the introduction, work and assessment of one assignment, or a role play exercise that aimed to support the integration of different knowledge forms in student learning. The selected activities form 'mini-cases' in the case studies. Data from observations, interviews and course documents relating to the activities were here analysed together and revealed qualities of the education practice with respect to how the teachers engaged and supported students, how students engaged in the activity and how the tasks and tools stimulated knowledge construction.

The interviews were subjected to a thematic analysis (Braun and Clarke, 2006), which revealed experienced challenges and opportunities with the course design and pedagogical approaches. This served to answer the second research question, but also to provide richer information about the course activities and how students engaged.

Based on the descriptive analysis performed through these steps, the information from each course was then analysed as a whole to trace relations in the course designs and practices, identify gaps between course elements and activity forms, and the ways in which the students were engaged and supported in the learning processes. This process was guided by the analytical lenses and concepts described above and generated a theory-informed interpretation of experiences, gaps, strengths and challenges related to the teaching and learning environment in the course.

For this report, we have focused on presenting the analysis of the course activities and pedagogical approaches, and hence placed emphasis on the characteristics and experienced challenges with the different ways of using student-centred approaches rather than following the students' learning processes as such. The case reports that follow give an overall presentation of the respective courses, but place emphasis on different topics and activities that emerged as important for the quality of educational practice in the cases. The final chapter presents a cross-case discussion of what we can learn about educational quality from these cases.

1.4.3   Credibility and limitations of the study

This report presents the descriptive analyses of the case studies of the sub project. It presents activities and experiences within the respective course environments as a whole, with emphasis given to the types of pedagogical approaches utilized in the courses and how these engage students in learning processes. More detailed analyses of specific phenomena within the courses, such as the ways in which students go about in their learning processes or the forms of teacher-student interactions that take place in feedback situations, require in-depth analyses of parts of the datasets, which will be presented in future scientific publications from the project. With this in mind, certain precautions and limitations follow for the use and the inferences to be drawn from this report.

The study is based on material collected from a limited selection of courses in higher education, within a limited time frame. As previously mentioned, the cases have been purposefully selected to provide insights into different ways of working with teaching at the course level and teachers´ and students´ experiences related to these. It follows that we cannot make inferences from the single cases about how different approaches unfold at a general level in higher education. Rather, the case studies allow for analytical generalization and discussion of what we can learn from the case studies regarding issues that matter for quality in higher education practices.

For each case study, a rich corpus of data was generated through the interviews with teachers before and after the observation periods, participant observations of activities, focus group interviews with students and the collection of various course materials and documents. This provides insights into the course activities as they were planned, enacted and experienced by teachers and students. The case studies were guided by joint instruments for data collection (interview guides, observation protocols and questionnaire). Several rounds of joint interpretation of transcripts and readings of case reports and finally the chapters of this report have been conducted among the researchers to secure the quality of the results. The interpretation of the many details and events of a course was further secured by participant validation. Thus, all the lead teachers have validated the individual case reports.

Although the amount of data collected from each case has initially been set to secure a common empirical basis, the datasets of the individual cases are, to a certain degree, uneven. This can be seen in terms of the amount of data collected in each course, and the questionnaire has also been used variably among the cases due to differences in student response rates (for more information, see the following chapters). These differences reflect differences in the course designs and time periods for the teaching and learning activities, as well as the character of the pedagogical approaches used and their related opportunities for data collection. Nevertheless, all case studies have used the minimum standards for observation periods and joint instruments, as described in section 1.3. All cases have a rich dataset collected for the purpose of obtaining rich information about the given pedagogical approaches. The difference in the amount of data is therefore primarily a challenge when looking at the total data corpus of all the cases, calling for a certain degree of caution when inferences across cases are to be made.

It is important to underscore that the case studies presented in this report serve the purpose of identifying quality issues in educational practices by conducting close-up research on how different 'student-centred' pedagogical approaches are used and experienced in different course contexts. They are conducted with this in mind, rather than for the sake of comparative analyses. Although the following chapters are presented in a similar thematic structure with related illustrations, and follow a common outline guided by the joint research questions and analytical perspectives of the study, they should not be read as similar cases for direct comparison. For instance, the cake diagrams used to illustrate the use of teaching and learning activities in each case chapter only refer to the particular case and are developed on the basis of course documents and information from the teachers. The use of colours and terminology in these diagrams are not standardized but follow the rationale of each course environment.

The case studies emphasize challenges and opportunities related to the different approaches to teaching and designing courses. However, a closer analysis is required to make conclusions about, for example, processes of learning, student engagement, feedback processes and deeper insights about teachers´ work with coherence and alignment in course design in the different courses. For such conclusions to be made, a rigorous analysis of more specific and limited aspects of courses must be conducted. In the time to follow, members of the project group will continue their work with the dataset, and the findings will be presented in planned articles and book chapters.

1.5 Presentation of the cases and structure of the report

The individual case studies are presented in the eight following chapters. The overall findings across the cases are discussed and some concluding comments and recommendations for future work and research on educational practices are presented in the final chapter.

The case studies are all presented by using a common thematic structure, comprising of the following main sections: a) course design and teaching approaches, b) empirical context and data, c) characteristics of the teaching and learning environment, d) opportunities and challenges related to the pedagogical approaches, e) conclusion and recommendations. Extracts from data transcripts and vignettes, as well as other data examples, are used to illustrate both unique and typical observations in each case. We have not used any names of participating teachers and/or students in the report. However, as the institutional and programme contexts for the courses are identified in this introduction chapter and since specific descriptions of the course content and activities are necessary to understand the teaching and learning activities, the course teachers are not fully anonymized. This has been discussed with the teachers, and, as noted above, they have also received the report pertaining to their own course for a participant validation.

The eight case reports serve as a basis for the cross-case discussion in the last chapter. Based on the analyses conducted in each case study, and guided by the overall research questions and perspectives of the study, six overarching themes emerged as significant for the quality of educational practices: a) ways of supporting students' exploration and construction of knowledge, b) ways of presenting students to 'real-world' problems in educational settings, c) challenges related to supporting learning in a diverse student population, d) forms of coherence and alignment between course elements, e) teacher collaboration, team work, and division of responsibilities, and f) productive technology use. The six themes are discussed with references to the case studies and overall conclusions are presented, followed by a list of recommendations for the further work on course designs and programme development in higher education, as well as for further research.

This report can be read in several ways. It can be read as a whole by those interested in quality issues related to teaching and learning in large and as a pressing issue in higher education. Those who want a quick overview can read the introductory chapter and the final chapter, and then continue with selected chapters they are interested in. The report can also be read more selectively by theme, either defined by interest in particular teaching and learning approaches and/or by academic field of study. In any case it is our hope that the report

will serve as a source for reflection and inspiration as to how different elements of teaching and learning environments represent potential drivers or barriers for the quality of educational practices and the way they provide opportunities for student learning.

2 Project-based learning in Computer Engineering Education

Crina Damşa

This chapter:

- Provides an example of how project-based learning can be implemented in professional engineering education
- Sets focus on course and learning design that illustrate constructive alignment have been used by the teachers to increase coherence of the learning and teaching activity, and to support learning
- Shows that learning design needs to take into account student variation and to leave space for adjustments on the way
- Shows that project work requires guidance into the complexity of the knowledge domain and support for group collaboration processes
- Shows that formative assessment and ongoing feedback play an important role in students' project work

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2.1 Introduction

The *Programutvikling*/Programme Development course was selected as a course highly illustrative of the use of project-based learning in computer engineering education. This is a specific form of learning activity through which student-centred approaches are being operationalised in engineering education. The selection of this course has a two-fold underlying rationale. First, project work is a complex activity, through which the students can learn both domain knowledge and practices, but also generic skills, such as collaboration. When engaging in such learning activities the students require, generally, skilful guidance and support, and a meaningful integration with the course curriculum and the other planned course activities (Damşa & Nerland, 2016). The selected programme has longstanding experience in organising learning activities that involve a combination of course-organised activities, such as lectures, laboratory/lab or coaching sessions, with individual learning and collaborative student-driven activities, in which the students' degree of responsibility and effort is substantial. In addition, given its specificity, the course also included a range of technologies, introduced

either by the programme or teacher, or used by the students; this allows an insight into how the pedagogical strategies and tools are being brought together in an intended or spontaneous manner. Second, this course is an essential component in the curriculum in computer engineering education. Program (or software) development is one of the central competencies in the computer engineering domain, its mastery being important both in terms of appropriating core knowledge of the domain but also generating opportunities for future employment. From this perspective, the course is important in that it introduces the students to one of the core areas of the field, by introducing them to knowledge, (distributed) resources and practices representative to the domain and, often, employed by professional programmers.

In this chapter, we focus especially on how the pedagogical design enacts project-based collaborative work, in order to make it possible for students to learn and apply advanced knowledge and practices in the field of software engineering education. In line with the research focus stated in chapter 1 (this report), we ask the following framing questions:

- What characterises the teaching approaches and ways of engaging students in the course?
- What challenges do students and teachers face with the given pedagogical approaches and learning activities?
- What can we learn from this case about issues that matter for quality of educational practices?

This case allows us to examine and gain an understanding of both how teaching and learning is organised and takes place and how the pedagogical design employed serves to introduce the student to a specific professional domain and its practice. Before we describe the course organisation and activities further, we give a brief account of what we know about these pedagogical approaches from previous research.

2.2 Previous research on project-based learning in engineering education

Higher education programmes are engaging with the challenge of preparing students to develop capacities to process, assess and employ knowledge, and even to become knowledge producers (Shaw, Holbrooke & Burke, 2011). Such scenarios often include forms of learning in which open-ended, student-directed explorations or research drives the learning experience, where learning is related to performativity and to the active work with knowledge (Säljö, 2010). These scenarios focus thus on student-centred learning activities and can include both relatively structured forms of learning activity – e.g. based on problem-solving or project-based work – and less structured ones (Levy, 2008). These can differ in the type of structure provided to the learner (from open-ended problems to clearly specified end-products) and the nature of the process (focused on problem defining and solving a complex problem, or in producing material solution, or conducting analyses. The project-based learning (PjBL), a form of student-centred learning, has been employed in various contexts. Project-based learning involves students in pursuing projects that involve real-world activities of experts (Kraijck & Blumfeld, 2006). It is characterised by students' pursuing knowledge with a clear, shared goal for the group and by students posing questions based on their own prior

understanding of a phenomenon, and gaining ownership of its knowledge-based explanation. The questions guide students in investigating disciplinary issues, which is expected to result in a product (report, experiment, software etc.) to be presented and assessed at the end (Spronken-Smith & Walker, 2010). The teacher's role is to guide the students in their choice of methods and use of theories, as well as to assess the project outcomes (Loyens & Rikers, 2011). Learners are usually provided with specifications for a desired end-product, and the guidance is more oriented towards particular procedural aspects. In professional higher education, carrying out customer projects is a regular practice, especially in business, engineering, and design studies.

Empirical research on PjBL documents positive features such as student motivation, experience of knowledge relevance and indications of conceptual understanding of abstract knowledge (English & Kitsantas, 2013; Damşa, 2014). On the negative side are complex logistics and assessment, extensive use of time, and difficulties in aligning with other courses (Aditomo et al., 2013; Helle, Tynjälä, & Olkinours, 2006). Previous findings have also suggested that learning across different disciplines and in authentic contexts contributes to creativity, and to generating transformative experiences for the learners (Latucca, 2002). A general critique is that educational practices of project work reduce knowledge to static entities, where problem-solving appears as linear, unambiguous, and de-contextualised (Bucciarelli, 2003). From the perspective of learning as knowledge construction, this model has to withstand the question of giving sufficient space for inquiry and original contributions. There is also a need for more clarity concerning how customers' (e.g., various external organisations, companies) requirements influence student engagement, participation and understanding. In Norway, empirical studies of project-based learning in engineering education (Damşa & Nerland, 2016; Damşa, Nerland, & Jensen, 2017; Nerland & Damşa, forthcoming/2018) show that, in the context of project work, students are introduced to standardised procedures for product development, and are presented with versatile tools for supporting their work. Such local studies also show that the way students participate in the process is influenced not only by their interest and the way they participate in learning activities, but also by how the programme facilitates their interaction with the procedures and resources of the domain.

In particular, we examined which pedagogical aspects are important and contribute to organising and supporting project-based activities to optimise students' learning. We focused on a number of aspects which we singled out as having potential to shed light on the aforementioned, namely:

- which teaching and learning activities have been planned and enacted in the course;
- whether and how the project-based learning activities have been: framed in the course documents; were part of an overarching pedagogical vision and approach/scenario; prepared and organised by the teaching team; integrated with the other course activities; provided with structure, resources, guidance; provided with formative feedback during the course period; and assessed in a clear manner;
- how the teaching team enacted the teaching, guiding, assessment activities, in addition to how they reflect on the course work, their own and the students' work and performance;
- the way the students: participated in course activities and especially in project work; understood the project work's added value and the way it is connected with the other course

activities; were stimulated to engage, think critically, act and reflect in relation to their project work; managed the complexity of the project situations; experienced the collaborative work and the support/guidance provided by the teaching team; and perceived the value of the project work for their own development as future professionals.

2.3   Empirical context and data

This case study was conducted by following and documenting a second semester bachelor's level course in the Computer Engineering programme at a large university of applied sciences in South Eastern Norway. The programme offers bachelor's and master's degree programmes in the engineering and information technology field, and it has as strong connection to the professional practice of software development. The selected course is a 10 ECTS bachelor's level second semester course, which introduces students from a number of study tracks at the Computer Engineering programme to advanced object-oriented programming knowledge and project-based programming using Java as a programming language. The course was planned and designed by a lead teacher, and was taught by this teacher, supported by one other lecturer and 4 teaching assistants (TAs). The two teachers each held a PhD in computer sciences (both from foreign universities) and had varying levels of teaching experience in Norway and abroad; each held lectures on themes within their field of expertise. The TAs, who were selected from among the programme's older cohorts, led coaching sessions, provided feedback in the lab sessions and assisted in the assessment of intermediate assignments. The organised course activities were documented through representative sampling. Of the total of students participating in the course, 15 students, organised in 5 groups of three, agreed to their group project work being documented. Table 1 below provides an overview of activities and data.

The collaborative project (called 'semester assignment/semesteroppgave'), consisted of developing a digital board game (called 'Game of life' or GoL), using the principles, programming languages and strategies learnt during the course (i.e., Java, CSS), and documenting individually their programming work. Each individual student was required to have fulfilled the mandatory individual assignments prior to engaging in the group work. The groups could meet twice a week during the lab time, but they were free to meet or work outside these hours too. The lab leaders were present during the lab hours and answered questions of the groups or individual students; questions regarding the development process could be addressed at any point through email to the teachers and TAs. The software product was first assessed in a formative fashion two weeks before the final deadline, with feedback being provided by the teaching staff. The project outcome (software and documentation) was the main material for assessment for this course.

Table 1. Overview of teaching-learning activities, participants and dataset (computer engineering)

Information on the teaching-learning settings	
Number of staff teaching the course	2 teachers (one the lead teacher) + 4 teaching assistants
Number of students enrolled in the course	170
Project period	18 weeks
Main assignment features	Development of software; use of programming languages (Java, fxml); use of validation procedures; delivery of a functional product (game); provision of individual documentation on programming choices; project work
Teaching and learning activities	Lectures; collective coaching hours; labs; group work (projects); project presentations; feedback on group work
Information on the research study (participants, data types)	
Number of students	5 groups of 3 students
Types of data	General course material: course plan, syllabus, lecture slides, task descriptions, resources provided via the Learning Management System (Fronter) Observation protocols: a total of 11 lectures (16.5 hours), 22 coaching sessions (22 hours) and 6 lab session (12 hours) were observed by three researchers Video recordings: 5 groups followed over 10 weeks and collaborative project work documented (36 hours of video-recording) Audio recordings: 5 groups followed over 10 weeks and collaborative project work documented (120 hours of audio-recording, overlap with video); presentation of project by each group for formative assessment; three TAs' feedback sessions Documents/Products: drafts and final versions (screen shots) of the 5 groups' product Interview data: Pre and post interview with main teacher (each 1h); post-interviews with second teacher and TAs; post-interviews with groups (each 1 h); Field notes/social media data: field notes from every site visit; course-related communication on Facebook and email Student survey: end of the course, questions about experience of teaching-learning environment, approaches to learning, self-efficacy, 22 responses (12% response rate)

2.4 Characteristics of the teaching and learning environment

2.4.1 Planned teaching and learning activities

The *Programutvikling* course is a sequel, and builds on knowledge gained in a first semester introductory course in programming, taught by the same lead teacher. According to the course plan, the students were expected to: acquire conceptual knowledge related to object-oriented programming; develop skills in applying various programming techniques; and develop competence in setting up and managing projects in groups. In order to achieve these outcomes, the lead teacher re-designed the course, based on '*discussions with students who previously were enrolled in the course and on what I thought was best for the student in terms of learning activities*' (Pre-interview lead teacher/T1). This course iteration was completely re-structured by the new team of teachers. From a functional perspective, the course structure, learning outcomes and activities were selected to meet the formal guidelines of the programme, which stipulates that at the end of this course the students should possess programming skills. But the lead teacher has addressed the programme plan by integrating it with the domains standards and with his own perspective of what is essential to address in the course.

In the interview, he articulated his vision (enacted in the course design as well) of what the students were to learn of particular programming knowledge and skills and particularly why, together with what pedagogical strategies he planned to use in order to make this happen. With regard to the former, an important part of learning to program is about understanding the principles and logics of coding, and learning to reason using these conceptual tools to develop some solid programming skills. Both lecturers indicated that they designed their lectures in a way that could allow conveying most knowledge in the most accessible way. The lead teacher (T1) indicated that the group work and assignments represented the essential way for the students to engage with the conceptual and practical aspects of programming in Java. The knowledge was to be conveyed through the lectures, which were designed to focus only on conceptual matters; the students were clearly instructed to not ask procedural questions related to their assignments. These questions were to be addressed in the labs and coaching sessions. From a pedagogical perspective, the lead teacher insisted that teaching and learning to program is not about giving the students the solutions to problems (often encountered in this process) but about providing them with the necessary knowledge, guidance and resources to find and develop these solutions by themselves:

> '... in programming there is no single solution for a problem. One can proceed in many ways. So, what we are interested in is not to describe solutions for the students, but to get them to come up with solutions themselves. So ... we can coach them, on how to find solutions, but the students must take the necessary steps themselves to ... generate these solutions.' (Pre-interview, T1).

The planned course activities were intended to reflect both the programme's formal guidelines and the lead teacher's vision. (see Figure 2).
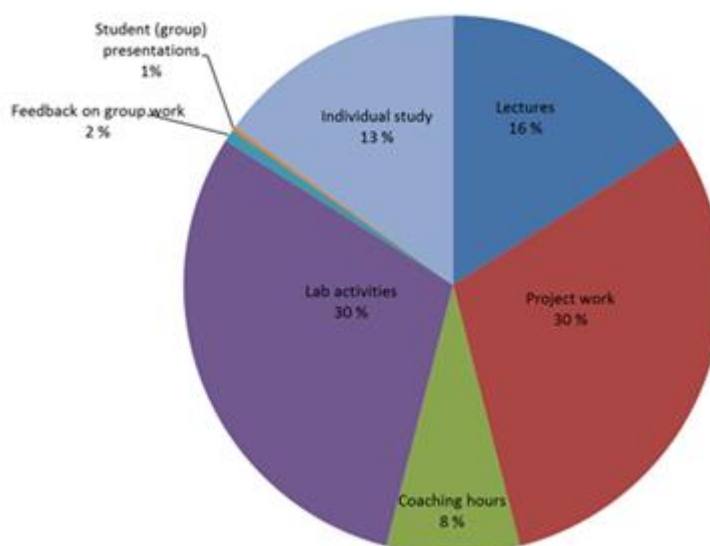

Figure 2 - Distribution of planned course activities (computer engineering)

We categorised the course activities, based on their description in the course documents, in course/teacher-led activities and student-driven (learning) activities, and a mixed type. The

former included a combination of: weekly lectures; weekly coaching sessions led by TAs with a total of 20 students attending each; and assessment moments, based on the groups' presentations. The student-led activities consisted of the group project work, in which triads worked together on developing software; bi-weekly labs, in which the group members could work together and request feedback from TAs; individual study. A hybrid type of activities was represented by the feedback sessions, which could be initiated both by the students and the teachers/TAs. Furthermore, the assessment moments also included group presentations by the student group, making this a hybrid type of activity as well.

The collaborative project work consisted of a large assignment, highly structured, to be performed in a series of 8 sub-assignments (see Figure 3), which were structured in connection with themes addressed in the lecture. The sub-assignments were cumulative and, upon being performed correctly by the groups, would lead to generating components of the software product, and eventually to the final product – a board game. The assignment was structured to be performed in steps, in order to provide the students with the opportunity to build their knowledge and experience with this type of knowledge & activity gradually; the sub-assignments increased in complexity. Organising work in project groups was motivated by the need to familiarise the students with the practice established in the software engineering field. This is how the project assignment was interpreted by one of the TAs:

'The groups must develop a game that plays itself. The basis is a grid, and each entity (family, neighbours, etc.) on the grid 'lives' according to particular rules. The game needs to contain rules that allow and support entities to live. The entities live or die depending on whether neighbouring entities live or die. The mathematical rules to be implemented are rather simple (probabilistics) but the programming process requires a good knowledge of these principles and the ability to apply the various techniques taught in the lectures.' (Pre-interview, TA1).

Wekly lectures	Group project (planned)
Lecture, theme	Assignments (proposed plan)
Introduction to course OOP-recap (from previous course/DAPE1400)	Introduction to semester assignment (GoL)
Design patterns	GoL planning: modelling
Architectural patterns	GoL planning: modelling and GiT
JavaFX and FXML	GoL planning: FXML
Multidimensional tables	GoL data structure and grafics
Texting, exceptions	GoL animation
File handling, streams	GoL unit testing and documenting
Winter break	
Text manipulation, regular expressions	GoL file handling and exceptions
Recursive functions	GoL additional: editor
Generic programming	GoL additional: saving as GIF
Easter break	
Java Collections	GoL additional: statistics
Java Collections cont.	GoL additional: saving as WAV
Functional programming in Java	GoL dynamic network
Parallel programming in Java	GoL thread programming
Program development	Semester assignment
Theory related to Game of Life (GoL)	Semester assignment

Formative assessment moment (no grading)

Formative assessment moment (no grading)

Summative assessment (grading)

Weekly tutoring sessions

Bi-weekly labs

Ongoing individual study

Resources available at all time: syllabus, lecture slides, Java online library, GiTHub (programming work plaform), online crowd-sourced resources, teacher via email, social media and Microsoft Outlook affordances
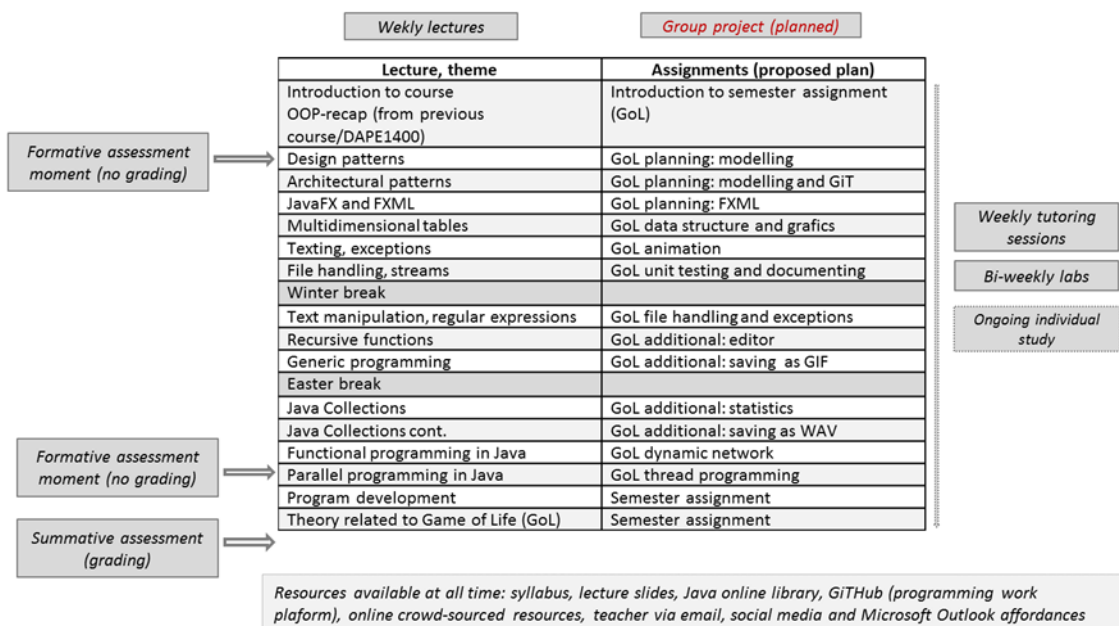
Figure 3 Collaborative project assignment structured in connection with other course activities

The assignment was constructed in a way that included two (formal) formative evaluation moments: the assignment was to be first planned in the group, before the actual programming was performed, and the presentation and approval of the group's plan and strategy by the teacher/TA was a pre-condition for continuing the project work. Another formative assessment moment was two weeks before the final deadline, when the groups were to present their product and receive feedback. The grading was based on the software product generated in the project and the (written) documentation of the individual programming work. In addition to the main group assignment, the students had the choice to also perform an individual assignment, on app development; this would add to their learning of programming, since app development is a highly marketable skill in the field, but was not graded.

2.4.2 Enacted teaching and learning activities

Knowledge content and resources

As explained by the lead teacher in the pre-and post-interviews, the knowledge addressed in this course is central to the software programming field and a requisite for becoming a programmer. Therefore, it is being introduced through different channels of communication (lectures, coaching and feedback sessions), applied in practice (through the project assignments or individual work) and assessed in detail. The main themes addressed in this course are outlined in Figure 3. The first column displays the themes addressed and elaborated upon in the lectures. We can notice that these are broader, overarching conceptual themes, which entail sets of concepts and notions (for example, architectural and design patterns in programming, different approaches to programming – functional, generic, peer, etc.). The observations revealed that the lectures' themes and the way these were elaborated followed closely the planned outline in the course documents. During the lectures, various knowledge resources were regularly presented or explained by the lecturer, relevant to the respective theme. Examples of such resources are: the Java library, where the students can find documentation on various concepts, approaches or methods; relevant syllabus chapters; the lectures slides (available in the LMS); and scientific work (articles/books), used by the lecturers themselves. Some resources were indicated as mandatory (the Java library), while others were optional.

The second column in Figure 2 visualises the detailed topics to be taken up by the students in their collaborative project work. These are more concrete and applied (in that they can be directly worked with during the programming session and do not require further operationalisation). This is in line with the pedagogical notion explained by the lead teacher, namely that having more confined topics for each sub-assignment made the knowledge more accessible and increased the chances of the student groups' successfully finalising the assignment. The more bounded themes the student group were to work with in the projects are each directly linked to an overarching/broader topic addressed in the lecture. The connection was valued by the students, but both teacher and students indicated that it was a rather ambitious intention, and the coordinated link between the lecture themes and the project sub-assignment themes could not be easily maintained because most of the groups worked slower than expected. In addition, in the coaching sessions, (detailed) topics relevant to the projects were

addressed and elaborated upon in different ways by the TAs; these topics were brought up by the TAs themselves or by individual students and groups. Examples of such topics were: peer programming, Java effects, coding tables, use of Boolean/binary principles, bit vs. byte notions, importing canvas, PHP strategies, etc. To address these topics and questions the TAs consistently referred to the lectures and to the Java library as resources. Finally, the feedback moments during the lab reiterated much of the knowledge addressed in other activities, through questions by the students and answers by the TAs, who often pointed out the same knowledge resources, but often also crowdsourced programming platforms, such as Stack Overflow.

Pedagogical strategies, communication modes and types of technologies employed

The pedagogical design of this course was complex, including a variety of teaching and learning activities, forms of communication and technologies used as resources or as support for the work. The conceptual and programming knowledge in the lectures was introduced through verbal presentations and explanations, but also through providing examples and demonstrations of, for example, logical/mathematical problem solving, and of basic string coding. At various points, the observations document that the lecturers attempted to activate the students' prior knowledge of programming (through questions, incidental quizzes and quick logical problems. Summarising techniques were often used by the lecturers to sum up the essential points and emphasise the take-home message at the end of the lectures. One of the lecturers used PowerPoint slides consistently throughout the course; the lead teacher used PowerPoint slides only incidentally, and used drawing sheets (projected with the overhead projector) to explain algorithms, demonstrate various steps in logical operations, and generate visual accounts. The dominant mode of communication in the lectures was verbal monologue, with incidental dialogical sequences (question and answer), supported by various technologies used as tools or resources. In the coaching sessions and lab sessions, the main pedagogical methods employed were verbal explanation and dialogue (question-answer-elaboration) between the TAs and the students. Generally, the TAs established the ways of working by explaining these at the start of the session. Resources used were the Java programming platform (wherein some of the TAs demonstrated coding steps and strategies), the Java library and Stack Overflow (where resources were identified), and the board (where one of the TAs often explained and generated sketches of basic notion, steps, and overviews). In addition, a form of guidance of group work was used by some TAs in the coaching sessions. When no topics were addressed with the entire class, the student groups worked together on the project and the TAs provided feedback on request. This was a situation similar to the one in the lab time, when the group could sit and work together, while the TAs were available for answering questions. The observation data indicated that the feedback provided during the coaching sessions and the lab was extremely useful, because it was tailored to each project and group's work, and was applied (as opposed to the lecture material, which was viewed as rather abstract and theoretical). The data indicated also that the TAs were rather challenged in their attempt to provide feedback to as many students as possible, and that they often did not achieve this goal, despite their great efforts, with some more assertive student groups

receiving regular feedback and other groups only incidentally. Generally, the feedback was appreciated, but some groups reported the need for more guidance to organise project work: '... *but then we get back to strategies on for example GitHub, how to actually make the collaborative coding work. Guide us on that – guidance on how to plan a project, that is something that could have been done more'* (Final interview, G2).

There was intensive technology use in connection to group work. The groups used the technology and software introduced in the course as part of 'profession-specific' technologies for programming (GitHub, FXML, Java), documentation (Java Library, fmxl), but also other generic tools and applications for communication and collaboration (Skype, Facebook Messenger, Outlook). It was regular practice that the students were permanently online, with search engines open and even communicating online while sitting and working together. The students had a high competence level in the use of generic tools, but found some of the professional tools somehow challenging to use: '*We haven't like exploited the potential that lies within GitHub because we are novices in using GitHub. So I think there should be, should have been a lecture or training on using collaboration tools like GitHub'* (Final interview, G3).

Table 3 Overview of technology and applications used (computer engineering)

Offered by course/teacher	Employed by students	Context of use/Pedagogical strategy, Activity
PowerPoint slides, (Overhead) projector		Lecture/Demonstration, Presentation, Drawing; Knowledge resource
Fronter	Fronter	Learning management system, Information sharing; Information source
	Dropbox, Google Drive	Repositories, collecting and storing information
FXML programming platform	FXML programming platform	Lectures, Coaching sessions, Project/Programming
GitHub	GitHub	Project/Collaborative programming platform, repository
Java library	Java library	Lecture/Demonstration, Explanation, Project
Web browsers: Google, Safari	Web browsers: Google, Safari, Internet explorer	Learning management system, repository of course documents, Information sharing
	Social media, WhatsApp, Viber, Messenger, Skype, Mobile phone	Communication between students
	Microsoft Outlook	Planning

Student activity and collaborative project work

Finally, in the collaborative project work, a variety of learning activities and elements were envisaged in the pedagogical design and enacted throughout the course. During the lectures, the students were prompted by the lecturers to (individually) answer conceptual questions and to engage in problem solving exercises with short timespans. The level of engagement in these 'activating' moments was not very high; some students motivated this by mentioning the fast pace of the lectures. The students were also offered the opportunity to ask questions themselves. In the coaching sessions, the level of participation varied; some students displayed a high level of engagement, answered questions and participated in generating elaborations and explanations together with the TAs or the own group, while others were either

passive or working individually on other tasks. The students explained the low level of engagement in various ways: the goal of the session was not clear, the topic/question was not relevant to their project, or their group was not present. Some of the TAs attempted to actively prompt students to answer by attending assiduously to groups' work and by repeating the aims of the sessions. In the lab session, the students were in charge of their learning activities. The two-hour lab sessions took place in an open space and two spacious labs, where students were free to move around, sit together with peers or work alone. Some groups chose to sit in group rooms which were isolated and quiet, but there were not enough for the high number of students present at the lab. During the labs, the types of activities varied, with students working individually, discussing with each other, or addressing questions for feedback to the TAs.

The group project assignment was introduced in the first course week, with explanation from the lead teacher of the project aims, an outline of the sub-assignments and of how the project will be assessed. The groups were formed by the teacher, based on an algorithm that grouped the students according to performance in the first-semester course. This group formation technique was designed by the teacher to engage stimulated students in working with peers with a comparable level of knowledge and to avoid 'free riding'. In practice this strategy was not welcomed by all students, because some wanted rather to work with students they knew from before. The TAs and the teacher made additional efforts to mediate problems that arose in relation to group work. The project groups were then placed in coaching groups, which were also organised based on performance, on nine levels. The generic project work strategy observed in groups entailed: discussions during face-to-face group meetings (or on Skype), individual work while sitting together and short moments of consultation; division of labour (each student worked with a different part of the project, which was then merged with the others); seeking feedback when encountering problems; and communication via mobile devices or social media when not meeting in person. Most of the students worked during the 2-hour lab sessions, but others spent many more hours sitting together and working on the projects. The choices for this strategy were articulated both by the TAs and the students, who deliberately chose to work longer than 2 hours to allow time for group discussions (up to 8 hours in some cases). Some groups deliberately chose to deliver an advanced product, aiming both at learning more advanced knowledge and skills, and a higher grade. Some groups chose to meet less frequently, have Skype meeting sessions and divide labour completely.

Forms of feedback & assessment

The feedback was focused mainly on the project work, and was mostly provided by the TAs during the lab and coaching sessions. Some students indicated that the teachers were also available for providing feedback through e-mail. Often, the TAs prompted groups to explain their projects or challenges encountered and provided feedback based on these accounts. The feedback was almost exclusively (as observations, recordings and interviews indicate) focused on aspects of software development, problems in the coding process, use of various tools and resources, application of theoretical principles, etc. Incidentally, feedback or guidance was documented as focusing on project management or collaborative work in the group. The feedback had a high formative value, being directed at the groups' understanding of the

principles of programming and at clarifying the use of various techniques and tools, rather than providing ready-made solutions. In exceptional cases, the TAs helped practically with coding. This type of guidance was received with appreciation by the groups at a higher performance level, but with some frustration and struggle by groups which were less advanced in their project work and understanding.

The project product was the sole subject for the course assessment, together with its presentation by the group and the individual documentation of the process provided by each student. The assignment, assessment strategy and procedure was presented briefly by the teacher at the start of the course and was described, together with the assessment criteria, in course documents available in the LMS. The assessment was organised in such way that it included two formative assessments, one at the beginning of the project period (when the groups were to receive a green light for the project plan) and another two weeks ahead of the project deadline. The latter was important for the groups, since they could present a nearly-finished software product and receive feedback from both teacher and TAs on how to improve or finalise the project. The way in which the teachers and the TAs provided feedback varied, with some providing extended and detailed feedback, and others being rather summative and minimalistic in their feedback approach. The students generally also had the opportunity to explain their work and ask questions. The final assessment was conducted by the lead teacher and an external evaluator, who received the final products and the individual documentation delivered by the student through the Fronter LMS. There was no feedback included in this assessment, except for the cases where the grade was very low and the teacher called in the students for a debriefing. Based on the lead teachers verbal account, the assessment generated a normal grade distribution.

2.4.3 Students' and teachers' experiences

The interviews conducted at the end of the course period with the five student groups, the teachers and the TAs revealed the participants' perception and experience with the planned and enacted course activities.

In general, the students reported that the course activities were useful in supporting them to engage with the domain knowledge and skills. Overall, the course aims were clear, the students had access to all the information made available for the teacher in the Fronter LMS, and the students understood what they needed to master, but there were also reports of not being able to estimate the amount of (new) knowledge, skills and work needed to reach the level of proficiency as indicated in the course outcomes and by the teacher. Finally, some students indicated in the final interview that they felt they learnt the technical skills and knowledge needed to program, but felt less confident about having learnt to manage a software development project:

> 'I (Interviewer): … but what did you actually learn? Because I'm sure you learnt a lot. What of these expectations were actually fulfilled?; S2: Yes, we learnt about programming… yeah, we learnt a lot about the technical part of program development, we learnt the different ways to test, to make sure that code works; S3: I think generally the course met my expectations,

but, for instance, there are some stuff I didn't like. The part that goes around the program-ming process itself, the organising.' (G2 final interview)

With regard to lectures, the students indicated that these were insightful, but the knowledge load was high and that it was difficult to directly understand how it could be applied in the assignments. They appreciated the clear explanations by the lecturers, illustrations using ex-amples from various known software, articulated demonstrations of various logical mecha-nisms behind some of the coding approaches and guidance in identifying sources of infor-mation. The students' experience with the coaching sessions (gruppetimer) varied. Some ex-perienced positively the coaching groups being formed to match their knowledge level and about having the opportunity to attend together with their groups. But others considered that specific technical questions were not addressed directly and that the setup was not com-pletely clear. The lab sessions were identified by the students as the most useful form of or-ganised activity, because of the self-determined work pace, opportunities for interaction with peers and student-assistants, and opportunities to work and receive feedback on the project:

'The student assistants generally, because they had both the lab and … and whenever I asked about something that was in the tasks, I got good help. And that was what I heard from other groups as well. That when it was something that was specifically talked about in the project description in the tasks.' (G2 final interview)

The students' experiences with the collaborative project assignment were predominantly positive. The students indicated that they learn much domain-specific knowledge from this activity, and also aspects of work in collaborative projects. Besides the knowledge of pro-gramming, among the aspects emphasised in the interviews as positive/useful were a better understanding of: the nature of project work in the field of software development; the prob-lems that can arise and the solutions to be pursued when engaging in practical development work; the amount of work necessary to achieve the project aims; the way software develop-ment can be organised in a (more or less) professional way; the types of collaboration needed when working on development projects; etc. An example:

'Practical work, yes. When you sit in program and working with the project and you're using a list, for instance, and you see how it works, then you understand why it was brought it up in the lectures. For me, I just learnt by working with it instead of just hearing about it.' (G1 final interview)

A set of challenges and difficulties was identified, and confirmed by a majority of the students, one being the group formation. Some students experienced the groups being formed by the teacher as problematic, since they considered it unjustified for the teacher to organise the groups; few, however, had an objective explanation of why this was not the recommended way. Another issue was the size and the complexity of the project. Most of the students indi-cated that they understand such projects must be sizeable, in order for them to learn more and to understand what a project entails. However, they felt they were not sufficiently made aware of the complexity and difficulty of the assignment, both in terms of the knowledge con-tent and the way of organising the development work. Of the most important issues, the stu-dents named incapacity to estimate how much complexity should be built into the software,

lack of capacity to anticipate what knowledge would be necessary (and what they should spend their study time on), incapacity to easily decide how to divide labour and how to bring output of individual labour together, little insight into how to apply the theoretical knowledge contents presented in the lectures into their project, difficulties with planning the development work, etc. With regard to assessment of the project, all groups indicated that there was some lack of clarity of what exactly will be decisive for the assessment, even if the general criteria were announced; some suggested that a clearer elaboration of concrete criteria and better communication would have been helpful.

The lead teacher indicated a clear agenda in restructuring and redesigning the course in terms of: aims, types of organised course activities, student support and guidance and the knowledge content. The rationale for this restructuring effort is that the students must learn programming knowledge and skills not only by learning how to program, but to understand the logical and mathematical principles and knowledge underlying programming strategies and techniques; this was the rationale behind introducing coaching sessions and organising them in performance-based levels, together with avoiding free-riding and increasing the opportunity for collaboration and discussion on topics that everyone would have knowledge of and be able to handle. The experiences with this selection were mixed; while still considering these as good principles, the teacher acknowledged that there is need to better organise work in such level-specific groups, which can stimulate both developing basic skills but also higher level competences:

> *'We will consider what we do next year, for all categories of students.... Because we must plan for those who need to learn the basics of programming, but also...when they (students) come to such a high level and there is no guidance it has to function somehow, they must inquire themselves, it is part of being a good student.' (Final interview T1).*

The final assessment criteria included various aspects of the product and process in order to acknowledge various aspects of the students learning and development. The way the lead teacher envisaged and designed the guidance and feedback activities appeared less clear. He stated clearly that the students should only receive guidance on problem solving, and not receive ready-made solutions (convergent with the aforementioned idea). However, it is less clear how this principle was implemented in practice during the coaching sessions and during the lab, since the TAs had a high degree of freedom in filling the content of these sessions. The assessment of the intermediate assignment was organised in such a way that the assessor should clarify the final assessment criteria for the students, and generate formative feedback that could help the students improve their projects in the final phase. T1 indicate that the project was '*a very good way to assess their programming skills as well as their group working skills. It has just the right amount of different sort of technologies you should use, and show how to use them differently.*' (Final interview). The challenges reported by the teacher were: a) the heterogeneity of the student population in the course; b) the varying level of involvement and commitment of some of the students, which led to misbalances or problems in some groups, which required attention to be given to mediating at social level (by TAs or teacher). Overall, both teachers reported positive experiences and a sense of accomplishment in the way the majority of the course features were implemented.

In the interviews, the teacher assistants (TAs) indicated varying levels of expertise/knowledge with regard to software development (as dealt with in this course). Two of them indicated good knowledge of program development (having obtained also good grades in the course), one explained that he does not feel he was an expert in the domain of software development, but he that he had enough knowledge to help those students who are actually in need of additional support. The TAs reported that they have not received pedagogical training ahead of their appointment. They were informed by the lead teacher about the structure, aims, approach in the course, and the main learning outcomes envisaged; the final assessment decision was based on discussion with the two teachers. The TAs indicated that they relied on their intuition and experience to organise the guidance and feedback for individual students and the groups, which was much appreciated by the students:

> *'S2: I learnt from T1 and T3 […]: S1: But he (T1) has the deeper knowledge […] And he just doesn't write the solutions, he tries to, like he gives more help and we try to solve it. Yeah, you learn a lot like that. He just doesn't give you a finished code, no; you have to think a little bit about it. But he sits with you and he has patience, he has a lot of patience.' (Final interview G1).*

They developed to a practice in which the TAs helped each other occasionally when difficult questions were raised by the students, but also that TAs switched sessions impromptu, depending on the students' needs:

> *'TA1: I would do my best to, if I had no clue I would just tell them, you should probably ask T2 instead, he probably knows a bit more than me about this. […] …and he would do the same when they were asking about graphical interfaces and stuff, that was something I have more experience with than him. So it kind of worked both ways. (Midterm interview TA1).*

In terms of challenges, the TAs also indicated: the heterogeneity of the student groups; the lack of motivation of some groups/students; their own lack of pedagogical knowledge; the large number of students they were supposed to support; the lack of clear guidelines on how many hours the TAs should spend on this work, how many students they should help, etc. Overall, the TAs indicated they have learnt much from this experience themselves, in terms of both programming knowledge and skills, about project work management, and about providing tailored guidance and feedback.

2.5   Discussion

The case examined in this study provides an illustrative account of how student-centred environments and approaches to learning – involving group work, student organising and managing own/group's learning activities (Jonassen & Land, 2012; Levy, 2008; see also Chapter 1) are applied and enacted in the context on software engineering education. Project-based learning is the particular form of activity that has been employed and implemented in this course, but which was complemented by other course-based/teacher-driven activities and individual learning activities. This case allowed to examine and gain a better understanding of both how teaching and learning are organised and take place in this context, but also how

the pedagogical design employed serves to introduce the students to the specific professional domain and practice of software engineering; the conclusions, however, are applicable beyond the boundaries of this programme. In particular, we examined which pedagogical aspects are important and contribute to organising and supporting project-based activities to optimise students' learning.

2.5.1 Alignment of course elements and domain-specific knowledge and activities

As shown in the literature (Levy, 2008; Spronken-Smith & Walker, 2010), designing and implementing student-centred learning activities is demanding, and while project-based learning is one of the most common forms, it is not to be taken for granted that successful organisation and implementation is a simple task. As illustrated by this case, usually, group-based work is combined with other learning activities, teacher or student-driven. This requires a thorough vision and organisation in order to attend to the alignment of course components, but also in relation to the curriculum (i.e., knowledge) components and assessment (cf. Biggs & Tang, 2011). In this course, the empirical data indicate that the envisaged design was faithful to the constructive alignment principle, in that the lead teacher considered the relevant domain-specific sequence of curriculum elements, the way these should be introduced through various course activities and teaching methods, how the process should be organised under way and which feedback and assessment forms should be used to match the learnt content and skills. The lead teacher in this course engaged with this task in a thorough and systematic manner, by identifying contents and skills of relevance, organising these sequentially and selecting the adequate course and learning activities in order to create the settings for an optimal learning experiences and outcome. The reports of both teachers and students indicate that the envisaged course design reflected clearly a pedagogical vision and the specific software engineering domain knowledge and skills to be learnt. The aspect of alignment was thus addressed both with regard to matching specific curriculum and the teaching/learning methods used for structuring and supporting students' learning.

At the same time, the enacted design differed to some extent from the one envisaged. While some activities were pursued and enacted as planned (such as lectures and lab sessions), others proved to be more challenging to realise according to the envisaged design (e.g. group tutoring and, in the case of some groups, the project work). The level of complexity and difficulty of the knowledge contents and competences required to engage successfully with the project task was reportedly one of the main issues, generating a need for adjustment. Such adjustments were performed during the course in the tutoring sessions, which required a more tailored approach that matched the different students' needs and in the project groups, where different types of advisory work were needed. In a sense, these emerge as positive interventions by the teacher and TAs, which aimed at aligning the envisaged activities better with learning needs of the students; a prerequisite of the student-centred learning perspective (Levy, 2008).

A special aspect highlighted by the various data sources is that of the nature of the knowledge domain and how the organisation and performance of teaching and learning is

influenced by it. In the case of the software engineering, it has become clear that the epistemology and logics of the of the domain, i.e. the learning and production through solving problems (Damşa & Nerland, 2016; Latucca, 2002), determined to a large extent the way the curriculum organisation and the teaching/learning activities have been considered and employed in the design. The project assignment and lecture material were framed in a way that prompted and supported the students to identify and generate programming solutions themselves, and did not provide ready-made solutions. This is in line with the pedagogical vision of the lead teacher, who indicated commitment to prompting and supporting the students to understating the principles and logics of programming, essential for setting the foundations of learning and development as a programmer (Nerland & Damşa, forthcoming/2018).

2.5.2 Pedagogical principles and strategies in project-based learning

As shown in this empirical data, this (entire) course was structured with the group project assignment at the centre of learning activities. The project-based work and product was intended to provide an arena for both learning and applying domain-specific knowledge and skills and collaborative project skills. The other course activities were planned in such way they can provide the basis, input and guidance for the students to engage in the project work. Based on empirical examination, a series of aspects deserve to be highlighted as productive when considering this type of student-centred activity, and in relation to the connection between curriculum and activities, together with some that need to be carefully considered when intending to improve such settings. One aspect relates to making the function and value of the project-based work (assignment in this case) explicit and clear to the students, which relates to some extent to both raising awareness of the way the characteristics of the professional field are being recreated in educational settings (Bucciarelli, 2003; Helle et al., 2006). As the teachers and TAs in this course emphasised, the students have to understand that project work in one of the main forms of practice in the field of software engineering; in that sense, this was faithfully addressed by the teaching staff, who allocated a high level of attention to introducing the task and consistently reminding the students about its importance. One aspect that undermined (in the case of some groups) work on the project that was perceived as successful by both teacher and students was the less clear/explicit presentation of the complexity of the assignment and what it takes to arrive to a final product. Guidance and support applies not only in introducing the task and underlying its value but also in unpacking the complexity, the goals and the necessary (time and effort) investment in a way that the students, as novice programmers, can gear themselves and organise their study and work accordingly. This type of observation goes beyond the recommendation by Loyens and Rikers (2011), who pointed to the need for guidance and support by the teacher once the students are working on their projects.

An aspect that is worthy of attention is the way the student groups are formed, together with differences in the way groups enact their project work. It is a difficult issue to address, given the diversity of the student population, and teachers often struggle with finding fit-for-all solutions. In the observed case, the teacher engaged in a creative way in forming the groups, based on performance level, aiming at increasing the homogeneity of the groups. The

practice in the course has proven that this strategy matched very well groups with a higher level of prior knowledge and ambition to perform well, but was not necessarily productive for groups/students that performed less well. Literature (Damşa, 2014; Loyens & Rikers, 2011) indicates that guiding structures and activities (i.e., group supervision, feedback session, coaching) are necessary to maintain project group work on course and reassure students of the value of this work. The teaching staff in this case were faced with a challenging task of having to provide tailored guidance and support to especially the groups that encountered difficulties in performing the task or pursuing collaborative work. This required a high level of investment, but sustained feedback from TAs and close coaching of some of the group by the teacher led to more groups finalising the project work, which indicates a way to address the issues generated by the group forming strategy. Nevertheless, literature on collaborative work (cf. Damşa et al., 2015) points at aspects of group dynamics that should be also taken into consideration when forming collaborative groups.

2.5.3 Students' exploration, knowledge construction and learning experiences

With regard to the students' experience with the project work, the case study recorded variation in the way they consider it fostered their exploration and learning experiences. Generally, all the students who provided self-reports acknowledge the value of project and collaborative work and indicated they have learnt much of the programming knowledge and skills deemed important. This indicates a high level of awareness of the students with regard to the study they are enrolled in and a successful approach by the teaching team in highlighting the importance of this form of activity. Variation in experience with group work is a regular finding of research on this topic (see Damşa et al., 2015), however, some aspects identified in this case are highly relevant to initiatives to generate productive pedagogical designs for groups. One aspect noted is the way the students observed and capitalised on the integration of forms of activity in the course, intended all to feed into and support the project work. Some groups made optimal use of these inputs (from tutoring or feedback sessions, for example) other had difficulties in making the connection between these various activities; others found it difficult to synchronise the pace of their project work with the rest. The second observation raises the issue of explicitness with regard to the purpose and function of the planned learning activities; the latter pinpoints an aspect indicated in students' interviews regarding the complexity of the material addressed in lectures and the pace at which some of this material was introduced. Here, the pedagogical principles of connecting to the students' prior knowledge and experience with the field (Brandsford et al., 2005, Introduction of this report), together with employing strategies of teaching theoretical knowledge in a way that is accessible to the students (Land, Hannafin & Oliver, 2012), both apply. This is to be considered in the case of complex pedagogical design, with high-pace complex activities, in order for the benefits for students' learning to materialise.

Finally, one aspect highly appreciated by the students was the formative feedback provided throughout the project work period, which was indicated as useful in both solving issues of programming but also bottlenecks in project management at times. In relation to this aspect, the observed case included teaching assistants, who performed a large number of

guidance and feedback tasks. While they had a good insight into the knowledge domain and the project topics, and experience with the course as students, they had less experience in guiding learning activities and group work. These situations were addressed at course level in some introductory sessions by the lead teacher and joint decisions of the teaching staff (during assessment or guidance of groups encountering problems). It is clearly indicated in the literature (Damșa et al., 2015) that preparation at pedagogical level can lead to optimising the impact and value of the feedback and guidance in the context of group work.

2.6   Conclusions and recommendations

Based on the findings from this empirical examination, a conclusion is reached that, depending on how the knowledge domain is organised, different curriculum organisations and support structures are needed for the students to make sense of knowledge and utilise resources in productive ways. To some extent, these differences are related to the character of the project-based assignment and the type of instructional support provided in the course. But the knowledge structures and practices of the respective domains shape, to a large extent, the nature of the contents and problems to be addressed, the process through which the students learn, and the availability and access to knowledge resources needed for learning. Hence, questions of quality of teaching and learning are much related to the characteristic of the knowledge domain within which these are taking place, in addition to strategic and systematic ways to engage with the pedagogical designs that increase the learning opportunities for the students (Land, Hannafin & Oliver, 2012). Furthermore, the set of challenges related to the complexity of the collaborative project work indicates a pattern – the need to generate a clearer, more structured, view of what the task comprises, to identify the aspects that require emphasis in instruction in the task and how much time investment is required to fulfil the task in a manner that leads to a learning benefit. These challenges valid especially for the teachers working to ensure quality teaching and meaningful learning in this course; but are of relevance also for the programme generally, as approaches and strategies within the curriculum are to be aligned.

A set of recommendations can be derived from this case:
- Recommended design strategy – keeping open the option of adjusting the design under way according to the students' needs
- Generate explicit accounts of the expectations in the course; transparency and explicitness on the level of complexity of the contents and tasks
- Consider the complexity of the course design – meaningful and transparent integration of the various forms of activity
- Engage with new content by connecting to the students' prior knowledge and experience in the knowledge domain
- Consider bridging between conceptual knowledge and practical examples (allow questions concerning conceptual knowledge and assignment) to help students connecting the two.

3   Portfolio assessment in an undergraduate course in ecology

Rachelle Esterhazy

This chapter:

- Illustrates the use of portfolio assessment and formative feedback to promote scientific thinking and to develop understanding of the knowledge domain of ecology
- Discusses opportunities and challenges emerging around the designing and implementation of a portfolio-assessment design in practice
- Provides recommendations for how to handle typical challenges of course complexity, high workload and student follow-up

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3.1   Introduction

This case study was conducted on an undergraduate course in ecology at a large research-intensive university in Norway. The Ecology Course was selected as an illustrative case study of a course based on portfolio assessment, where students had to deliver several assignments that were provided with formative feedback during the semester and that were assessed with a weighted grade at the end of the course. The selection of the course was based on several reasons. First, the course was recently re-designed in an attempt to develop a better alignment between learning outcomes, teaching activities and assessment tasks. It was planned and coordinated by a teacher who is linked to a Centre for Excellence in Education Initiative (SFU) and who has wide experience in designing courses according to research-based pedagogical principles. Due to the close cooperation with the SFU, the study programme in biology at this university has generally undergone widespread development with regard to course designs and pedagogical methods chosen by the teaching staff. Second, the course faced an interesting challenge in that it followed several rationales. Being labelled an introductory course, it was meant to provide students of any level with a thematic introduction to the field of ecology. At the same time, it served the purpose of introducing students to authentic simulation software used in ecology research. The course also aimed to develop students' general scientific and academic writing skills. The combination of these rationales influenced the teacher's choice of portfolio assessment, as it requires students to write several assignments

covering a wide range of topics and requires the use of authentic technology relevant for the field. Third, portfolio assessment is a pedagogical design that has generally proved effective in promoting student learning and has received increased attention in Norwegian higher education over recent decades (Dysthe, Engelsen, & Lima, 2007). However, studies have shown that there are many forms and ways of employing a portfolio-based course design and whether it leads to student learning depends on many factors. As such it is often challenging for higher education teachers to understand and evaluate which design is the best for their purpose and what challenges and opportunities the different forms of portfolio assessment entail. Last, a central element in the portfolio assessment is the opportunity for students to receive formative feedback on their work before submitting it for final assessment at the end of the course. Feedback is arguably one of the most powerful course elements that can promote student learning (Hattie & Timperley, 2007). However, delivering, understanding and making use of feedback are complex processes that entail many potential pitfalls both on the students' and teacher's side (Evans, 2013).

For those reasons, the case has been selected as an illustrative example of a course that aims at activating students to engage with relevant knowledge of the discipline and general scientific skills through portfolio assessment, use of discipline-relevant technology and formative feedback. The case allows us to study how a course design unfolds during the course of a semester and what challenges and opportunities are met by both teachers and students. Particularly, we explored the pedagogical aspects that are relevant for activating and engaging students productively with the knowledge domain of their field. In line with the reasons presented above and the research focus discussed in chapter 1, we have addressed the following questions:

- What characterises the teaching approaches and ways of engaging students in the course?
- What challenges do students and teachers face with the given pedagogical approaches and learning activities?
- What can we learn from this case about issues that matter for quality of educational practices?

Before presenting the course design and activities of this case, we give a brief overview of the educational practices typical in the discipline of biology, and what is relevant for understanding the pedagogical practice of portfolio assessment.

3.2 Previous research on portfolio assessment and higher education in biology

The educational practices in the discipline of biology have gone through a number of changes over the last decades. Like other life sciences, biology is facing a rapid expansion of knowledge and technologies that enable access to large amounts of data. The growing technical demands of these emerging methodologies provide challenges to biology education that needs to provide sufficiently qualified graduates for the increasingly technology-intensive biology sector (Hounsell & MCcune, 2002). These developments contribute to a shifting focus towards gen-

eral skills and employability in biology education. Against this backdrop, the role of traditional laboratory teaching in the biology curriculum is being critically discussed. Especially considering that many graduates are not working in laboratories anymore, it has been argued that laboratory work should be decreased in favour of new content and technologies used in biology (Jones, Reed, Weyers, & Weyers, 2007). While laboratory work remains a central element in biology education, recently a number of new teaching and assessment practices have emerged, such as portfolio assessment, increased emphasis on ICT skills and use of learning management systems to support the learning. These developments are also noticeable in Norwegian higher education in biology.

In Norway, biology is offered both at bachelor's and master's level, and as part of teacher training programmes (lektorutdanning) at nine different institutions. In a recent mapping survey of biology education in Norway, Hole and colleagues (2016) asked biology students (N=751) and teachers (N=231) from all Norwegian higher education institutions about their experience of different aspects of teaching and learning. Students reported being generally satisfied with their study programmes, but had differing opinions about different teaching approaches. The majority claimed to learn best from self-led studying and group work and maintained that individual written feedback and conversations with the teacher function better towards learning than grades and more general feedback to the whole class. The survey among biology lecturers showed that 56% of the respondents have completed a pedagogical course and that a majority would like a stronger emphasis on teaching from the university leadership. Nonetheless, few wish to prioritise the development of their teaching skills or to use more time preparing for their teaching. Teachers differed in their attitudes towards teaching methods, but generally reported that they believe group discussions and student presentations promote motivation and active learning. Regarding student diversity, teachers claimed that new students often lack basic knowledge in mathematics, biology and general study skills. The developments in Norwegian biology education are also reflected in the establishment of a Centre for Excellence in Education Initiative (SFU) focused on improving and innovating the way biology is taught and studied at Norwegian universities. The ecology course in this case study was linked to this SFU, which has among one of its aims to 'change from a culture of teaching to one of learning' by engaging students actively in their learning and by developing new teaching methods.

One of the pedagogical practices used in the courses linked to the SFU is portfolio assessment. Portfolio assessment is a topic that has been widely studied both in the Norwegian context and internationally. There is a variety of definitions available in the research literature and practices around portfolios vary greatly across institutions and disciplines. One common definition is the one by Paulson and colleagues (1991, p. 60):

> 'A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, or achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for judging merit, and evidence of the student's self-reflection.'

Dysthe and Engelsen (2004) expanded the notion of portfolio and described it as a process that is typically divided in three learning phases: the first phase includes activities resulting

in a variety of objects (written, oral, visual, practical) that are collected in a working portfolio. In the second phase students select documentation for their presentation portfolio, often supported by formative assessment. In phase three, the presentation portfolio is assessed summatively, i.e. it is marked with a final grade. The element of formative assessment, or, in other words, feedback that is given on the students drafts with an aim to improve their final assignment is central to the design of portfolio assessment. Feedback provided before the final assessment has shown itself to be a powerful tool to promote student learning and motivation (Evans, 2013; Hattie & Timperley, 2007). It is argued that feedback is most productive when it provides the student with information about the learning goals of the task, what progress has been made towards the goals and what activities need to be undertaken in order to reach the goals (ibid.). In line with this argument, Clarke and Boud (2016) argue that portfolios should not only be seen as a tool for students to demonstrate their learning outcomes, but that the process of receiving and giving feedback also serves as a learning goal in itself. Especially making meaning of feedback and developing strategies to implement feedback comments in their work is a complex process that students need to master (Esterhazy & Damşa, 2017). Clarke and Boud (2016) suggest that if portfolio designs provided students with opportunities not only to receive, but also to give peer feedback on each other's portfolios, it would help them in developing their ability to judge their own work. The ability to self-assess has long been recognised as an important skill needed not only in higher education but also in the workplace setting and for lifelong learning (Boud, 2000). This would also make portfolio assessment more manageable for teachers, who often refrain from choosing this design due to the high workload that comes along with teachers providing feedback on all working portfolio elements of their students. Another opportunity emerging from portfolio designs is related to the information that teachers receive about the learning progress of their students. In that sense, portfolio design is a strong case in point for the classic definition of formative assessment, which entails a two-directional provision of feedback to both students and teachers, which enables them to adjust their learning and teaching strategies along the way (Scriven, 1967). Despite the growing popularity of the portfolio design, the element of peer feedback is often not used. In the Norwegian context, a study revealed typical patterns in hard sciences such as biology, where feedback is usually given by the teacher and the portfolios mostly comprise practice-related, case or project assignments but rarely reflection texts from the students (Dysthe et al., 2007).

Against the backdrop of these research findings and the developments in the field, this case study provides an opportunity to shed light on the way student-activating pedagogical practices are concretely implemented in biology and how these practices are related to the wider institutional and disciplinary context they take place in. Based on the research literature on portfolio assessment, a focus is put on the way students were provided with and engaged with feedback. Moreover, we took special interest in the way the portfolio assessment tasks and related teaching activities were planned by the teachers and what factors influenced the way these elements were enacted during the course. In this regard, we paid special attention to the challenges emerging for both students and teachers in managing high workload and course complexity.

3.3   Empirical context and data

The case study is based on a 21-week-long undergraduate course in ecology (10 ECTS) at a large research-intensive university in Norway. The course was taught in English and enrolled both Norwegian and international students who could choose to write their assignments in either English or Norwegian. The data collection period spanned the full semester. The data were collected first and foremost by one researcher, but were also partly provided by the students who recorded their group work by themselves. Five different teachers taught on the course: three full professors and two postdoc researchers. The professor in charge of designing and coordinating the course was the main contact person during the whole data collection period. All teachers consented to participate in the study. Due to the introductory nature of the course, it had a diverse student intake. Of the 27 students, most were enrolled in the local bachelor's programme in Biology, but the group also included master's students, students from different natural science degrees, student teachers , as well as exchange students.

Table 4: Overview of case and collected data (ecology course)

Number of staff	3 professors + 2 postdocs
Number of students en-rolled in the course	27
Course period	21 weeks
Main assignment fea-tures	1 individual open assignment on self-chosen topic; 3 group assignments covering three main areas of ecology represented by the three different professors; 5 individual text-book assignments covering different topics from the textbook
Teaching and learning activities	Individual and group work; lectures; tutorials/data labs; feedback on drafts & feedback sessions-on-demand; peer review of individual assignment
Number of groups/stu-dents observed	3 groups, 3 students each
Types of data	**General course material:** course plan, syllabus, lecture slides, task descriptions, re-sources provided via Learning Management System, teacher's self-evaluation of the course **Observation protocols:** a total of four 2h lectures, five 2h tutorials/datalabs and two 2h student presentations were observed by the researcher by filling in a protocol **Video recordings:** three lectures and four tutorials were video recorded (only teacher in the front); videos of six group work sessions of student groups during the tutorials (9h5m) **Audio recordings:** two recordings of group work during tutorials (2h20min); eight group work sessions recorded by the students themselves (22h30min); three recordings of feedback sessions with the teacher (1h22m) **Documents/Products:** Drafts and final versions of individual and group assignments of the nine students; notes and screenshots from the group work sessions **Interview data:** Pre and post interview with main teacher (each 1h); Group interviews with three groups (each 1h); brief ad-hoc interviews with three of the other teachers and the students groups **Field notes/online data:** Field notes from every site visit; all course-related interactions in the Learning Management System, on Facebook and email **Student survey:** questions about experience of teaching-learning environment, ap-proaches to learning, self-efficacy and general working skills; handed out after the course ended; 13 responses (50% response rate)

A total of nine students consented to be interviewed and to have their group work observed and their assignment drafts collected. The other students were only passive participants, which means that none of their drafts were accessed and they were not recorded. The nine students signed up voluntarily in the third week of the course after they had been assigned

by the teacher into three groups in order to work on the group assignments together. These groups were followed in detail and formed three embedded cases (cf. Yin, 2013) within the overall case study of the course. The following Table 4 gives an overview of the case and the collected data.

3.4 Characteristics of the teaching and learning environment

3.4.1 Planned teaching and learning activities

According to the course plan provided by the main teacher, the course aims to provide an introduction to basic ecological theory and to develop students' ability to think and write scientifically. In line with these aims, the course plan describes learning outcomes that are partly focused on disciplinary content (e.g. to understand link between ecology and evolution) and partly on more general skills (e.g. to be able to write independent, scientific texts). To reach these aims, the main teacher divided the course into teacher-led activities and activities organised by students themselves. The course plan provided a detailed overview of the planned activities and how much time of the 266h (workload for a 10 ECTS course) is allocated for each activity. Figure 4 gives an overview of these planned activities, which shows that most of the course workload was assigned to student-organised activities, such as reading the syllabus or working on the different assignments, both individually and in groups. Only 10% of the workload was planned for teacher-led activities such as lectures, tutorials and feedback sessions. The students were presented with the course plan at the beginning of the semester and were regularly informed about upcoming activities and assignment-related deadlines, for example at the end of the lectures or through the Learning Management System,
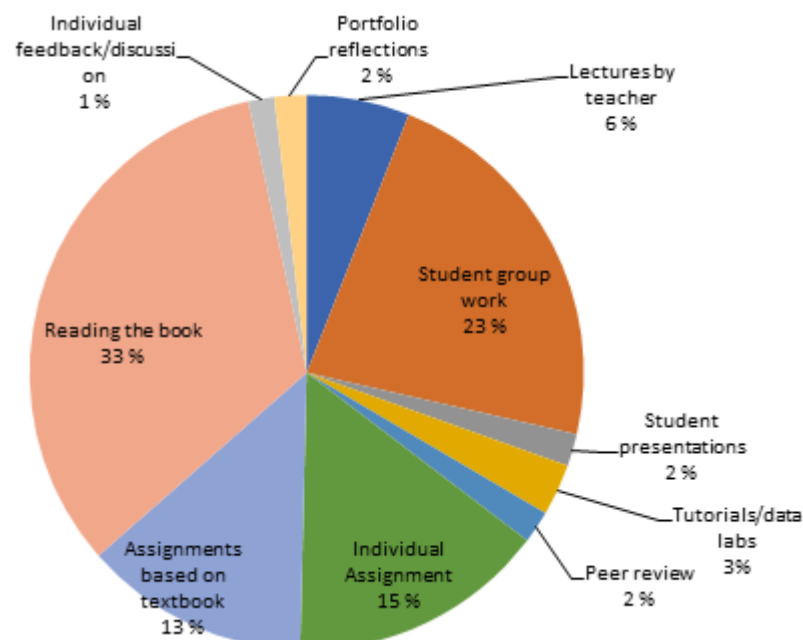

Figure 4: Overview of activities planned according to course plan (ecology course), percentage of 266h workload (10 ECTS)

3.4.2 Planned portfolio assessment structure

Due to the portfolio-based design of this course, the tasks and activities assessed as part of the portfolio constituted the central element of the course. The course plan required the students to write a total of 9 different assignments, give one oral presentation, write one peer review for another student's assignment and write a reflection on their portfolio. All portfolio elements had to be submitted by one final deadline at the end of the course, after which they were graded and combined to one weighted individual grade for each student. Table 5 gives an overview of the assignments and activities that were planned to be assessment tasks in the portfolio and how they were weighted in the final grade. The whole course structure was designed around these assessment tasks and any teacher-led activity was directly linked to them, providing the students with resources, instructions or feedback that were to facilitate their independent work on these tasks. The course plan informed the students about the exact percentages of the grading weight calculated by the teacher based on the proportion of the estimated total workload.

Table 5: Portfolio consisting of 12 assessment tasks

Assessment tasks	Estimated workload	Grading weight
3 x group assignments (two ca. 3000 words; one without word limit)	60h	40%
5 x individual textbook assignments (each 1000–1500 words)	3h	23.3%
1 x individual open assignment (1000–3000 words)	40h	26.7%
Oral presentation of individual assignment (5 min)	5h	3.3%
Written peer review of another student's individual assignment	5h	3.3%
Portfolio reflections*	5h	3.3%

taken out in final assessment due to lack of time

According to the main teacher interview and the observation data, the content of the assessment tasks was organised according to two different principles. On the one hand, the ecology textbook on the syllabus framed the questions asked in the five textbook assignments. On the other hand, there was a focus on three main areas in the field of ecology as reflected in the three group assignments, namely on predator-prey interactions, ecosystem services and biodiversity. For the three focus areas, the main teacher invited four colleagues, both from within the same department and from other institutions in Norway, to join the course and design group assignments and textbook assignments linked to their own research specialisation. For two of the group assignments, students had to work with data sets comprising authentic research data. The assessment tasks were not introduced all at once, but were presented successively by the different teachers over the course of the semester. The first assignment was introduced in week 1 and the last ones in week 12. All assignments had the same final deadline in the final week of the course. This led to varying amounts of time students had available for working on the different assignments. The students' self-organised learning activities consisted of reading the textbook, writing drafts, discussing group assignments with their peers

and writing comments for the peer review. The following Table 6 is based on interview data and course documents, and gives an overview of the planned assessment tasks, which teacher was responsible for them (stated in the first column), when they were to be introduced (second column), what their topics were (fourth column) and what support was offered by the teachers (fifth column). It visualises how these tasks provided the frame for the structure of the course.

Table 6: Overview of the planned assessment task structure over the whole semester

	Intro	Type of task	Topic of task	Offered support by teacher
Prof A (main teacher) & Postdoc A	Week 1	Individual Assignment	Free choice of topic	Teacher approves topic in week 3 Oral presentation & feedback in week 9 Peer review in week 15 Written feedback & feedback sessions
	Week 3	Textbook assignment 1	Methods of ecological research	Lecture on related topic Written feedback & feedback sessions
		Textbook assignment 2	Prey characteristics	Lecture on related topic Written feedback & feedback sessions
		Textbook assignment 3	Impact of climate change	Lecture on related topic Written feedback & feedback sessions
	Week 4	Group assignment 1	Predator & Prey (Netlogo software)	Lecture on related topic Tutorials, incl. instruction videos for relevant software Written feedback & feedback sessions
Prof B	Week 7	Group assignment 2	Ecosystem services (Excel software)	Lecture on related topic Tutorials Written feedback & feedback sessions
		Textbook assignment 4	Value of ecosystem services	Lecture on related topic Written feedback & feedback sessions
Prof C & Postdoc C	Week 12	Group assignment 3	Biodiversity (Ecoprimer software)	Lecture on related topic Tutorials/data labs for relevant software Written feedback & feedback sessions
		Textbook assignment 5	Biodiversity loss	Lecture on related topic Written feedback & feedback sessions

3.4.3 Enacted teaching and learning activities

The original course plan changed slightly during the semester, for example, the schedule of the feedback sessions was changed, submission deadlines of drafts were postponed and one element of the planned portfolio was dropped altogether (reflection text) due to limited time at the end of the course. We refrain from giving an estimate of the actual amount of time each individual student spent on the different activities, as our data set only gives insight into the time spent on the group assignments, but not on the individual assignments. Attendance was not mandatory, which means that students only had to submit the final drafts of their assignments in order to meet the minimum requirement to be assessed. Due to this fact, the number of students attending the teacher-led activities varied and the opportunities to hand in drafts and meet the teacher in a feedback session were not used by all students. This also means that some students did not fully participate in the portfolio design and in the central learning ac-

tivities of producing working drafts and receiving formative feedback. In the rest of this section we present the different teaching and learning activities and how they were enacted during the semester.
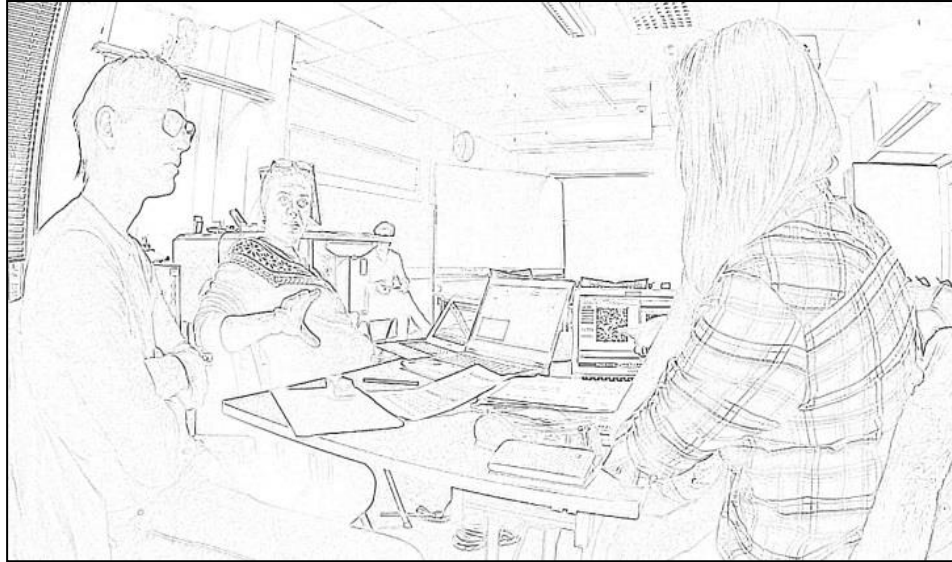

Illustration 1 - Student group working on group assignment

Beginning with the most central learning activity in the course, students used very different approaches to work on their individual and group assignments. Based on student interviews and data drawn from the learning management system, students differed in the amount of time spent on assignments, the distribution of this time over the semester, the working mode of their group work and the different resources they used. No precise time estimates exist for the individual assignments, but the three interviewed groups reported having used from about seven hours group work for each of the three tasks, while others reported having met around five times over the whole semester for all tasks together. The learning management system revealed that some students submitted drafts regularly over the course period and in time before each deadline, while others started working on their assignments only towards the end of the course, thereby skipping most deadlines that had to be met in order to receive feedback. Some reported that it was easy to work regularly on the first tasks that were given in the beginning of the course, as they had not many other assignments or exams in their parallel courses, yet. However, as their general workload and the complexity of their time schedule increased during the semester, their time investment in the portfolio assignments steadily decreased. Another aspect where students used different approaches was their mode of work on their group assignments. One group did all their writing jointly during meetings that could last several hours and in which all steps involved in the process were done together, e.g. finding resources, conducting analyses, and writing up findings. Another group used a division-of-labour approach where every student worked on an individual element of the task. All of their communication took place only virtually via social media and their writing was done in a shared draft using Google Docs. Finally, students used a different variety of knowledge and ICT resources when working on their tasks. While some used mainly the textbook and the

presentation slides from the lectures, others activated other literature in their texts, such as scientific journal articles, other textbooks or governmental reports. Furthermore, some students used additional ICT tools that were not required by the teacher, like GoogleDocs, social media or other statistical software they were familiar with from before.

In total, there were 8 lectures spread out over the semester and the observed sessions were attended by about half to two-third of the whole class. The lectures gave an introduction to several topics in the field of ecology that were aimed at providing a background to the different assignments. Observations showed that lectures were held frontally and mostly by the main teacher, while some topics were also presented by the other four teachers. The content partly comprised textbook material, but also examples of the lecturers' own research. In six of the lectures, subsequently new portfolio assignments were introduced. They were held in English due to several international students, but discussions regularly emerged in Norwegian when local students posed questions. All teachers tried to engage students to participate in the lectures by encouraging them to ask questions and taking time to answer them. No further student-activating methods were used during lectures. Several students used the lectures as an 'informal feedback session' in that they talked to the teachers about their assignments in the break or after the end of the lecture.
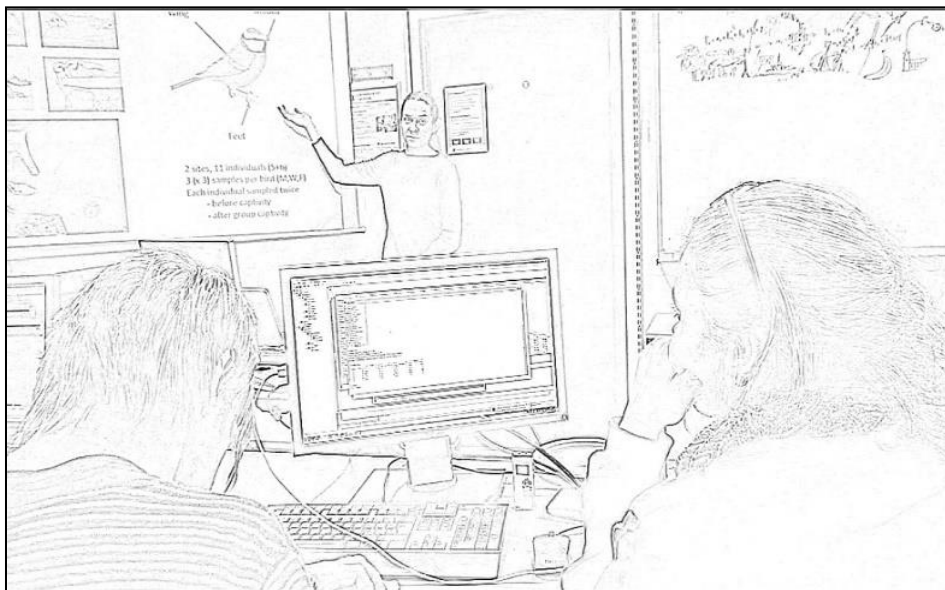
Illustration 2 - Teacher explaining software program during data lab

Further contact with the five teachers was afforded through the 8 tutorials/data labs that provided students with practical knowledge about general academic skills, and the two domain-specific software programs used in the course. The observed tutorials were attended by about half to two-thirds of the class and varied greatly in their set-up. Some teachers provided frontal instruction, while others used a free structure in which students could work independently during the session and only ask the teacher for help when necessary. One software program was introduced via a video pre-recorded by one of the teachers, while the other one was demonstrated live in a data lab where the software was installed. Students either

worked with self-generated simulations or with data sets provided by the teacher. Some data labs sessions were faced with structural limitations, as one of the software programs was commercially licensed and only installed on few computers, so that students had to work in groups on each machine and could access the software only during opening hours of the data lab.

Originally there were 8 days with voluntary feedback sessions planned in the course schedule. In the beginning the main teacher specified concretely what assignment each scheduled feedback session was about, but towards the end this went over to offering open sessions in which students could ask about any assignment. In the end there was a total of 17 days in which the different teachers offered time slots for feedback sessions, but only a small fraction of those were actually used by students. Students were to meet certain deadlines to upload the drafts they would like to receive feedback on. The feedback sessions usually were offered 1–2 weeks after each deadline and once the teachers had uploaded written feedback comments on the submitted drafts. Observations showed that sessions lasted between 15–30 min and took place in the cafeteria or the teachers' offices. Teachers reported in the interviews that the discussed comments typically addressed concrete suggestions of how to improve task structure or format; more general discussion of what the teacher expects from the students; clarification of the assignment requirements; or a preliminary assessment of the students' work (if requested by the students).

Another teacher-led activity was the oral presentation of the students' ideas for the individual assignments. They were organised as two 1.5h sessions on two consecutive days in week 9 of the course, and required each student to present his/her topic of the individual assignment in about 5 minutes. This was followed by brief comments and questions by the teacher and the other students. As the presentation slots during the sessions were timed beforehand, some students arrived just in time for their presentation, which means the number of students in the room varied during the sessions. The presentation was graded and counted for 3.3% of the final portfolio grade (see Table 5). Attendance was not mandatory, but if students did not present, their combined final grade was reduced by getting a failing grade on the 'oral presentation task' of the portfolio assessment.

Students and teachers used a variety of technologies during the course. Some tools were introduced by the teachers, who provided formal instruction on their application, while others were activated by the students on their own initiative. The following Table 7 provides an overview of the technology used in the course.

Table 7: Overview of technology use (ecology course)

1 Offered by the course/teacher		2 Activated by students (own initiative)	
Type of technology	*Context of use*	*Type of technology*	*Context of use*
Learning Management System (LMS)	Information sharing, full class; Communication with individual students; Scheduling of classes/FB sessions	Learning Management System (LMS)	Communication with teacher and peers (but this was quickly moved to more common communication means) Sign up for feedback sessions Retrieving information about course
NetLogo (discipline-specific modelling software)	Demonstration in self-created video tutorials; Needs to be used to solve Group Task 1	NetLogo (discipline-specific modelling software)	Work on Group Assignment 1
Excel	Demonstration in self-created video tutorials; Needs to be used to solve Group Task 1 & 2	Excel	Work on Group Assignment 1
EcoPrimer (discipline-specific analysis software)	Demonstration in data lab; Needs to be used to solve Group Task 3	EcoPrimer (discipline-specific analysis software)	Work on Group Assignment 3 in data lab
PowerPoint	Information sharing during lectures	PowerPoint	Information sharing during oral presentations of individual assignment
Email	Communication with individual students;	Email	Communication with teacher/peers
EndNote	Students are encouraged to use/familiarise themselves with it	R (general statistical software)	Work on Task 2 (one group uses it as substitute for Excel)
ISI Web of knowledge	Students are encouraged to use/familiarise themselves with it	WhatsApp	Communication with peers
		Facebook group and Messenger	Communication with peers; sharing of documents
		Google docs	Sharing of documents; working in parallel during group work
		Dropbox	Sharing of documents
		Wikipedia/Google	Look up definitions

3.5 Students' and teachers' experience of teaching and learning activities

3.5.1 Experience with the different assessment tasks

The students interviewed provided various reports of how they engaged with the different tasks and how this changed over time. In general, they agreed that they learnt most from their self-study activities and their group work. Especially the individual assignment was described as a valuable learning experience, as students could choose their own topic and develop their own ideas. As the assessment tasks were the most central element of the course, students were relying on the task descriptions as a central source of information. Some of the students

experienced the descriptions as vague and they wished to have more concrete requirements with regard to both how much time they were expected to invest and how long and detailed the texts were supposed to be. Some students also experienced a challenge with regard to the textbook assignments. They reported that at times they got confused by seemingly contradictory feedback comments indicating that they should stay closer to the textbook content, while at the same time being asked to think independently. In referring to the challenges of decoding what the teacher expected, one student said: '*You get stuck in a way, so like, what does [the teacher] mean by that expression and you kind of get stuck there, in [the teacher's] thoughts, instead of actually being able to write about your own perceptions*'.

Some students felt that being discouraged from going beyond the book content closed down valuable learning opportunities. The teacher also reported noticing this challenge through the frustration with which some students reacted when they received feedback that asked them to adapt their answers closer to the book. At the end of the course he reflected upon the textbook assignments and explained that he had not been entirely decided about their purpose beforehand. He had designed them to ensure that the students read the textbook, but in the context of the open format of this course in which students generally had a lot of freedom to choose what and how to write their assignments, he realised it was difficult to ask the students stick closely to the book.

In general, students experienced the group work as engaging and motivating, which was also related to the fact that the tasks were considered to be of high authenticity (designed by ecologists and based on real data sets and software used in the field). Also, the fact that the group assignments counted for 40% of the final grade motivated students to invest time in their group work. One student reported that she '*would have given up this course if it wasn't for the group working so good as it is*'. The teacher was satisfied with the group assignments and saw that working in groups benefited the overall performance and grades of the weaker students. But also for the stronger students he saw positive learning outcomes, even if they were not necessarily reflected in an improved grade.

3.5.2 Experiences with the lectures and tutorials

Concerning the lectures, most students admitted that they were not certain about the role they played in the course: '*Lectures didn't really encourage you to go to them, because what you got out of them. You didn't really get valuable information that you could put into the textbook assignments or your project*'. Several admitted having skipped lectures in order to spend time on individual study or other course commitments instead. Other students commented that some of the lectures seemed unaligned with the textbook and that they had expected the teachers to include more concrete references to the book in their lectures. This could be related to the fact that some of the co-lecturers explained in the interviews that they were not familiar with the particular textbook used in this course and had used their own material and approaches for explaining ecological concepts during the lectures instead. Some students suggested that more frequent lectures would have provided more contact points with the teachers. When reflecting on the challenge of making the lectures relevant for a portfolio-based

course, the main teacher explained that he had tried this by tailoring the lectures to the text-book assignments, so that students felt that attending the lecture helped them with those tasks. However, retrospectively he realised that more frequent lectures might have helped to establish more personal contact with the students who tended to lose contact over the course of the semester.

Regarding the tutorials, students generally appreciated the introduction to the simulation software as a resource that gave them access to professional practice in the field of ecology. However, as one student pointed out, it remained uncertain what the actual goal of the course was: were they supposed to '*learn about ecology or learning how to do ecology?*' This was related to the general challenge of the main teacher who reported that the design of the different course activities and tasks was guided by several principles that partly contradicted each other. On the one hand the course was supposed to teach students academic skills and independent thinking, while at the same time ensuring a baseline knowledge of ecological concepts. While the portfolio design would have worked well for a course that was only about academic skills, the teacher felt that it did not work the way he intended it to with regard to ensuring the students introduction to the basic concepts and theories of the field.

3.5.3 Experience of course structure and workload

Both teacher and students agreed at the end of the course that the complex structure made it difficult to follow. Some students reported confusion about the connection between the lectures, tutorials and the different assignments. The fact that all activities were voluntary shifted part of the responsibility from the teacher to the students who were free to choose how much contact and instructional support they wanted to request from the teacher (feedback as instruction-on-demand). In principle, a student could pass the course without participating in any teacher-led activities and only by handing in the final assignments. Some of the students would have preferred the formative feedback to be a mandatory element of the course. As one of them commented: '*I think that [the submission of drafts to get feedback] should be mandatory, because that's the way you get the learning outcomes from it*'. The teacher saw his role in promoting the students' learning from a different point of view. While he saw that all assignments improved over the semester and '*many of them [...] corrected themselves and changed their style considerably*', he was not sure what role his feedback had played, as '*many of those that didn't, didn't get any feedback, also some of them do deliver good, good assignments*'.

While the teachers invested a lot of time in providing feedback to those who requested it, there was no special effort made for motivating inactive students to participate more in the course activities. Some students experienced this responsibility to organise their own learning as challenging, while others saw it as a strength of the course. In general, the interviews indicated that those students motivated to finish the course with a good grade were more likely to engage with the offers made by the teachers, while those who claimed to be satisfied with a passing grade were less inclined to engage with the learning activities envisaged by the teacher. Generally, the students were much more diverse than the teacher thought. Besides the typical bachelor's students in biology, there were several students with previous degrees

and working experience, who had no biology background at all. This diversity was reflected in a very varied level of assignment quality. The teacher described it this way: '*I mean you could feel that some…there's something, yeah. Yeah, some sort of release of energy or something […] Others don't know where to start. They're just trying to understand what is it that the teacher is looking for*'. Nonetheless, he thought that the portfolio assessment led to a narrowing of the gap between students with regard to their final result and that it was in general easier to get good grades than in an exam.

The students reported that their overall engagement was dependent on the workload caused by their other parallel courses. Several admitted that they didn't follow the envisaged course structure and ignored the deadlines to hand in drafts, but instead postponed work on the assignments until the last weeks before the final deadline. As a student explained: '*It was kind of intensified in a period […] because usually it collides with other courses, other deadlines*'. However, most appreciated the option of receiving formative feedback on their drafts and realised this opportunity whenever their semester workload allowed for it. Also, the teachers reported having experienced an increased workload, but generally the reading and commenting on the assignments was appreciated as more rewarding than grading exams. As the main teacher explained, the most challenging task was to produce good feedback during a busy time schedule, because it takes a '*lot of, actually quite mental capacity. It's really hard work*'. His workload also varied a lot during the semester and, due to the frequent changes in the course deadlines, it was sometimes difficult to foresee the peaks in workload. In general, to keep everything running and to make sure that feedback was given at the right moment was a demanding task. He describes it as: '*It's always on my mind in a way. So it takes a lot of attention*'.

3.5.4 Experience with feedback

The formative feedback teachers gave on the assignment drafts was experienced as an important knowledge resource for the students. However, students had mixed experiences with the feedback from the different teachers. Some were highly satisfied with amount and content, while others had more negative emotional reactions when feedback was experienced as too corrective and direct. This seemed to relate to what the students had expected from the feedback beforehand. For example, one student who had rather negative experiences summed up the expectations as follows: '*I guess we [were] looking for more guidance. Rather than feedback*'. In general, the course set-up being implemented for the first time, the main teacher reported he was surprised by the steep learning curve he had in providing the 'right' kind of feedback. He realised soon that the bachelor's students expected a different kind of feedback than his supervised master's and PhD students, or when reviewing a journal article. He said: '*commenting a scientist is something completely different from, from that. It's very direct and […] of course, less positive I guess. So, so the challenge is we have to try and be positive. And I've increased my […] sort of ratio of positive to negative comments along the way.*' However, being positive is not always easy, as '*you cannot be over-enthusiastic about a poor assignment either'*.

In general, the teacher experienced an unusually close interaction with the students on this course, which he developed through his regular commenting on their writing. He felt it was surprisingly personal, both for the students and for him. Both sides were more exposed, as he explained:

> *'It's a bit of a, it's a bit of a give and take. You know […] they expose themselves much more in their writing. […] It also becomes more clear what's the criteria that we are looking for…I am looking for. And that sort of exposes me as well.'*

This meant for him that he had to think more carefully about what a good assignment is and what he wanted the students to do. The feedback sessions he perceived to be a very efficient way of clarifying things and only through discussing with the students he realised the difficulties they had with understanding his written comments. Unfortunately, there were fewer students making use of the feedback sessions than he had anticipated, which he interpreted to be related to the fact that many students find it scary to discuss one-to-one with a professor. In general, the teacher felt the feedback sessions were a great way to teach students about scientific processes and academic writing, which otherwise are difficult to explain through written comments. Also, the peer review was experienced very positively by the teacher, as he saw how the students benefited from comparing their work with their peers' and formulating feedback themselves.

Overall, the teacher reported that the sheer amount of feedback did not only produce a large workload for him, but also made him much more aware of what his idea of a good assignment is and what he really expected of the students when designing the tasks. At the same time, he saw the portfolio design as a rare possibility to get insight into the learning process of his students. In his eyes, the process of learning to understand and make use of feedback comments was an important part of the student learning in this course. As he explained: '*This ability to absorb comments and make use of them and actually improve based on it. It's a learning, it's a learning process also'.*

3.6   Discussion

This section provides a discussion of the opportunities and challenges identified during this course. This case is an interesting example how a course plan that has been planned in detail and with many considerations on the teacher's side, might unfold in unexpected ways during the semester. It illustrates how portfolio assessment can provide the students with an opportunity to actively explore disciplinary knowledge and to practise and demonstrate their independence and scientific skills early on during their bachelor's studies. However, it also indicates that not all students understand this pedagogical design as a learning opportunity, but that for some it is more related to frustration, negative emotions and unproductive behaviour. In the following we will discuss some of the challenges and opportunities that emerged during the semester.

3.6.1 Course complexity

The portfolio design with nine different assignments involved students in a wide range of different learning activities, from writing brief summaries of textbook chapters to developing their own research problem or reporting an independent analysis of empirical material. The tasks covered a wide range of topics and were mostly unrelated to each other. This variety of the different tasks was paired with a high complexity of the semester schedule, including several deadlines for handing in drafts and different teachers involved in organising the activities. The complexity was partly due to the different teachers who represented different areas of ecology and who each designed their own tasks and used their own style of lecturing and providing feedback. This created an authentic academic experience and confronted students with the challenges and frustrations of managing their own time and relating to various knowledge contents, deadlines, peers and teachers at the same time. Students were not just required to attend lectures and read the textbook, but they had to identify and actively explore the knowledge and practices that were necessary to meet the different task requirements. This created a student-centred learning environment that provides students with many access points to highly specialised knowledge of a discipline, as well as a support structure for helping students to actively make sense of this knowledge (Säljö, 2010). At the same time, this complexity also provided one of the greatest challenges for the course. Both students and teachers reported that the course complexity contributed to an increased workload that was at times difficult to manage. Most students had parallel courses that created certain workload peaks during the semester. The teachers – especially the main teacher – had similar experiences of varying capacity to engage in the activities of the course (especially the provision of feedback) depending on the workload produced by other work commitments.

3.6.2 Organising principles behind course activities

The course complexity was also related to the principles by which the course activities and knowledge contents were organised. The organisation followed two main principles: on the one hand, it followed the disciplinary knowledge structure by introducing students to basic topics, concepts, theories, methods and tools used in ecological research (Muller, 2009). This was reflected in the textbook assignments that required the students to summarise and paraphrase parts of the textbook. As explained by the teacher, this was intended to make the students read the syllabus and to ensure that they master the basic 'language of ecology'. At the same time, some activities and tasks were designed in order to develop the students' academic writing skills and their independent exploration of the discipline. This was reflected in the open assignment and the three group assignments that provided students with many choices and room to explore. Here, the underlying principle was rather an emphasis on the students' future professional life and how course activities and content can become relevant for their professional development (Muller, 2009). These two underlying principles can at times begin competing, which became visible when students struggled to adapt to the various tasks that required them to demonstrate independence and individuality on the one hand, and a more conservative approach in form of reproducing the knowledge of the discipline on the other hand. Furthermore, having two organising principles also made it difficult to create

clear coherence between the lecture contents and assignments. Students reported struggling with understanding what information from the lectures was relevant for which task, what was a repetition from the textbook and what was additional information that went beyond the course rationale. This also demonstrates the challenges of aligning instructional elements, assessment criteria and task descriptions that constitute a portfolio-based course (Biggs & Tang, 2011).

3.6.3 Face-to-face student-teacher contact

As most of the workload in this course was based on student independent study or group work, students and teachers had less face-to-face contact than a more conventional lecture-based course would require. Furthermore, the few lectures and tutorials did not have mandatory attendance, which led to some students skipping nearly all of the offered instruction, often due to colliding schedules with parallel courses. That means the teachers had little opportunity to talk to those students who typically skipped lectures. As the scheduled feedback sessions were voluntary as well, they were also not a reliable meeting space where teachers could motivate and engage less motivated students directly and personally. However, several students reported that especially working students appreciated the possibility of following the course without mandatory attendance, as they could work on the assignments in their own time. Much of the communication between teachers and students took place in the Learning Management System, in which the main teacher frequently and reliably provided information about the planned activities and where students were actively encouraged to ask questions and approach the teacher when needed. Even though students experienced this way of communicating as being easy and of low-threshold, the observational data showed that there was only a fraction of students – mostly those who attended the lectures - who made use of this opportunity. This shows that the limited personal contact in this course provided students on the one hand with opportunities to manage their own time and working pace, while at the same time requiring them to take the initiative in order to follow up and communicate with their teacher and peers. Seen from a portfolio assessment perspective, the fact that several students did not engage in creating a working portfolio and did not receive any feedback during the course indicates that those students were strictly speaking not participating in a portfolio assessment (cf. Dysthe & Engelsen, 2004). Instead, they only experienced a 'traditional' assessment method that only required them to submit a final product by the end of the course. This shows that a course design that was planned in one way might for some students unintentionally turn into something else depending on the way they engage with and respond to the design.

3.6.4 Students' responsibility for their learning

Related to the minimal student-teacher contact is the generally high responsibility students hold for their own learning in this course. Students are expected to do most of the course activities by themselves. In principle, a student can pass this course without attending any

lecture, but by only following the updates on the Learning Management System and by handing in all assignments on time. The only other people the students are accountable to are the other two students with whom they work on their group assignments. The teacher explained that this high degree of independence was intended in order to foster academic skills and active exploration of the disciplinary knowledge. In order to support this independent work, the main teacher put into place several supportive activities that allowed follow-up of students, such as lectures, tutorials, feedback sessions, peer review, oral presentations and an open-door policy that encouraged students to approach teachers with questions. Overall, these activities were designed as a form of instruction-on-demand. While especially those students who made use of these offers reported a generally positive follow-up and learning experience, there were also several students who struggled with this learning form and who did not engage with the instruction-on-demand as intended. Hence, the course design required a high level of responsibility on the students' side. Considering the diverse student body in this course ranged from first year bachelor's students to some experienced students already holding master's degrees, this challenge was easier to address for some students than for others (cf. Chapter 1).

3.6.5 Role of feedback

During the course students had the opportunity to receive written feedback on all of their written assignments. Moreover, they could meet the teacher who provided the written comments and discuss them in individual or group feedback sessions. As explained by the teacher, these feedback sessions were meant to replace traditional instruction modes and to provide students with instruction-on-demand. In a course design that is characterised by high complexity and high demands on student responsibility, the formative feedback becomes an important element for providing students with access to resources relevant for monitoring their own progress and meeting the assignment requirements. The written feedback had a signposting function for the students, indicating whether they were on the right path or whether they needed to approach the teacher and demand more instruction. Here, two challenges emerged: First, those students who did not hand in assignment drafts missed out on an essential instructional element of the course. Indeed, some students did not make use of the feedback sessions and had no personal contact with the teachers during the whole semester. Second, several students had trouble interpreting the written feedback and what exactly it 'signposted' with regard to their progress. For example, the uncertainty whether few written comments indicated that the student had yet a lot of ground to cover, or whether they were well on the way, caused frustration among some students. This communicative challenge related to the written feedback was experienced likewise by students and teachers, which was related to diverging expectations of what feedback should do and look like. While being appreciated as a valuable learning opportunity by most students, some also commented that they experienced some comments as not helpful, or even upsetting. At the same time, one teacher explained that providing feedback on all assignments was not only time-consuming but also challenging with regard to 'hitting the right tone'. The challenges related to providing and making use of feedback are not unique to portfolio assessment and misunderstandings

between students and teachers are a well-known phenomenon (Evans, 2013). The difficulties arising around feedback are often related to a diverging understanding of what purpose it holds in the respective course context. Feedback can have several purposes, such as providing students with information about the learning goals of the task, what progress they have made and what could be done to reach their goals (Hattie & Timperley, 2007). To come to an agreement on what purpose feedback has in each specific feedback encounter is an important part of the whole process, which is more than just a one-way transmission of information but rather a dialogue that requires both students and teachers to share their understanding and to negotiate the meaning of the feedback comment (Esterhazy & Damşa, 2017).

3.7   Conclusion and recommendations

In conclusion, this case provided rich insights into the opportunities and challenges emerging from an introductory portfolio-based course. Generally, the course was experienced positively by the students, who reported having developed their academic writing skills and their disciplinary knowledge of ecology. While students generally were positive about the course design, all agreed that the course challenged them with an amount of workload that was at times hard to manage in addition to their parallel courses. Addressing the question of what quality aspects matter in portfolio-based course designs, we have identified three main aspects. First, portfolio assessment has great potential to be productive for learning, but this potential is dependent on the coherence of the course content, activities and resources. The portfolio assessment provides many promising ways of application, which can be tempting and easily lead to a high course complexity and contradictions in the purposes it is supposed to serve. Generally, the design of the different course activities and assessment tasks is more likely to be clear and easily understandable for the students if the organisation of these elements follows a principle that informs all decisions made in the course design. Second, both students and teachers benefit from a clear definition of their roles and tasks in the course. As the assessment tasks are the central element of any portfolio-based course, it is essential that students understand exactly what is expected from them, what purpose it serves and what resources and activities are necessary and sufficient for reaching the learning outcomes compared with those that are offered for students with ambitions to go beyond the scope of what is expected. Third, delegating the responsibility of managing their own learning to the students is one of the portfolio assessment's aspects that has most potential to promote active student learning. However, its success is dependent on the way students are followed up during the course and how they manage themselves to stay engaged. In this regard, the value of feedback and productive student-teacher interaction cannot be stressed enough. Both students and teachers need to be willing to invest time and effort into reaching out, asking questions, and engaging in dialogue and feedback. All of these processes require considerable social and emotional investment, which often is underestimated by participants in portfolio assessment.

Based on above discussions and on recommendations suggested by the teachers and students themselves, we have identified concrete elements that might help strengthening courses with similar designs:

- Avoid having a too complex portfolio structure with too many elements
- Provide coherent task descriptions that inform students about what is expected of them with regard to how much, in what detail and how independently they should work on the different assignments
- Provide students with enough freedom in the choice of knowledge sources they can use to address the assignments in order to make them less likely to fixate their attention on re-producing and copying information without productive engagement with the content
- Include mandatory teacher-led activities that ensure regular personal contact between students, their peers and their teachers
- Increase the amount of peer feedback, which fosters students' judgment skills and makes the teacher's workload more manageable.

4   Group assignments and roleplay in Organisation and Management

Line Wittek & Monika Nerland

This chapter:

- Illustrates the use of case assignments and role play to facilitate knowledge integration
- Discusses opportunities and challenges in group-based assignments
- Provides recommendations as to engaging and supporting diverse students in joint activities

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4.1   Introduction

Bachelor's programmes in Organisation and Management are widespread in Norwegian higher education, offered by a number of institutions and accommodating a large group of students. One of the challenges in these programmes is to incorporate practical experiences from organisational life and to create a productive relationship between theoretical and experience-based forms of knowledge. For these purposes, different forms of case analysis and group assignments are common approaches. The present case is illustrative of such pedagogical approaches, and focuses on the use of group assignments and role play exercises in a course in personnel management. Themes related to human resource management are at the core of this course, with subthemes like recruitment, motivation, and systems for rewarding staff according to the objectives of the organisation. These themes are both theoretical and practical in nature, and gaining concrete experience with personnel practices and processes at the same time as such processes are analysed and theorised constitute significant learning challenges for the students.

The course selected for this case study is located in the second year of a bachelor's programme that has placed special emphasis on ways of engaging students in activities that integrate theoretical and experience-based knowledge. An applied practical perspective is stated as the running pedagogical vision for the course as well as for the entire programme, encapsulated in the programme documents through the term 'pracademic' (Jørgensen et al., 2011).

Pracademic refers to the intention that the students should adopt knowledge, ways of thinking and theoretical background within the field, as well as applied skills for the practical life of work (ibid., p. 212). The term has its origins in the US and in efforts to enhance synergy between theory and practice in public administration programmes. About a decade ago, Posner (2009, p. 14) stated that 'A rich tradition has grown up over the years to connect practitioners with academics'. He underlined the bridging roles that 'pracademics' can play, they can for example serve as network workers, creating new channels to enhance cooperation and communication across the academic-practitioner divide. They can also add value through their teaching, research and management leadership alone (ibid., p. 17).

The programme in which our case is situated has invoked these ideas to find solutions for a range of challenges related to work relevance. For this effort and its achievements, the programme was rewarded with the national prize for best quality of education in Norway in 2012. The committee assessing candidates for this prize stated that 'The programme is both scientifically solid and relevant for the area of practical work. In addition to a close collaboration and involvement with actors from professional life, the responsible people have managed to build an excellent and including learning environment for the students'. Hence, it has been recognised as a programme that provides high-quality education to its students.

In this report, we focus especially on the use of group-based case analyses and role play as activities to engage students and to realise the visions of a 'pracademic' programme. In line with the research focus stated in chapter 1 (this report), we ask the following framing questions:

- What characterises the teaching approaches and ways of engaging students in the course?
- What challenges do students and teachers face with the given pedagogical approaches and learning activities?
- What can we learn from this case about issues that matter for quality of educational practices?

Before we describe the course organisation and activities further, we give a brief account of what we know about these pedagogical approaches from previous research.

4.2   Previous research on case analysis and role play in groups

Organisation and management education is challenging in many ways. The multidimensional responsibilities that the candidates will meet in the field of practice require a willingness to engage in personal growth and development, in addition to engaging with theories and concepts in the knowledge domain (Morgan and Manganaro, 2016; Haber-Curran and Tillapaugh, 2013; Cook-Sather, 2006). To deal with this complexity the research literature often emphasises a need for students to employ theoretical resources in situations that resemble 'authentic' work contexts (e.g. Keys & Wolfe, 1990; Knoll, 1997; Rule, 2006). Brazer and Kruse (2014, p. 268), state for example that:

> Organizational theory provides a powerful set of tools that can assist aspiring leaders to navigate through the shrouded and changing landscape. (...) Inasmuch as organizational leadership is made up of an ongoing series of interactions, many spontaneous in nature, it

becomes necessary for candidates to be able to utilize organizational theory beyond the classroom.

In the present case, this was sought to be achieved through the use of case analyses and role play to engage students in work-relevant activities. Case analyses can be seen as one of several forms of inquiry-based approaches. Bearing some resemblances to problem-based learning, it typically engages students in the investigation of problem situations relevant for the course content in which they are supposed to activate previous knowledge from the literature and/or course lectures in resolving the case (see also Damsa et al., 2015). Role play focuses more on the training of procedural knowledge by enacting realistic scenarios in settings where students are assigned specific roles and perform these based on set guidelines provided by the teacher. It is described as one type of simulation pedagogy that in this case is not computer-based (Lean et al., 2006). Both types of activities have a long history in management education and aim to support students to apply material from the course in practical situations and to integrate theoretical and experience-based knowledge (Martin et al., 2014).

Research has shown that these activities, both in computer-based and face-to-face versions, may enhance student motivation, collaborative skills and reflection, depending on how it is organised (Baeten et al., 2014; Martin et al., 2014). Challenges experienced with the approaches include that it requires good planning and organisation from teachers who need to be familiar with the approaches, the tasks need to be suitable for the knowledge content and outcomes of the course, and it may be time-demanding. Especially role plays involve unpredictability that needs to be handled by teachers and which may generate insecurity among students (Lean et al., 2006; Moizer et al., 2009). Hence, a common recommendation is to combine these approaches with lectures and other activities to support student learning (deNeve & Heppner, 1997; Baeten et al., 2014; Martin et al., 2014). This applies to the course we report here, which combined group-organised case analyses and role play with lectures and individual assignments. In the analysis of the case we paid special attention to the way the approaches were used to engage students in the course, the type of challenges students and teachers faced with the approaches and how they interplayed within the overall visions of the 'pracademic' and, more generally, to what we can learn from this case about issues that matter for the quality of educational practices using these approaches. Moreover, in the specific case chosen here, it has been particularly interesting to investigate group work and the use of cases in group assignments.

4.3   Empirical context and data

The course in basic personnel management takes place in the second year (third semester) of the bachelor's programme in Organisation and Management. During previous semesters the students have had courses that aim at realising the 'pracademic' idea and which has included extensive group work and practical exercises.

The course in basic personnel management was staffed by one teacher only, who was responsible for all lectures, assessment of assignments and exams as well as for organising student group activities. The cohort of students that we followed during the course consists of

80 students. They were organised in core working groups of 5–6 students who worked together during the entire course. Regarding gender, the students were equally divided. The course lasted for seven weeks and the core teaching activities are lectures and three assignments to be solved by the core groups. The first assignment concerned sketching an introductory programme for new employees in a large technology company, who were to recruit a high number of new employees in a condensed time period. The second assignment was based on a fictitious case from 'Riksrevisjonen'[7] in which the students were asked to analyse the case and suggest strategies for investigating the work environment with respect to securing relevant competencies in the organisation. The third assignment included a role-play of an envisaged recruitment process, where the task was to interview two fellow students as mock applicants for a specific position, based on application letters all students had to submit individually in advance. All three assignments included discussions and/or practical exercises, as well as requests to discuss experiences in light of the syllabus. All of them ended up in a report to be submitted in the LMS. However, while the two first assignments asked students to consider and apply general knowledge on realistic cases from professional life, the latter was about preparing students for a specific task belonging to the future profession as a manager. In this task the students were supposed to go through an exercise including all parts of a process of recruiting and employing a mock person for a position.

The data collection followed the overall design and approach outlined in Chapter 1 of this report, and included interviews with the teacher before and after the main activities in the course, observations of course activities, group interviews with students as well as an end-of-course questionnaire distributed among the students.

Three student groups agreed to be observed in their group activities and interviewed. The observation-based data were collected throughout 5 of the 7 weeks of course duration, focusing on the activities related to assignment 2 and 3. The data material consists of observation protocols of 5 lectures, 20 hours of video observations of group work related to assignment 2 and 3, 3 group interviews with students,[8] 44 responses to the questionnaire, and different documents, such as student assignments, teachers responses to these, syllabus, guidelines and information given to students in the LMS. An overview of the course and the collected data is provided in Table 8.

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[7] Office of the Auditor General of Norway

[8] A total of 13 students participated in the interviews (5+4+4), these were the same students observed during the process of assignment number 2 and 3. The age of the students was between 21 and 24 years. All participating students had some work experience; a few had worked regularly for as much as a year or more. Most students had part-time jobs alongside their studies.

Table 8 - Overview of teaching-learning activities, participants and dataset (organisation and management course)

Information on the teaching-learning settings	
Number of staff teaching the course	1 teacher
Number of students en-rolled in the course	80
Project period	8 weeks
Main assignment features	Enhance student learning based on active engagement. All assignments are based on cases and in one of them role play is also used.
Teaching and learning activities	Lectures; Group work (projects); Feedback on group work
Information on the research study (participants, data types)	
Number of groups/students	3 groups /13 students
Types of data	**General course material:** course plan, syllabus (one specific book), lecture slides, task descriptions, resources provided via the Learning Management System (Fronter) **Observation protocols:** a total of 5 lectures (8hours), Video recordings: 3 groups followed through the working processes of two different assignments (20 hours of video recording) **Documents/Products:** drafts and final versions of the 3 groups' submitted assignments **Interview data:** Pre and post interview with main teacher (each 1h); Post-interviews (in groups) with the three groups of students that were followed by video observation (each 1h); **Field notes:** Field notes from every site visit **Student survey:** End of the course, questions about experience of teaching-learning environment, approaches to learning, self-efficacy, 44 responses (55% response rate)

4.4   Characteristics of the teaching and learning environment

The teaching approaches and ways of engaging students in the course were related to the general vision of offering a 'pracademic' study programme, which aims at fulfilling the three following functions (Jørgensen et al., 2013, p. 216). The first function is to work as a pedagogical tool to support student learning of abstract theory. The second function is to address the aspects of relevance regard to both practical skills and analytical competencies. The third function is to be a carrier promoting tool, to cover the threshold between education and work. Students shall learn to know the field of practice and the field of practice shall be introduced to the competencies of the students according to the initiators (Jørgensen et al., 2013).

The aims of the course were to enhance students' knowledge and skills regarding how a HR unit can support the learning and development of the employees, drawing on the pracademic ideas mentioned above. The course description stated seven intended learning outcomes, which highlighted that the students, upon completing the course, should have knowledge about basic functions in personnel management; knowledge about different aspects of the employee-employer relationship such as recruitment, professional development, reward systems and leaving the work organisation; knowledge about ethical challenges and

diversity issues in personnel management; capacity to relate personnel practices to organisational aims and strategies; capacity to reflect on and use theoretical knowledge in handling practical situations and challenges.

In the initial teacher interview, the course teacher explained that a main challenge with the course is that to a large extent it concerns practical skills and experience-based knowledge, and that HR as an academic domain only recently has developed a theoretical base. As the teacher expressed; '*When I first met HR about two decades ago it was more of a "cookbook subject", very hard to teach. I don't think it is easy to teach, it is a challenge to make it come alive*'. This is however about to change, and the teacher expressed satisfaction with the textbook that forms the reading for the course. The theoretical development of the subject is seen as important for students to be able to justify their decisions and hence to develop a 'pracademic' competence:

> '*The difference between our students and others who are given similar tasks, is that our students must be able to justify their choices and decision with support in the professional domain and literature. And this is what this course is about: to raise awareness of them in how they can use the theory to suggest alternatives and give reasons for their choices*' (Teacher, initial interview).

The course included several learning activities such as lectures, student group work and student presentations. The syllabus consisted of one textbook, and the lectures mainly followed the structure of this book. The scheduled, teacher-organised activities were distributed in the course plan as illustrated in Figure 5.
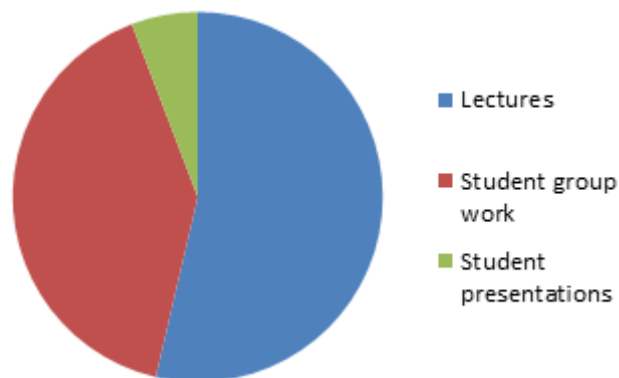

Figure 5 - Planned distribution of course activities (organisation and management)

In total, the course included 18.5 hours of lectures and 14 hours of student group work. The course was assignment-driven in the form that students' work is organised as a series of mandatory assignments conducted partly in teacher-scheduled sessions and partly worked on beyond scheduled sessions. Students worked on three mandatory assignments (case analysis and role play) and one home exam, all of them done by the core group. Two hours of student presentations were organised for the first assignment. The teacher-organised activities were

realised as planned, but student groups worked with assignments beyond scheduled times for group activities. Lecture topics followed the structure of the textbook and were related to the assignments. Attending lectures was optional. In the following we describe the main activities more in detail.

Table 9: Overview of the different components in the course

Week (in the course)	Plenary sessions	Assignments	Assessment
1	Introduction to the course (chapter 1 and 10)		
1	Introduction to assignment 1	Group work 1	
		Submission of group work 1	Formative assessment (no grading)
1	Recruitment (chapter 11)		
3	Recruitment (chapter 13)		
3	Appraisal (chapter 14)		
5	Human resource (chapter 16)		
5	Management and health (chapter 19)		
5	Introduction to assignment 2 (chapter 21)	Group work 2	
		Submission of group work 2	Formative assessment (no grading)
6	Conflicts and bullying at work (chapter 20)		
6	Introduction to assignment 3	Group work 3	
6	How to measure the employees' enactment (chapter 15)		
6	Salary and reward (chapter 18)		
		Submission of group work 3	Formative assessment (no grading)
8	Health, Safety and Environment (chapter 22)		
8	Introduction to home exam	Individual work	
		Submission of individual home exam	Summative assessment (grading)

4.4.1 Plenary sessions

In total, there were 10 lectures spread over the period of 8 weeks. The other plenary sessions included instructions for group work, written assignments and the exam. Moreover, most of the plenary sessions were thematically-based lectures on specific chapters in the syllabus book, and most of the book was covered by the lectures. The lectures were supported by PowerPoint presentations, which were uploaded in the LMS in advance. Other resources drawn upon in the lectures were some web-based HRM resources and examples from everyday life or organisational issues familiar to the teacher. Most of these were not written in the PowerPoint but used as elaboration of the presentation by the teachers. The teacher uploaded the

PP presentation in the LMS a few days ahead of each lecture, and the students also had information about what parts of the syllabus book would be covered in the upcoming lecture. At the beginning of the course, the teacher recommended the students to read the stated chapters before the lecture. In the interviews some students expressed that '*they knew that they should have read the relevant chapters of the book, but for different reasons they did not have time to do so'*. But some of the students explained that they always read relevant chapters as a preparation for the lecture. These students were among the most active participants in class. According to our observations, approximately half of the cohort attended the lectures. The teacher commented upon this as '*normal*'.

All observed lectures included frequent invitations to student participation, organised as 'buzz groups' or plenary discussions. The buzz groups and the plenary discussions were often linked in the mentioned order. According to our analysis, students participated actively and engaged both in buzz groups and in plenary discussions. The students were invited to articulate their viewpoints and ideas in plenary. Such ideas were typically written on the blackboard as bullet points, and referred to in the following part of the lecture. However, it is interesting to note that these discussions were rarely about scientific concepts. Rather they invited students' reflections through questions like 'what would you do if …', 'what do you think is the explanation for …' or 'what is your opinion of …'. Students were also encouraged to ask questions during the lectures, and they did so quite frequently. Some students explained in the interviews that they knew there would be a lot of questions and discussions, and that this insight made them read the syllabus and prepare themselves for the lectures. In the group interviews, all students clearly expressed that the practical examples from real life situations in organisations, given by the teacher, were really helpful for them. In particular they found the examples helpful as a way to get a grip on the rather abstract syllabus.

Based on the analysis of the student interviews, we see that students appreciate that the teacher applies dilemmas in her lectures and invites them to discuss these, because it makes them reflect. One student says: '*The lectures in this course are very good. The teacher is good at establishing a dynamic atmosphere, she moves around in the room. An open community has developed, where it is easy to ask questions'* (female student, group B). In these regards this specific course was experienced as particularly good compared with other courses within the programme, according to the students. One student characterised the lecturers as '*a conversation*' (male student, group A). At the same time our lecture observations indicate that the engagement of the students in the lectures was unevenly distributed and that the same 10–15 students were most eager to raise their hands in plenary.

In addition to the dialogic approach that characterised the lectures, students also appreciated that the teacher has a sense of humour, and that she is so '*open*' and responsive to input from the students. Finally, it is underscored that the teacher does a brilliant job by giving her suggestions about how they should work with the syllabus and the assignments to have the best outcome of the course, and by being clear in her statements. As one student said: '*if you ask a question you actually get a clear answer'* (male student, group B).

The lectures, as well as the course as a whole, were described as very relevant for future work by the students. A typical example from the interviews is this statement: '*I would like to have a job within Human Resource Management, and this course has opened up the big range of*

different areas that belong to that type of position' (male student, group A). The students who followed the lectures also valued that the teacher used a range of practical examples to illustrate the points made in the lectures. The students explained that her illustrations are based on her own extensive professional experience. Such experience-based knowledge complemented the syllabus in a most helpful manner, according to the students: '*She puts little information into her slides, and she talk about a lot of other stuff. We would not have been able to pick up that if we weren't present*' (female student, group C).

The framing of the plenary lectures and the structure that was established by the teacher from the beginning of the course clearly has the potential to open up for active participation by the students. This went beyond the concrete activities of buzz groups and plenary discussions during lectures. It also had an impact on how students prepared themselves for the lectures. In the interviews the students stated that because of the frequency of discussions that they know will be part of the lectures, they read the relevant syllabus in advance to be prepared for the discussions. Students find this motivating and relevant for their future work. It should be noted that the lectures are not mandatory and that our observations showed that only half of the students showed up for the lectures, and from the attending students there are just some of them who prepare themselves as described above. This pattern was confirmed by the teacher as the normal state, and in part explained by the fact that students needed to move from their main campus to a different building in order to attend the lectures.

4.4.2 Group work and group assignments

At the beginning of the course students were organised in groups that worked together during the entire course. The group constellation was made by the students themselves. The students had three group exercises during the course; all of them should end up in an assignment to be submitted. The three assignments were not assessed by grading, but were to be submitted in order for the students to have the course approved. As mentioned earlier, our data collection focused specifically on the group processes related to assignment numbers 2 and 3, in which the work of selected groups was recorded. Below, we comment briefly on assignment 2, before we go more thoroughly into assignment 3, as this was held up as one of the most interesting activities aimed at operationalising the 'pracademic' ideal by the teachers responsible for the programme.

Assignment 2 was a case analysis of Human Resource Management challenges in a work organisation. Students were provided with a case narrative where they should envisage themselves as professionals in a HR department, as responsible for a training/competence development programme. The story reveals several problems in the work organisation related to stress, insecurity, and the collegial environment. The task given to students was threefold: 1) to identify specific challenges the leaders of the organisation should be aware of, and suggest ways for them to gain more information about the employees' work situation; 2) to suggest strategies in the organisation to ensure that it holds the relevant competencies for performing its tasks; and 3) to give specific advice for how the work environment in the organisation can be improved. The assignment was to be a written response from each group, consisting of about 2,000 words, and the discussion and advice should be theory-based.

In our analysis of the students' group work we found that this assignment typically was solved by the groups by agreeing upon a division of labour as soon as the assignment was introduced in the LMS. They wrote their individual sections, and when collaboration time was scheduled by the teacher, they sat down in the same room, working on their individual sections of the text. To a certain degree the participants engaged in discussions about concepts, problems of interpreting the assignment, the core argument in their text, or other issues.

The practical task in group assignment 3 was to interview 2 applicants for a fictitious position, based on application letters all students had to submit in advance. Each group needed to decide on who would take the role as interviewer and who would be the note taker. Interviewees were from other groups in the same cohort. The whole session was organised in 30 minute slots, in total stipulated at 3.5 hours:

- 30-minute introduction in plenary
- 30-minute group preparation of the interviews to decide distribution of roles and questions for the applicant,
- 30-minutes for the first interview,
- 30-minutes for collective reflection on the experience and feedback to the interviewer from the observer.
- 30-minute discussion on the whole process

Steps 3 and 4 were repeated for the second interview. The teacher did not participate after the thorough instructions given partly in the LMS and partly in the introductory session. She was however available for questions during the day (sitting in the plenary room), and she led a summing-up session towards the end of the day in which the students could share their experiences with the class. Apart from this, the groups worked in small rooms with no involvement of the teacher. The teacher gave written feedback to all groups after submission of their report.
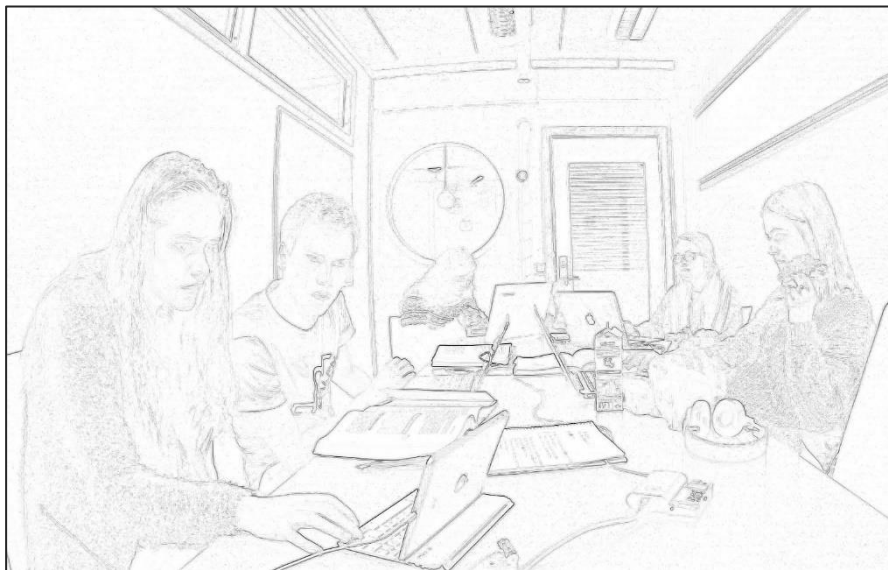

Illustration 3 – group work at the organisation and management course

The observations revealed that most students were highly engaged in the activity, and showed great concern to prepare the interview and their roles as well as the strict timekeeping needed in order to make the exercise work. Those who were given the interviewee roles often felt nervous and excited about how they would perform, and expressed that it was an important exercise in relation to getting a future job. As one student said, '*everyone will have to apply for a job and go through a recruitment process*' (field notes from observation). Interestingly, taking the role of the interviewer and planning the recruitment process from the imagined employer side seemed to generate less anxiety, despite the fact that the course topic addressed in the role play exercise was recruitment as a personnel management practice. This might have to do with the fact that the planning of the interview was a collective endeavour, and that the very situation of performing a job interview has the character of assessing the applicant. However, it also points to the issue raised in section 4.2 that the knowledge and learning challenges in this domain have a personal and affective dimension, and from the students' perspective the role of the job applicant seemed more vulnerable than that of the recruiter.

The final phase of this practical task was giving feedback to one another about their performance in the roles as interviewer and applicant. Students found this part of the task challenging, and a unified opinion is that it was particularly difficult to be critical. However, most students think it was useful to hear how the other students considered their performance. As one student expressed, '*I was made aware of things that I did – that I did not know that I did*' (female student, group A). In one of the groups (C) one candidate did not manage to stay serious, he laughed and made fun of the situation, something that ruined parts of the session. Because of this, the students in this particular group suggested using people that they are not familiar with in this activity instead of using students from the same cohort. The whole group of students were gathered in a teacher-led debriefing discussion at the end of the session, in which they could share their experiences and raise questions they had faced on the way. After the session, the groups wrote a report based on their experiences with reference to the syllabus.

Based on the analysis of student interviews, it is striking how positively the students characterise assignment number 3 as a learning activity. One statement is '*This assignment stood out as a magnificent example of the "pracademic" way of working*' (female student, group C). Another student says: '*I believe that this is the best assignment I have ever been up to*' (male student, group C). When students are asked *why* this particular activity gave such a high outcome, they give several reasons that can be summarised like this: first, they learnt a lot from the practical arrangement of enacting the whole process of recruitment for a position. One student says: '*This is the [course] activity I remember best, because it was practical*' (female student, group C). Second, the experience made them reflect upon elements that they had not been thinking about earlier, for example how much work it takes to prepare this process properly, or how complex the interview situation is. One student stated: '*It was clearly demonstrated how complex the situation was and how difficult it is both for the interviewer and the candidate to behave normally at the same time as you focus on all the other aspects needed in the situation*' (female student, group C). Third, the experience made the students more conscious about how to act in both roles, and they also realised how biased they were in their

ways of approaching such a situation. They explained that they had decided who they would give the job to in advance, however, during the interview, many of the students started to question their first supposition. In the discussion after the interview they found it interesting to see the high degree of diversity of interpretations among the students that had been in the same situation. Fourth, this was an assignment where students experienced that they could apply a lot of what they had read in the syllabus.

In both group activities the students seemed engaged. At the same time the level of engagement varied within the groups, and some students seemed to take more responsibility for the group processes than others. This led occasionally to some conflicts and disagreement as to the division of labour and distribution of tasks among the group members.

4.4.3   Assessment and grading

As already mentioned, the groups received written feedback on all assignments from the teacher, but the students had varied accounts of the degree and usefulness of the feedback they received from teacher on their assignments. When this was addressed in the final interviews, one group could hardly remember having received any feedback at all. The other two groups stated on the other hand that the response from the teacher was most useful. They explained that she pointed clearly to what was really good in the text, but also what they had to develop further. The reasons for this variation in accounts is not clear, but it might have to do both with the comments provided by the teacher and with the way the students engaged with the comments in their further work.

When it comes to assessment of the course as a whole, the final mark (A–F) was decided on the basis of the final exam alone; however, the assignments had to be passed in order to take the exam. The final exam was a home exam lasting for 48 hours, to be written individually, with a stated length of 2,000 words. A copy of an article from the internet about the company FINN served as a point of departure, and the students were supposed to envisage that they were experienced human resource consultants. The assignment had two parts: first, the students were asked to discuss different ways of measuring the performance of employees in the described company, and to develop a plan for how the company could work to improve the efforts of employees. They were also asked to discuss how the plan could be implemented in practice, supported with references to theory. Second, the students were asked to suggest how the same company could go about selecting the best candidates when recruiting new people.

Even though this was an individual exam, the students we interviewed described the process as highly collaborative. They sat together in the same groups as they had been working in for the other assignments, discussing how to interpret the exam text and responding to each other's drafts. The experience of writing a home exam was described in diverse ways by the students, and the views on this differed both within and between the groups. All interviewed students talked positively about working as a group for the exam. They expressed having learnt a lot from the process, partly dividing the production of text between the members, and partly writing in collaboration.

At the same time, the students expressed in interview that they found it strange or even wrong that the previous assignments did not count for the final mark. They argued that one piece of text was not representative of the knowledge they had achieved during the course. They added that had the three other assignments counted for the final mark, they would have put far more effort into them.

Most of the students stated that they prefer a home exam to a sit-in exam, because they could apply the syllabus in a more considered way than in a sit-in exam, where they would have to produce the whole test in a few hours without any available sources. '*The way you work with the home exam enhances learning*', according to the students. However, how the home exam is commented upon by the students in more detail revealed a whole range of different views. Several students stated that it is relevant for work life in the sense that you are introduced to a problem and that you have to solve that particular problem within a restricted time frame. Another viewpoint that was underscored by the students was that they learnt more in the home examination format, because they had to apply the material from syllabus and reflect upon it. Finally, it was described as fairer because '*you're not restricted by how you feel a particular day and the level of stress that particular day*'.

According to the teacher responsible, this was a productive assessment format in the current course. The student groups were able to show their capacity, and the teacher explained in the interview that the average mark for this specific exam was high compared with other cohorts.

4.5 Opportunities and challenges related to the pedagogical approaches and activities

This section will discuss the opportunities and challenges identified in the case with respect to issues that matter for the quality of educational practices at the course level (see also Chapter 1). Three themes will be highlighted: the forms of curricular coherence that characterise the course organisation; the opportunities the activities give for integrating different forms of knowledge; and the way student engagement is enhanced and supported through group-based assignments.

4.5.1 Coherence and principles for course organisation

The previous sections showed that the students by and large appreciated the learning activities and pedagogical approaches used in the course, and that they also shared the overall vision of the programme and course as aiming to develop a 'pracademic' competence. This came, for instance, into view in how the students described the learning potential of the home exam as related to the opportunity to reflect on and employ perspectives from the course literature in their exam. The ideal of a 'pracademic practice' runs as the pedagogical vision for the course, and serves as a joint frame for the teacher and the students as well as for seeing connections between this particular course and the programme as a whole. The students seemed to recognise ways of working across the courses, and to be familiar with the intended

learning outcomes. Within this frame of thinking, we will characterise the course as *assignment-driven* in the sense that the lectures and the assignments follow the same progression over the course period and in the way that the assignments build on each other and build up to the final exam. For instance, students were asked to write a fictitious application for a job, which later was used as a basis for the role play of job interviews. The group assignments also resembled each other in their format, in the sense that the students responded to or enacted a practical situation and then wrote a report in which their reflections on and advice on the situation was to be grounded in theoretical knowledge and concepts from the course literature. We can say that the course is constructively aligned (Biggs and Tang, 2011) in the way the assignments and course content are related to the pedagogical visions and intended learning outcomes. Moreover, ways of engaging students in learning activities form a principle of contextual coherence in the course, and contribute to create a sense of continuity for the students when entering a knowledge domain that is not clearly structured by theoretical concepts (Muller, 2009) – see also the discussion about coherence principles in chapter 1 in this report. At the same time, there is a certain gap between the course activities and the final assessment. The final mark is based on the home exam only; the three assignments (written by the group) just had to be passed. As a consequence, the group assignments had the function of training exercises that stimulated the students to relate theoretical knowledge to practical situations, but the knowledge and understanding achieved in these exercises did not count in the final grading as such.

The different courses within the programme are conceptualised by the students as linked well together, and apparently it is also easy for them to see how the different courses are linked. In the specific course on basic personnel management the teacher explicitly encouraged the students to use relevant elements from other courses in the assignments. Another sign of integration across courses is that the students, in the final interview, sometimes struggled with separating the different courses from one another when we asked particularly about their experiences with the course in basic human resource management. However, when it comes to feedback on the assignments we can see a discrepancy between teacher's intentions and students' experience. While the teacher stated that she carefully gives feedback to all groups, the students' experience varied from groups that found the teacher feedback very useful to groups that could not remember having any feedback from the teacher at all. As mentioned earlier, this might also be related to whether and how the students have accessed and worked with the feedback. Several studies in other contexts have revealed that this matter significantly for how feedback is experienced and that it might vary across student groups (Evans, 2013). Nevertheless, the variation found in this particular course indicates that students' further work on the feedback they received was left more to the students' voluntary initiative, rather than forming a key element of the organised course activities.

4.5.2 Opportunities and challenges for knowledge integration

Integrating theoretical and practical forms of knowledge was a key to the teachers' pedagogical vision in the course as well as in the wider study programme in Organisation and Management. The course activities overall seemed to support this integration. In particular, the

way the lecturer applies practical examples and illustration from real-life professional contexts, helped the students to see the relevance of the theory. However, the relationship between theory and practice appears to us as somewhat blurred. When students used the concept of 'theory' they referred to everything that was written in their textbook, which included theoretical concepts as well as practical examples, empirical material and discussions. In other words, the concept of theory covers a lot, and seems to relate to everything that is conveyed in a written format by authors external to the course. On the other hand, the term 'practice' is also used about a range of elements, like the practical illustrations given by the teacher in lectures, discussions and group assignments; all that is conceived as relevant knowledge by the students. Thus the concepts of 'theory' on the one hand and 'practice' on the other seem to overlap. This might in part be explained by the character of the knowledge domain of HRM, which, as also stated by the course teacher, has only recently been subjected to theoretical developments. It might also be explained by the purpose of the learning activities, which will vary according to the knowledge challenges they entail (Markauskaite & Goodyear, 2016). In this case a main purpose was to introduce students to practical personnel work and provide them with conceptual resources needed to reflect on and justify choices in applied HRM.

Looking further into the activities of case assignments and role play, we notice that these were experienced as productive learning activities by the students. The activity that stood out as particularly stimulating for student learning was the role play they enacted when solving assignment number three. This can be explained as an example of an opportunity for the students to activate their varied experiences from (part time) jobs. However, our analysis indicates that several students saw this primarily as relevant for themselves as applicants for possible jobs (now or later), rather than as future personnel managers. As mentioned above, taking on the role of the job applicant seemed to generate substantially more anxiety than that of the interviewer. A challenge in this regard might be that teachers and students operate with different basic assumptions about 'relevance'. While the teacher might take it for granted that this exercise is relevant for the students as future personnel managers and recruiters in organisational life, the students seemed to think of it as more relevant for their lives here and now. This points to a more general challenge in how educational content can be made relevant for learners in different life phases, and to what the ideal of creating 'authentic contexts' (Keys & Wolfe 1990; Knoll 1997; Rule, 2006) might mean in different knowledge domains. More specifically, it raises the fundamental question of how learning activities can emphasise experience-based knowledge while at the same time preparing students for future positions they are not yet designated to take.

Our analysis indicates that the teacher plays an important role in students' integration of different types of knowledge. A more thorough analysis of this issue would require more data and in-depth investigations of teacher-student interactions in the course contexts. In sum, however, the different activities in the course seem to complement each other also when it comes to opportunities for knowledge integration. In the lectures, the textbook and theoretical concepts provided the basis for practical illustrations, while the group assignments worked the other way round and asked students to use practical scenarios as a basis for theoretical reflections. In this way there was a productive relationship between the activities. However, the fact that only around 50% of the students actually followed the lectures raises

a question about the importance of these lectures for the cohort as a whole. Clarifying what counts as the theoretical grounds and conceptual resources for human resource management, and supporting students in actively using conceptual resources in their reflections, therefore comes forward as an educational challenge.

4.5.3 Engaging and supporting students in group processes

As mentioned in the introductory chapter to this report, student-centred approaches assume the active role of students in learning processes, which involves participation in knowledge construction and active exploration by them. Peer discussions and interaction with peers played a prominent role in this course, by way of the assignment-driven course design which to a great extent was organised as group work.

The students in this course had extensive experience with group work from their first year in the programme, which was an important basis for their course participation. The students seemed to appreciate the high level of collaboration in the course and presented rich arguments for why collaboration enhances learning. The fact that the students could decide the group constellations themselves was also highly appreciated by the students. This was related to the opportunity to work with people they knew and who had the same level of ambition for their achievements. However, in some cases a few participants seemed to do most of the work, and we could also see examples of groups spending their time with other stuff than they were supposed to do in the planned slots of time. The video recordings of group processes also demonstrated that there were tendencies to conflicts and disagreement in some of the groups. Such conflicts were linked to division of labour, and to the fact that not everyone took the same responsibility for the work to be done by the group. Hence, a challenge with this type of learning activities is to ensure that everyone contributes so that it becomes a truly collective endeavour. Creating assignments and monitoring students' work in such a way that students are guided to activate deep approaches to learning is this equally important, if not even more, when using group-based activities (cf. Parpala et al., 2010). This might be further enhanced by the teacher explaining the work procedures also for the social regulation of the group process, in addition to the knowledge-related work.

A challenge with these activities, and with the course design more generally, is also that it is quite time-demanding and vulnerable with respect to the staffing and engagement of teacher support. Pedagogical approaches as case assignments and role play require good planning and organisation from the teacher side (Baeten et al., 2014; Martin et al., 2014), and following up students in their group processes is a time-demanding endeavour. The workload in this case was characterised as 'absolutely extreme' by the teacher, who also was responsible for several other courses in the same period. This points to an overall challenge of not seeing teachers' work or the different activities in isolation, but keeping the whole work process for both teachers and students in mind when designing student-centred learning activities and environments.

4.6 Conclusion and recommendations

This case study set out to examine how the interplay of case analyses, role play and written assignments worked to link theoretical and experience-based forms of knowledge in an Organisation and Management course focusing on HRM practices. The students in this course had been organised in working groups also during the first year of their BA programme, and they thus had extensive experience from how to organise group processes. This was partly a result of their own experiences and partly a result of how structures and strategies for successful group work had been explicitly taught by the teachers in the introductory part of the programme. These experiences were important for the students' self-organising of working groups in line with their academic ambitions.

Most study activities within the course appeared as opportunities for the students to activate their experience-based knowledge. Whilst this is found important for learning, it may at the same time generate differences between the students' participation opportunities (Bransford et al., 2005). It is particularly interesting in this case to see how group work with assignments is organised in ways which imply that having work experience may be an advantage. It is also interesting to note the openness in the role play as to what kind of experiences the students could gain and what these were related to (e.g. seeing themselves as prospective job seekers, or as HR managers responsible for recruiting processes in work organisation).

Constructive alignment of the course elements was by and large achieved by this structure. However, there are reasons to ask whether such alignment can be fully achieved if the students do not see how the different assignments build up to the final exam. The three group assignments in this case were compulsory but they did not count in the final assessment of the course. Together with the lack of clear rules for the social organisation of the process, this might explain some of the discrepancies we found in the group collaboration and in the perceived feedback from the teacher on the group assignments. Based on these insights, we provide the following recommendations for courses that employ related pedagogical approaches and learning activities:

- Take students' previous experiences with group work into account when designing group assignments and their related pedagogical support
- Consider how students engagement and achievements in the learning process can have implications for the final grading in the course
- Consider what previous experience and knowledge students have in the given knowledge domain, to align notions of relevance and purpose of the learning activities
- Consider the resources used on lectures and teacher-led activities in the course as a whole, if these are not mandatory and followed by a majority of the students

5   Simulation in a practicum course in nursing

Yngve Nordkvelle & Odd Rune Stalheim

This chapter:

- Investigates how the use of simulation in nursing education affects students learning.
- Discusses opportunities and challenges related to the use of simulation activities in practice and how students are engaged in learning activities.
- Provides recommendations for how to handle and use high technological simulation as part of students' practicum.

5.1   Introduction

This case explores the use of simulation in nursing education. It highlights how students prepare for and experience the acting out of the simulation situation. The emotional, cognitive and professional development as a result of exploring the paths and shortcuts between the domain of theory and practice through simulation technology is an exciting and innovative development in nursing education, a type of innovative practice that has shown merit over the last decades (see below). The question is, does it improve the quality of learning and teaching?

Nursing education is a complex professional education with strict rules and restrictions for the setup of courses. The ministry has decided that Norwegian nursing education institutions will follow the National regulation of nursing education from 2008 as well as the National Qualifications Framework (NQF) (of 2013) for local curricula, adhering to a common European framework. The two have different legal status, and, as most higher institutions, the administration has strived to revise the texts to comply with what is interpreted as viable consequences of what the framework implies nationally (Prøitz, Havnes, Briggs and Scott, 2017). The division between theoretical and practical teaching is 50% to each, and the design of theoretical and practical teaching is up to the higher education institution to structure. This caters for practices that carefully follow laws and regulations on one hand, and creativity and

entrepreneurship on the other, in promoting innovative environments for teaching and learning.

Teaching practicum is in some respects a contradictory expression in light of the long tradition in nursing education of letting students work with experienced nurses and learning the skills in a master-novice relationship. Teaching is really more supervision, and practicum is a gradual initiation of a professional practice. This case concentrates on the simulation part of a practicum course in nursing called 'Supervised practice in clinical Nursing', and focuses on how the teachers approach their tasks when students are in-house during practicum to learn specific skills using a high-tech simulation studio for the purpose. The questions addressed in this context are how the simulation was designed and how the students are engaged with learning activities during the simulation. The simulations are particularly intense and challenging learning situations and the case focuses on the particular challenges that a simulation offers. We also try to describe the perils and rewards of a highly intense learning situation and how simulations can be rendered of being of high quality or not.

One important context is that the institution and department in question hold a high profile about the achievements of their 'centre for simulation' and position themselves as a spearhead in a Nordic context for the use of simulation in nursing and health education.

During the course, 'Supervised practice in clinical nursing' students go through practice in a local hospital where they operate supervised by a trained nurse. The assigned nurse supervising the students varies on a daily basis, but there is one nurse that is head, in charge of the students, and who cooperates with the university as regards evaluation and follow-ups. During practice, students are encouraged to work together in groups due to challenges they experience during their practicum. It is mandatory for the students to write reflection papers after their work duty at the hospital every day during the course. The course is especially interesting because the simulation activity is a mandatory activity within the course. During simulation, there is time set aside for preparation before the simulation and for feedback and debriefing afterwards. The main skill expected from the students is that they are capable of participating in nursing actions in accordance with the requirements for sound and evidence-based practice of acute, critical and chronically ill patients with surgical disorders.

5.2 Previous research on teaching and pedagogical approaches in simulation in nursing

'Human Patient Simulation' (HPS) is an activity used in nursing training over the last 60 years. It has many precursors in single activities with patients, but it was with the production of resuscitating manikins that clinical simulations began to resemble modern clinical simulations in health education (Breckwoldt, Gruber, & Wittmann, 2014; Hopwood, 2017; Jeffries, 2005). Sim One was the first manikin connected to a computer and software in 1967, and the manikin could breathe, have a heartbeat, blood pressure, opening and closing abilities for eyes and mouth, and could respond to a number of medications (Bradley, 2006). In the late '80s, high fidelity manikins began to be reasonably priced and easy to manage, and a number of 'systems' began to spread. One driving force has been the reorientation of many medical

studies, where overload of information and need for more clinical experience has been a common denominator. Another driving force has been to avoid any possibility of harming patients. A variety of simulations are available, serving general as well as very specific areas of training for all medical professions.

The integrated simulator used in this case combines a full-bodied manikin with sophisticated computer controls that an operator can manipulate to produce physical or graphical responses; it hears, speaks, and produces different states of temperature and perspiration. High fidelity systems are now widely available. In nursing, it is considered that simulation provides a safe supportive learning environment (Wangensteen, 2010). It allows all levels of competent users, without running risks of causing harm to patients (Morrison & Catanzaro, 2010; Roberts & Greene, 2011). It allows participants to experiment in a realistic situation, and to reflect with peers and experts on the experience. It allows thorough rehearsal and practice of critical procedures. It relieves time and energy so that basic skills are learnt and leaves more time to concentrate on what can be learnt in real life contexts in the hospital with patients. Teaching with HPS is demanding and students experience elements of intimidation and stress. Even though performing nursing actions in front of fellow students and supervisors induces anxiety of failure and erosion of self-confidence, research shows that watching peers simulating offers unique learning opportunities (Hopwood, Rooney, Boud, & Kelly, 2016; Morrison & Catanzaro, 2010). A significant literature exists describing commendable teaching practices, and the quest for the most efficient and successful methods is strong in the research community (Jeffries 2015, Morrison & Catanzaro, 2011, Roberts & Green, 2011). Although agreement is strong about the potential of simulation, the didactical dimensions are still much debated. The quality of the simulation depends on numerous factors, of which the literature primarily focuses on the quality of the teacher interventions, students, educational practices, and simulations design characteristics (Jeffries, 2005). The better quality of these inputs, the better reflective processes will be as an outcome. Jeffries (2005) suggests that up to 50% of practical clinical training may be substituted by simulations, if performed well and in sustainable environments. Concerns related to practice make facilitators and operators sensitive to the individuality of the student, and the dynamics of small group collaboration. During simulation teachers and facilitators seek situations that challenge students at a manageable level and yet make them experience positive stress in order to maximise their performance (Jeffries, 2015). Frequent simulations are considered productive, but the issue of how often and what duration is also a practical matter. The nature of nursing is undergoing a great deal of change and patients spend less time in hospitals. Subsequently, political and institutional factors also affect the success of simulation as a phenomenon in nursing education.

Students tend to assess simulations very favourably (Keskitalo & Ruokamo, 2016). In comparison with the hospital practice they find simulation encourages reflection. The 'real' hospital sessions do not contain room for pausing, thinking again and doing things differently. The compelling context of having to act with the patient is transformed to a reflecting and experimenting context. The student experiences more opportunities to connect to previous knowledge and build a professional 'self' (Gundersen & Aareskjold, 2012). The simulation contexts give room for student emotions, to talk about anxiety and fears, communicating with fellow nurses, provide advice and critique and participate in a budding 'professional team'.

Literature (Kennedy, 2009; Keskitalo, Ruokamo, & Gaba, 2014; Roberts & Greene, 2011) suggests that students improve their learning outcomes if a number of conditions are present. First, they a) should be prepared to get involved cognitively and affectively, and b) have acknowledged the possibilities and limitations offered in the simulation case. Then, c) they should know how to handle the equipment and the technology, and, d) be adequately prepared for the challenges offered in the case they are facing. The next set of factors consider, e) the need for understanding the experiences they are making, and, f) succeeding in communicating in the collaboration in the nursing situation. Last but not least, g) they make use of the debriefing situation in productive ways, e.g. are open to critical questions about what was observed, and continue to probe the matter with references to previous experience and general and specific knowledge (Ødegården, Struksnes & Hofmann, 2015).

5.3   Empirical context and data

The institute offering the simulation (BA in nursing) as an integrated part of the practicum has a staff of 40. The institution has a strong tradition in health technology research and development, and has a reputation for developing new technologies for health education. They have created a 'centre for simulation and patient security' with five stations for training with operators through high-tech manikins, streaming of sound and pictures, and adjacent debriefing rooms. The centre also contains student laboratories where students may come and train continually, a ward of 24 beds where large groups may operate, special rooms and an auditorium for 50 people. In the basement of the building is an extra training unit for paramedical simulations. In brief, they can offer a wide set of simulation opportunities. They have keenly sought recognition for their excellent practice, with considerable success, for their methods and national courses for health personnel. They have won achievement awards, such as a third prize in the Norwegian Agency for Quality Assurance in Education competition for best quality in teaching and learning in 2012. The subject experts and administrators, and the studies they serve in nursing, radiography and a wide range of further education programmes, have seemingly a great engagement in quality improvement and are active participants in research and development work. The centre considers itself as a cutting edge professional community in the matter of high-fidelity simulations, organising conferences and seminars, and has issued a book about 'best practice' (Tosterud, 2015) in the field. The use of simulation as a method to integrate theory more closely with practice in nursing is becoming more common, and this centre places itself as a hub in this contemporary development.

The course is an obligatory 10-week course module presented in the spring semester of the 2nd year of the bachelor's in nursing part-time. These students follow a 75% progression through their bachelor's except for this course that is full time because of the work practice at the hospital. The course is based on guided practice in hospital only interrupted by a couple of days in the middle of the period of the 10 weeks at the university for simulation and pedagogical presentations.

One researcher prepared for the observations of simulation by participating in a full day of simulation activities in the lab at the institution, four weeks ahead of the observed simulation in the case. This was done in order to understand more of the simulation processes, become

familiar with the studio and the personnel operating it. All of the students participating in the case had prior experience with simulation, but mostly only one full simulation. The facilitators responsible for the simulation of the case were experienced organisers of simulations, and expressed confidence and mastery of the setup and procedure of the event. The simulation contains a preparatory phase, which is driven by the students, before the actual simulation takes place, followed by the debriefing of the events.

Qualitative methods were used to obtain data for the study. Data for the case study consist of four individual and one group interviews with 2nd year nursing students, two interviews with the supervisor for the course, the trained nurse in charge of the students at the hospital, as well as the director of the BA programme, A group interview was also conducted with 3rd year students in their final week as students in order to get a broader view of the bachelor's programme as a whole. A total of 13 informants were interviewed. Observations and video recordings of two simulation activities including briefing, action and debriefing and pedagogical presentations were obtained. The observations counted 11 participants.

Besides the interviews, the study also consists of observation from the discussion before, during and after the simulation. Those students – six in all – who did not take part in the simulation watched the scenario from a separate room via streaming, taking notes and commenting along the way. In addition, we also observed one pedagogical presentation from one student. All students are required to hold a research based pedagogical presentation with relevant issues from their practicum during the course. The simulation sessions were videotaped from the simulation administrator's position. The debriefings were taped by the researchers. The interviews followed a semi-structured format that led to a discussion related to the topics presented. All interviews lasted for approximately one hour and were audio recorded. Analysis began with independently reviewing all the data (video, audio and field notes) and identifying moments and passages that were pedagogically interesting and provided a structure for further analyses. Final themes were created based on the coding process. During the final stages of that work, the video recordings were used as a supplementary and complementary information source to the interviews. The video observations from simulation were viewed and compared with the theory-driven categories to see if they supported the thematisation based on the interviews and research questions.

The observed simulation is performed in a context of a 'reflection seminar', where the simulation is explicitly connected to reflection as an activity. It is framed as a retreat situation, pausing from the busy days of the hospital practicum, and working on the experiences in a different setting, with other inputs and more room for thinking about the relations between the actions and the philosophical and theoretical foundations of the practicum. The students are invited to reflect on a) simulation, b) a student presentation, and c) general reflections on how practicum is experienced about half way through the period.

Table 10 - Overview of case and collected data (nursing)

Number of staff	1 teacher in charge at the university, who also facilitates the simulation in the lab, 1 trained nurse in charge of the students at the hospital and several trained nurses who functions as supervisors at the daily practicum at the hospital.
Number of students	11 students on the course. 5 students observed for the study.
Number of groups interviewed	2 groups organised by the teachers.
Project period	10 weeks.
Main assignment features	Simulation activity, oral presentation, reflection papers.
Teaching and learning activities	Simulation (briefing, action, debriefing), oral presentation with discussion. Voluntary group work, writing daily reflection papers.
Types of data	**General course material**: course plan, syllabus. Additional data important to our analysis are course documents and descriptions, student assignments and documents related to the simulation activity. **Observation protocols**: Two high fidelity simulations with briefing, action and debriefing. Pedagogical presentation from 1 student. **Video recordings**: Video data were collected from simulation, debriefing and pedagogical presentation. **Audio recordings**: Interviews with teachers and student groups. All recorded material was transcribed. **Documents/Products**: Assignment texts, exams, Syllabus. **Interview data**: 1 pre and post interview with the study programme leader, 1 pre and post interview with the responsible course teacher, 1 interview with the nurse in charge of the supervised practice at the hospital and 2 group interviews with 4 and 6 students. The latter with 3rd year students at the end of the semester. All interviews lasted approximately an hour. **Field notes**: Field notes from site visit. **Student survey**: LEARN, 4 responses.

5.4 Characteristics of the teaching and learning environment

The course is based on two elements: a guided practice in a hospital with an individual assignment, and one pedagogical presentation and simulations at the institution. The course is scheduled to have a total of 300 hours of hospital practice. During practice, students spend a total of two days at the simulation lab for simulation and pedagogical presentation. In addition, students are encouraged to work together in groups on challenges they experience during their practicum. It is also mandatory to write reflection papers every day after their duty, and the time the students set aside for this will vary. During the simulation, there is set time for preparation before the case and feedback and debriefing after the simulation.

Practicum has a tradition in nursing education as a long sequence spent with a supervisor guiding the students, or enculturing them into habits and procedures of the everyday routine in a hospital or similar institution. In recent years the nursing practicum has been through a phase of seeking a stronger scientific and professional foundation (Elzinga, 1990). When students prepare reflective papers every day after their duty, and receive comments on that, and with intervals, return to their university to take part in simulations, it is intended to make students connect the theoretical and practical in more fruitful ways. Participating in group discussions, making judgements explicit and in writing, is meant to improve their ability to make assertions, give reasons for their actions, think and rethink about proper arguments and ideas.
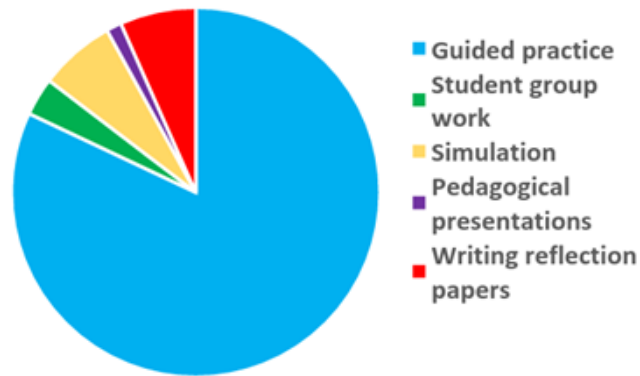
Figure 6 - Main activities, approximate time spent (nursing)

Planned time spent on activities suggests 250 hrs guided practice, pedagogical presentation 3 hrs, simulation 17 hrs, student group work 17 hrs, 12 hrs writing reflection papers).

There are two days of simulation training sessions during the course. All students are supposed to take part in both of the obligatory simulation exercises during the course, either as participant or as observer. The knowledge content is concentrated on learning procedures in surgery with a focus on post-operation challenges. In the next section, the main teacher-led activities are described.

There are three distinct phases of the simulation: a) preparation; b) doing the simulation; and c) debriefing, followed by a student presentation and a general reflection phase.

5.4.1   Preparation

The preparation phase follows a well-planned pattern that is uniform from simulation to simulation. Preparation starts with students getting to know the case on paper a week in advance. Preparing oneself by knowing the case intimately is stressed by the teachers. The description is fact-oriented and resembles sheets ordinary nurses get to see before a new patient is encountered in 'real life'. The students are encouraged to study the possible subjects that might occur with the problem focuses in the case. Two students are chosen to perform as nurses. The preparation ends with their supervisor assuming the role of facilitator, after the procedure, and the technical and clinical details are described in a guided dialogue with the students in the simulation room. The operator fills in with further details, before leaving the room and finding a seat in the operator's room from where the simulation is observed via a one-way-see-through window. The remaining students leave and enter the debriefing room to watch the streamed simulation on a large screen. The operator handles the manikin from a control board, and wears a headset with microphone for communication with the nurses. The facilitator stays in the simulation room and wears a headset to communicate with the operator and to act as any personnel the nurses need to consult during the simulation (medical doctor, assistant nurse). The operator starts the simulation. This phase is clearly one with an instructional design. The supervisor and operator 'show and tell' before the students act on their own in their roles as 'nurses'.

5.4.2 Simulation

The simulation starts with a patient in bed, apparently just arriving from a surgical operation or similar for observation and continued nursing. The tension and suspense is demonstrated by the student nurses gradually surveying what is the right place to start the nursing process. The patient is supplied with a peripheral venous catheter, lying on his back and using hospital clothing. Nurses wear a white cotton nursing coat, carry a stethoscope around the neck and start the dialogue with the patient, clarifying to the patient who they are, and what their roles and functions are. The nursing procedures are talked through with the patient, and the alternatives chosen are explained to the patient loud and clear, while the patient is constantly consulted on his sense of well-being and presence. The communication between the nurses, where one has the leading role, is also continuous and mutually supportive. When elements are confused or steps in procedure deviate, the facilitator intervenes discreetly and guides the nurses back on track with brief statements. The facilitator announces when the case is deemed over, and the students take a brief recess before gathering in the debriefing room. This phase is an interactive exercise where the student nurses observe, register, interpret, communicate and act in accordance with the material conditions, behaviour from the 'human manikin', messages from technological devices and instruments, and with each other. The presence of the supervisor is visible and intended, but with a minimum of interference.

5.4.3 Debriefing

The third phase is the debriefing. The tempo of the debriefing is quite high, and 15 minutes is deemed the maximum for the slot. The two nurses simulating are the most active in the dialogue with the facilitator and operator. The other six students fill in or support them. The questioning follows the case timeline and adheres to the scheme in the drill of nursing: the ABCDE: Airway, Breathing, Circulation, Disability, and Exposure. The references to the structure are explicit, and the questions rehearse what the nurses performed and assessed during the simulation compared with what was general and specific knowledge about the illness, and the patient in question. When the scheme has been checked step by step, more general assessment issues are raised, and the debrief is over. The debriefing clearly follows a well-planned line of progression emanating from vast experience of doing these simulations, as well as from the structured scheme. The pair of teacher nurses maintain a guided dialogue, drawing on the student's contributions, expanding on them and probing the student's thinking: 'what would have happened if …?'

Student presentation and general reflection

Two more activities follow the practical simulation: a student presentation on a chosen topic and a general debrief of the current topics of the hospital practice. The student presentation is a session where the student has picked a suitable topic for a theoretical outline of an illness and its nursing context. The presentation follows a pattern from a teaching session: the stu-

dent comments on a flow of PowerPoint slides, and illuminates the listeners with clinical observation, general information and evidence from the nursing and medical literature. Students and teacher pose questions and assess the content and presentation afterwards.

The general debrief has an open agenda and the teacher asks general questions about the students' experience during their practicum. The students express their concerns freely and are encouraged to bring them to the forum.

Illustration 4 – Students in a simulation setting

5.5 Engaging students and supporting their learning

Students expressed great suspense and huge expectations before the simulation. The tantalising situation of possibly being selected to perform as nurse is experienced as a challenging and daring one. They express being well prepared, but are uncertain of how they will perform if actually chosen. The students who participate as nurses report strong experiences and a great deal of satisfaction with doing the act, while the observing students also participate eagerly as spectators, commenting and offering alternative solutions through the situation: '*She has already measured the temperature!*' (whispering in the reflection room). The facilitator and operator express great concerns about the vulnerability of their students in the simulation and the cautious steps they need to take while observing the student capacity to face challenges, reflect on site and in the situation. The care is expressed in the facilitator gently guiding the students when they seem bewildered or miss out something 'obvious' in the nursing procedure. When a student nurse explicitly asks: '*Where is the painkiller?*' she quietly points her in the right direction. During debriefing, the question and answering situation is primarily directed towards the students who simulated, but addresses all participants in the small group. The two main participants receive proper acknowledgement for their good decisions: '*Here, I think you were very good!*', or actions or reflections on what they experienced in the heat of the moment: '*That was a very good observation!*'. The context is supportive and positive. The pace of the debrief is fast, and resembles a working context of a recently experienced nursing situation. The questions address: what do we know from experience, what does

the drill say, what is complicated here: '*Was he conscious at that time?*', what does theory tell us, what is obvious and what is up for contextual reflections and second thoughts: '*Yes he was conscious, and you talked to him continuously*'. The questions offer clues, more or less obvious, sometimes opening with sentences that stop, wanting students to fill in words, or as open-ended questions. The facilitator and operator fill in with experiences or short poignant anecdotes. The students take notes intensely and participate in assessing the performance of the nursing students: '*they cleared out what was going to happen, and collaborated without flaws, and without talking too much to each other*'.

5.5.1 General reflection

The student presentation and general reflection is more relaxed, less paced than the debriefing. The supervisor runs the session without the operator, which signals that the intensity of the simulation is over. In general, memories and experiences are encouraged to come to the fore, with open questions and a maieutic dialogic tone. In the presentation context, the candidate makes many references to theoretical knowledge as part of her argument, while the general reflection with the whole group on the practicum, which the supervisor directs, is more general and open. The references to the habits and chores of the practicum are important. During practicum, they experience the need to produce daily plans for the nursing duties, and to corroborate those plans with their supervisor's comments, and as a last exercise, take reflection notes from the plans, comments, experiences and afterthoughts as a whole. They express this to be somewhat overloaded by reflections and complain that their investment in reflections sometimes is disproportionate to the amount of feedback and response (Interview 2nd year students).

The group processes during simulations are primarily focusing the two selected students, while the student presenter takes centre stage through presentation. The remaining students are spectators of the simulation with clear aims for observing, and also participants in the reflection and debriefing situations. The process of watching the simulation causes a great deal of identification with the acting nurses and actors 'on screen'. They comment to the operator: '*You are a good actor'.* Watching the simulation induces sighs, comments and questions from the fellow group members during the session: '*See, the pulse is high!*'.

The reflective dimension is most expressed in the final session. The student presentation contains explicit references to nursing literature, textbooks and scholarly journals, while the specific and general debriefing contains fewer explicit references to research literature. On the other hand, frequent references to 'what we know' underlines the context of evidence for the entire session.

5.6 Knowledge resources and technology use

Before simulations students are encouraged to bring to mind their experience and prior knowledge. During simulations students act on behalf of their memory of the drills they are familiar with, and react to the manikin and its responses to their actions. Technology knowledge is essential in the field of nursing and the students are trained in different courses

with the equipment that is used. To gain proper simulation competence it is important that the students are confident and secure when handling important technological equipment. The technology of the manikin mediates the challenges the operator sees fit for the situation. When a technological component fails, the facilitator fills in and informs students. Eye contact with the facilitator goes along with the constant communication with the manikin. They maintain two viewpoints: one immersed in the situation and the other checking the facilitator monitoring their actions. The manikin is their main source of information and represents also the experienced nurse (the operator) who via the manikin creates the scenarios the students follow. Their co-creation is vital and affects the next step taken. This interactive pattern is the dominant and the consequences of, for example, the torso being lifted up or assisted to a side-position, are responded to immediately. The experienced 'reality' and the guesswork about what might be the alternative – the 'as if' is constantly kept up. The observations suggest that students are seemingly very present in both realms – the real being in the context, and the possible alternative – would the patient be better off if lifted up, or medicated before; these are experienced as very challenging elements in the flow. In the interview with year 3 students it was expressed that gradually students become better at immersing themselves in the simulation. In the debrief situation the facilitator and operator act as experienced and extremely knowledgeable exponents of the profession. They may refer to findings from research under way, but act primarily via their habitus as experts on the case. The occasional reference to what students might have read or remember, reminds them of the availability of extra resources to use when needed. During the student presentation, explicit theoretical work, referring to nursing principles, as well as empirical work with the chosen topic, sets an example of how to refer to evidence of good practice.

In addition to the high fidelity manikin and other technological tools the students used more basic technology in their learning processes, see Table 11.

Practically, all courses are managed through the formal Learning Management System, which, at the time was 'Fronter'. As many students experience, student groups quickly established their Facebook groups to communicate in the smaller group. Facebook is also integrated with a messenger function, so participants will be alerted when new actions take place. Students report they do check e-mails from the institution and interact with the LMS in order to download material and readings that help them prepare for the simulation or other procedures. However, for instant or quick communication they prefer Facebook. The YouTube channel is also commented on as a good provider of videos of certain procedures, and they watch such videos to get the flair of the situation in their preparation for the simulation. The simulator is a system for which they only can respond to in the context of the laboratory, while they may spend much time practising easier procedures with less complicated set ups in other settings of the laboratory. Using PowerPoint for presentation is a familiar technology for some younger students, while more mature students need peer support to master its challenges. Besides what we think of as study-related technologies, students also commented on the practice of the commuting habits of these part-time students. Seeking to drive together, filling the car with fellow students and rehearsing and discussing the theoretical and practical experiences in the morning or afternoon after a long day in practice or laboratory, was seen as an utterly interesting dimension of technology use.

Table 11 Overview of technology used (nursing course)

1 Offered by the course/teacher		2 Approached by students (own initiative)	
Type of technology	*Context of use*	*Type of technology*	*Context of use*
Fronter	Information sharing, lectures, providing case descriptions	Fronter	Lectures, information, reading case descriptions
Simulation	Demonstration, lecture context, procedure training, simulating surgery case	Facebook	Sharing information, asking questions, for quick updates of busy schedules
E-mail	Information and communication	Simulator	Practising skills and procedures.
		YouTube	Looking at procedures. Students look up procedures they are expected to learn and experience during their practice. It was a help in memorising.
		Power Point	Students presentations/pedagogical presentations

5.7   Experiences and challenges with the approaches and activities

The simulations are, in themselves described as situations where mistakes are allowed to happen and sometimes welcomed because the drama illuminates certain specific details about the case. It is often expressed that the debriefing and reflections afterwards are a more valid representation of the student's capacity for doing their routines correctly, than what is demonstrated in the 'stressful simulation'. The facilitator observes the group dynamic and encourages the less talkative or less extrovert students to become more active. The limits between 'natural' shyness or what might be concealed incompetence is a concern, not only for the teachers, but also for the student nurses. The teachers assess the dynamics between students and supervisor in practicum, and the process of noticing students who fail to progress in their practicum is closely monitored. This is a dimension in practicum that students are continually assessed in the various situations they are exposed to during the entire course. Their teacher stated: '*I call this [the practicum] an exam and you are about to perform on a 10 weeks long audition – and that's how it is!*' (interview, teacher). It is also an exam in the real sense, for which they only have two chances (in contrast to an ordinary exam allowing three attempts). Normally, about 10–15 per cent of the students will fail the practicum (interview, teacher). There are strict procedures for feedback to students. Students who are in danger of being rejected during practicum go through procedures with a warning and a plan for how to succeed. Students are also eager to maintain a skilled and competent companionship within the group. They experience the fine line between solidarity and 'realism' – if a fellow student falls behind: '*the students who fail, do so because they don't keep up in reading and getting to know about what is happening*' was a firmly expressed opinion by one member of the group (2nd. year student). This context of assessment is always present and is regulated by teachers and supervisors along the way.

One anecdote is worth mentioning because it showed up in different interview situations: a student experienced that the patient died, and was furious and inconsolable, reacting rather harshly to the facilitator and operator. Two weeks later the student returned to the teachers with apologies. She had just experienced a similar situation in the practicum, and felt the drill she had failed to follow then, now was corrected and extremely helpful in the 'real situation'. Even if this must be considered as an exceptional event, it illustrates the potential of invoking emotions and drama. Assessing the students and considering the limits of 'comfort zones' of students is constantly brought up by the teaching staff:

'I've had students who really were resentful since they did not get things right. They were a little upset that they were challenged, but then they show up after a few weeks and say; you know what, I had that patient now and I handled it. That's part of the secret you know, when we manage to create real life situations.' (Teacher, interview).

They reflect on how part-time older students face difficult challenges versus younger full-time students, and how nursing students respond in comparison with other students in health professions. Striking the balance between progressive and assertive learning situations is seemingly at the core of the teaching challenge. The students have great respect for the simulation because they might feel embarrassed when they make mistakes in front of the class – or for their teachers/assessors. Some students are less bothered and reveal a possibly extrovert personality when they claim that their teachers find mistakes or debateable acts good for raising discussions in the debriefing situation. The anecdote referred to above shows the duality of the risks to which students expose themselves. The 3rd. year students still refer to the simulation as quite challenging, and still ponder on how to tackle those situations: '*It can be a bit scary – knowing that the rest of the group is watching you.*' (Interview, 3rd. year student). Even though they express a feeling of fear and anxiety before the simulation they, after gaining more experience, act immediately on impulse and instinctively when they enter the lab. They acknowledge that performing nursing while others watch is highly 'natural' and is a part of the professional ethos of not being shy to expose your practice and receive criticism from others. Giving and taking criticism is deemed as a reciprocal act that confirms a professional community – in addition to formal and informal knowledge available for each case. '*It was scary in the beginning, and it continues to be so, but now we do see the purpose of it [more clearly]*' (Interview, 3rd. year student).

An interesting point is when the students are asked explicitly if they consider the simulations as 'practice' or 'theory', they immediately framed them as 'theory'. This judgement came spontaneously and firmly in the interview with the entire group of second year students. They were learning 'theory' when they had simulation, and described it as a very 'refined' sort of learning theory, but 'theory' nonetheless. The 3rd. year students expanded on the matter in terms of references to the 'real practicum' and repeatedly assigned the gold standard to the realities of practicum: '*it can't be compared*' (Interview, 3rd. year students). They see simulations as a combination of learning practice and theory, as a hybrid state of learning opportunity: '*It's both practical knowledge and theoretical …*' (Interview, 3rd. year students) '*We would rather have more simulations in addition to the practice we have here!*' (Interview, 2nd. year students). Acknowledging 'the theoretical', and assigning it a secondary position in the

mental order, so to speak, is an interesting estimation of how the students think. They emphasise that when you do simulations and make some mistakes, that is responded to in a helpful manner, '*then you also remember and understand the theory'*. 'Remembering and understanding theory' as a necessary dimension of doing the practicum, represents a certain respect for 'theory' that was an important part of the intention of the reflective seminar. During the practicum their main contact is the experienced supervisor, and the context is less imbued with discourses of evidence or theory. Practicum is highly regarded as the context in which you learn the most: '*It's very constructive, yeah. That is the arena where I learn most of what I get from the study*'. The best learning contexts during practicum is described in this manner:

> '*The most successful learning in practicum took place when "I" have worked with other students, and not operated as a single student. That gave "us" opportunities to discuss and reason together for an answer to problems and challenges. And you have a supervisor and other nurses in the vicinity and you can talk with them or the assistant nurses. Simulations are considered an important bridge between arenas, but quality – that's practicum' (Interview, 2nd. year students).*

The successful simulation has no strictly outspoken parameters. It may run smoothly with students who master procedures to perfection – or it might end with disaster, resulting in the patient's death. Students are familiar with the anecdotes of what went wrong in certain simulations, and the teachers have vivid memories of crisis occurring from time to time. Student responses to traumatic events during simulations are unpredictable and cause a great deal of concern in the group of teachers. They are also sensitive to the challenges of not knowing all eventualities to perfection and are clear about their own ability to improvise when needed. They emphasise the dual character of the nursing profession – as both evidence and research informed, as well as a craft where the practitioner needs to spot the problems in time and solve them wisely, marrying both episteme, poiesis and phronesis in the act. In that sense, the quality measures relate to how reflection is stimulated and how students reflect on the situations of the simulations, guided by their practical mind and their ability to connect to their taught learning material.

Students who comply with the requirements of being able to solve the challenges of the simulation are considered having 'simulation competence' (Tosterud, 2015). Being able to observe colleagues and learn from the drama that is acted out in the simulation is also an important component. Detecting the reasons for doing what is observable, discussing them, and providing alternative ideas, make them more able to learn from others' experiences.

5.8   Opportunities and challenges identified in the course

The whole course has an activity that encourages reflection. Reflection is trained in the daily routines of the hospital practicum, of the participation in the simulation, of the seminar activity of student presentation and general reflection. 'Reflective seminar' is also used as a term for the simulation session, communicating that the technological context is subordinated to the mental and cognitive dimensions of reflecting upon practice. Inviting students to the university for a simulation provides stimuli that induce many opportunities for learning. The

simulation creates situations that highlights certain practices and invites students to reflect on them with more experienced practitioners (teacher/facilitator/operator). In this context teachers – and sometimes students – refer to research evidence for arguments. The teachers said that previously one rarely heard a trained nurse utter that 'new research' would improve anything. Now, however: '*we educate nurses who have a much lower threshold for standing up and actually claim they know something because they've read an article about it, and that's what was done, and possibly we could learn something from it.*' (Interview, teacher). Gradually, they find that using reflective contexts for discussing practice and theory as two equally important dimensions is what simulation is good for.

The simulation is based on a prescribed case that is enacted as such. In the case itself, students aim at filling a role they sense as prescribed as far as the responses from the manikin go. They know of the duality of the situation, that it is possible to make mistakes in the nursing actions, and that the mistakes will not be interpreted as detrimental or ruining the student habitus, and yet, fellow students and supervisors are observing and noting their actions in an evaluative manner. The nursing situation in the simulation is not the time and place to alter routines and outline new ways of nursing patients with 'cardiac arrest'. The anecdotes and rumours circulating among students about 'patients' dying after student malpractice in the nursing simulation are vibrant and alive. Similarly, teachers refer to those occasions when that actually happened because it underlines the seriousness of the professional acts, and reminds the students of the costs of coming unprepared to the simulation. Indeed, sometimes patients are impossible to save from death, and this ultimate result is also considered worthwhile to add to the students' registry of situations that need to be mastered. However, generally, the facilitator and operator will seek to avoid those situations (Interview, teacher).

Even if students tend to navigate familiar landscapes during the simulation, they are exposing themselves to risks and challenges to their comfort zones. The teachers constantly negotiate where those boundaries go for the individual students, and are predominantly supporting a view of building the simulation competencies gradually and with care. They are unwilling to gamble with the resilience and robustness of the student. Knowing that task difficulty level is found to be an important variable when it comes to the efficacy of learning, and that clinical failure (such as the simulated patient dying) is likely to undermine the confidence of students they are watching out for the area of the 'possible learning zone'.

Observing and reflecting on the practical simulations takes place in two different contexts. The first part is divided between the two nurses taking care of the patient, while the rest are spectators watching the streamed pictures on the screen. While the acting nurses are very busy, the spectators during the observation of the screening are rather silent. Comments are uttered as the procedure runs, and this is imaginative and interpreting talk about what takes place, with whispering voices, through sighs and grunts. In varying degrees they see themselves as the acting nurses, and identify with the critical situation the acting nurses are in. Second, sitting in and going through the formal debrief is the next option for exploration and active knowledge construction. While the debriefing is both a matter of finding the 'correct answer' and 'reflecting on alternatives' the desire to find the best answer or reflection is significantly more present in the mood and tone of the situation. Still, the 'as if' context is upheld and the facilitator and operators maintain a positive and encouraging sentiment for seeking

knowledge in an open-ended manner. One obvious challenge is to make the learning opportunities for spectators and acting nurses equally intense and daring. While the spectators know their turn will come, sooner or later, the pulse and excitement of the acting nurses is more likely to be higher. On the other hand, some students might learn more from being an observer, than being 'on stage'.

We noticed that the debriefing situation was given a relatively narrow time slot (15 minutes). Knowing that research suggests the debriefing to be the most valuable situation for learning, spending little time on the dilemmas and critical moments that occurred can be justified by the fact that it is a natural consequence of a busy everyday practice. It would not be natural to spend significantly more time than allowed by a working context. Spending more time, however, would allow using a playback of the streamed sequence, winding back and forth, and do more thorough analytical techniques for finding issues and actions that might be debated.

Reflection on general matters about the practicum takes place in two contexts – with the supervisor on site in hospital, and in the general seminar. Our observation covered the general reflection, which was an open-ended Q&A session. The interview with students in practicum and the interview with the supervisor revealed that practicum is often rather busy, affording few pauses for thorough probing difficult or sensitive issues. In the practicum, students sense that the pace of notetaking, planning nursing activities, writing summaries and reflections is too extensive. The context of the reflective seminar gave more space for bringing in afterthoughts, critical questions and rethinking than the daily practice in the hospital allowed.

The feedback in the simulation is given orally during the debriefing. One might also characterise the supporting corrections the facilitator gave during the simulation as a sort of 'in-the-moment-feedback'. In the debrief the students receive more oral feedback both on the actions taken and on the uttered reflections. The size of the group makes it easy for the facilitator to get a good impression of how the group members behave. The simulation situation is also an assessment context. The demarcations of what is up for assessment and not are difficult to track. The students express that observing other students' presentations is valuable and sets standards for finding interesting topics and do research in the literature for relevant information that might illuminate the topic chosen. Most students say they value the pedagogical presentations very much. They highlight the investigation they get to do about a topic of relevance and interest. The activity gives them experience with presenting and arguing professionally.

Most of the students are satisfied with the reasons for the required daily plan for aims and reflection during practicum. Despite this, some students are dissatisfied with the feedback they are given on their written reflections. They wish for more detailed and constructive feedback and to get better assessment of their achievements. Sometimes they felt that they wrote too much and nobody was actually reading it. Feedback like 'Good' does not say much about their performances. Usually they manage to establish reasonable aims for the day in cooperation with their supervisor.

The simulation is considered a highly refined technological environment. The devices and technologies operating to make the simulation realistic are 'hidden' and need to be so. In

terms of media theory, the manikin and its characteristics tries to emulate reality and disguise its technology (Bolter & Grusin, 1999). The radio communication between operator and is a visible not-like-real device, and similarly, the streaming device that broadcasts the simulation to the reflection room is extra to other teaching and learning situations. In Bolter and Grusin's terminology, they are efforts of a 'remediation' of the original medium, e.g. the body, the hospital context and actual nursing (1999). The obvious challenge with a remediating approach, is how well it emulates the reality it is supposed to simulate. As Bradley notes, the process of making the remediation more lively, transparent and realistic is a result of continually refined technology, both in terms of hardware and software, as well as didactical perfection from the human actors (2006). No matter how much the technology reduces the distance between the two modes of reality, there will still be a gap:

> *'it's a manikin lying there, yes you may spray the manikin with water and … you hear voices, but still you don't get that clinical gaze you get when there is an actual person or real human body […] how a normal human body will react. It's all good with the manikins, but it's not optimal still' (Interview, 3rd. year student).*

On the other hand, students also claim that they easily become immersed with the situation and get 'hooked' on the simulated 'reality'. Students have, probably, different approaches, or thresholds, for becoming immersed in such situations. This is a constant challenge for the teachers to identify.

While the simulation is taped, the tapes are not used for extra scrutiny or examination of details, nor are transcripts or registers of pulse, temperature or other graphical input used in the simulation debrief. The potential is obviously there for using such approaches for detailed analysis of singular nursing acts. The teachers involved in the research and development of the simulation lab are testing out two strategies that might be fruitful. One is producing a media story of a family, which is provided with episodes of its well-being or illness, a story that will be applied to the different sections of their training throughout their three – or in this case four – years of progression. A project has been designed, and an application to an external financing body (Norway Opening Universities) has been produced (Tosterud & Bogsti, 2017). Making debriefings more productive has also been identified as an area worth exploring by the same group. Based on the research provided by several professors (Tosterud, 2015) they will test out different approaches to perform the debriefing (Tosterud, 2017).

The catalogue of cases is an important resource for the simulations. They contain scripts for what is likely to happen and which parameters might be altered to run the dramatic storyline towards the desired goals of the learning situation. Compared with how students assess other teaching and learning activities, the reflective seminar in simulation is deemed to be of a high quality. Connecting the experiences gained in practicum more directly to the chosen case for simulation more directly is a possible improvement suggested by the students. For our own part, we would recommend a closer investigation into what a narrative approach might add to the student's learning, not only as logs or reflection notes from practicum (Alvsvåg & Dahl, 2013), but by audiovisual means (Hardy & Sumner, 2014; Jamissen, Hardy, Nordkvelle, & Pleasants, 2017; Nordkvelle, Fritze, & Haugsbakk, 2017).

5.9   Conclusion and recommendations

The simulation is generally seen as a valuable addition to the practicum teaching and learning context. Students find the opportunity to have a distinctively active role in their practicum very positive and are very satisfied with having teachers who have the courage to set up simulations which can be open-ended and daring. They assess the method for their involvement to be challenging and arousing of emotions. Fear and awe of the situation is joined with the acceptance of the need to find a fluency in handling the complexity of the nursing situations. The students find the teachers to be careful in their running of the procedures during simulations, and are strongly engaged in their own thinking and reflection about their performance, and how this links to theoretical knowledge and the standard wisdom of the experienced nurse.

This case study affirms that students value the simulation as a daring and challenging learning situation. The quality of using simulations is linked to at least three dimensions:

- it makes it possible to cut out singular typical nursing situations, focus on its details and study it apart from other distracting features
- it generates suspense and sparks off a desire to perform well both for the student's own sense of progression, but also for the collective of nursing students
- it caters for reflection by means of guided action, collective discussion, supervision and discourses of evidence-based nursing.

Student nurses think it adds value to their learning in practicum, primarily because it creates more space for theoretical reflection in an orderly manner, e.g. first noticing, then describing, thinking systematically and critically, seeking alternatives, screening literature and research. The tension and anxiety of the students who act during simulations is a concern that is handled with care. It is on the other hand strongly agreed that the experiences are close to reality and very valuable for thinking nursing through. The safeguarding of students and patients is obvious, and simulations with the kind of manikin and technological devices employed in this context encourage the student nurses involved to become immersed in the situation. The quality of the simulation depends on numerous factors, as said earlier, and the literature primarily focus on the quality of the teacher interventions, students, educational practices, and simulations design characteristics (Jeffries, 2005). In the case analysed we assess that the teachers (facilitator, operator) were highly attentive to student needs, unfolded their roles with sensitivity, provided a sophisticated mix of experience and theoretical insights during debriefing, and maintained a positive and supportive tone during the entire simulation. The students were actively involved, curious and attentive, and seemingly well prepared for the simulation. The 'acting' during the simulations was affirming; mistakes made caused no harm, but rather were welcomed as points of reflection and critique. During debriefing attention was intense and constant. The dialogues and variety of instruction, questioning, reflection, and the use of media showed that the selection of educational activities was wide and comprehensive. The simulation design seemed to be well proven and functioned well.

The simulation takes place in a practicum period, where many disciplines in the nursing professional study come into place. Making the different subject areas join together is a vital factor for the students' making sense of the topic. The emphasis on reflection on action, trial

and error of the simulation and the situations where students are simulating on the one hand and trying out in practice on the other is the dominant activity.

This case shows us the benefits of simulation training. The interviews reveal interesting thoughts concerning how students define the simulation activity. Students find simulation to be good theory lessons. We also learn that simulation requires good planning and students need a basic simulation competence to get the full potential revealed in the case. An interesting factor in the simulation is how much pressure the students tolerate in the actual simulation. Supervisors and facilitators tell us stories about students having a breakdown after a 'patient' died in simulation. This leaves supervisors with challenges in how far they should go in simulation to make the students feel that they succeed and raise their self-efficacy. All this requires a lot of preparation and knowledge from supervisors, both on the actual simulation and the students as well. The four most important aspects to understand quality in simulation, as suggested by Jefferies, are all displayed in the case. We have seen teachers cater for a situation, going from role to role: as facilitator, supervisor, seminar leader and also teaching, performing assessment. The character of the teacher interventions was caring and careful, mindful of the state of the students, adjusting the educational practices with variation, and simulation design characteristics presenting a variety of cases to study.

To maintain high quality, the teachers should be properly trained to compose good cases, programme and enact the technical, as well as communicative and interactive sessions. Coordination and joint understanding of the didactical elements, as well as a command of the affective, psychomotor and cognitive dimensions that come in play during simulation and debriefing, are regarded as requirements for making simulation deliver a high-quality learning situation (Tosterud, 2015).

Room for improvement is primarily detected in the realm of improving conditions for student reflections. Apparently, students have a sense that writing reflective notes could be more productive if they were used more creatively. We think that the reflective notes contain raw material students might organise and sample to produce more narrative pieces that might provide more context and meaning for the students. Recent developments in digital portfolios, digital storytelling and narrative studies might provide some alternatives for reflection that might support the student to build a professional identity further.

The quest for teaching that links theory and practice is in high demand in professional studies. Simulations can be one strategy for training students in secure conditions in increasingly more naturalistic environments. They offer teachers the opportunity to construct complex life-like situations whereby students are challenged to demonstrate how knowledge and skills may merge with good ethical and reflected disposition of doing 'the right thing'. Engaging students' emotions, challenging them to observe and perform a practice that might be imperfect and reflect on their actions is a strong hallmark of quality in education.

Recommendations:

- Students could get a stronger sense of coherence between the practical nursing training and the simulation laboratory by involving their writing of reflection notes and use audiovisual means. The teachers involved have announced a renewed effort to improve such matters

- Debriefing is seen as a vital process and a closer look at the procedures could improve the reflective potential of the spectators
- Rethinking the fairly strict context of assessment throughout the practicum might ease some of the stress felt by the students towards the simulation

6   Bringing work-related elements into teaching and learning of legal education

Trine Fossland & Thomas de Lange

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This chapter:
- Investigates how a course in criminal law implements various teaching approaches to engage students in practical learning of criminal law
- Discusses opportunities and challenges related to making various teaching approaches work well together for both staff and students
- Provides recommendations for how to handle challenges related to the implementation of several parallel teaching and student assignment activities, information exchange and feedback within a highly competitive learning environment

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6.1   Introduction

The selection of this case in legal education is based on the aim of the QNHE project to illuminate approaches to university-based professional education. The specific case is also a popular study programme which attracts many students. The case is also interesting because it concerns a part of the university sector which often draws on traditional approaches to teaching and learning activities with limited student interaction.

The selection of the course in criminal law in the fourth year of the programme had a three-fold underlying rationale. First, the course in criminal law was 'redesigned' to become more student-centred, learning-oriented, work related and engaging. The term student-centred is often contrasted with instructor/teacher-centred, which emphasises knowledge transmission associated with monologic teaching and students as passive listeners and knowledge receivers (Wright, 2011). In contrast, student-centred approaches seek to involve students actively with disciplinary issues in the academic or professional field, that more strongly require students to be active participants in practices of sharing, understanding and constructing new knowledge (Barkley, 2010; Baeten et al., 2014; McCormick et al., 2013) This included, for example, to facilitate fewer traditional lectures, more digital learning resources, more collaboration, more holistic and complex challenges and assignment, as well as teaching and learning methods closer connected to relevant practical experience. While these two approaches in

practice rarely appear in a pure either/or form, this dichotomy of student versus teaching centred can serve the purpose of identifying the priorities of an educational programme and/or teaching community.

In this respect, Postareff & Lindblom-Ylänne (2008) argue that learning-focused approaches often see teaching as facilitating the students' deeper learning process and knowledge construction, in contrast to content-focused approaches where teaching is seen more as a knowledge transition process. The intention with this case report is to provide an insight into how various elements of student-centred teaching are implemented in a selected law programme and in displaying student experience, teacher's practical approaches as well as leadership-perspectives on intended outcomes and challenges. The main reason for implementing these teaching approaches in the given case was thus to integrate different thematic areas such as human rights law, methodology, ethics, criminal law and procedural law (including criminal procedure and civil procedure), which traditionally are thought and worked upon separately. The present case represents an example of teaching approaches and curriculum design attempting to integrate these thematic areas. The ambition is thereby to highlight a focus on learning about the complexities of these disciplinary areas and how they are interwoven in practical law and real-life professional situations. The implementation of student and learning-centred teaching is here provided as a facilitator for achieving this knowledge integration.

Given these characteristics, the case selection fits well with the purpose of the project, which is to investigate a set of educational practices in different course settings with the aim of identifying issues that matter for quality in higher education. This is in the current case related to teaching and learning activities that aim to strengthen connections to professional practice/working life and how these are combined in the course design. Based on this focus we will attempt to answer the overall research questions in the project:

- What characterises the teaching approaches and ways of engaging students in the course?
- What challenges do students and teachers face with the given pedagogical approaches and learning activities?
- What can we learn from this case about issues that matter for quality of educational practices?

Before presenting the course design, activities and research focus within this case, in the following section we provide a brief overview of educational practices that are typical in law education, which is relevant for understanding the observed pedagogical practice in our specific case.

6.2   Educational design and teaching approaches in law education

The need for training students to invoke emotions and persuasive legal arguments in practical law has been a concern throughout the history of legal education (Daley & Higgins, 2011). While Aristotle argued for this as early as three centuries BC, later efforts on rhetoric have been set up in practice in legal education in different ways. A typical feature in teaching law is approaching the discipline though cases (op.cit.). Teaching is here related to case analysis

and how to dissect and break down a legal case into discrete components (facts, issue, precedent, rule, application, holding). A common objective using cases in teaching is to display to students how to discern what the court is actually doing and giving students an opportunity to distinguish between important and irrelevant features and facts decisive to the outcome (Snape & Watt, 2005). Another approach, so-called moot court exercises, explicitly address the need for practical training through simulated court hearings in which the participants prepare written or oral arguments in areas of law; usually involving two grounds arguing for each side (Gaubatz, 1981). The ideas are, as Aristotle pointed out centuries ago, that instead of being provided with theoretical knowledge through lectures, law students should work with problems as the 'starting point' for learning the profession (Moust & Nuy, 1987, p.19). Various kinds of mooting have been introduced since the late 18th century and emerged as a prominent part of legal education in the US, with other countries following (Dickerson, 2000).

However, research on contemporary practices in teaching law reveals a challenge with the tendency of focusing mainly on content-features in the law. This content focus in teaching is dominated by traditional lecturing with a single teacher in an auditorium presenting a defined topic through an oral monologue to large student audiences (Berman, 2015). One of the main inadequacies with these traditional lecturing approaches is that law schools tend to struggle with succeeding with the integration of 'the three apprenticeships' of legal education (theory, ethics, and practical skills) (Wolff & Chan, 2015). Especially when relying heavily on one way of teaching (whichever method it might be), law school curricula tend to fail when meeting the requirements of integrating these three knowledge domains. Recommendations from research on law education are that this inadequacy is best handled through a curriculum that integrates the three pillars, rather than having a curriculum that focuses on doctrine (theory), and treats the other pillars as 'add ons'. Another finding indicates that law schools tend to lag behind other educational institutions in how they assess student learning, and the extent to which they provide feedback that improves learning (Sullivan, 2007). Legal education is also criticised for its lack of professional training, resulting in disconnectedness of the learning from the professional duties that lie ahead (op.cit.). These findings are also in line with the Norwegian white paper 'The Lawyer in society' (NOU 2015:3, p.131–133), that suggested further education after the master's degree to provide students with more practical skills and experiences before entering the *legal profession.* Other shortcomings addressed in law education are the limited use of new technologies, compared with other disciplines (Bone 2009). This last issue is an ongoing debate about how legal education can be reformed, where technology can play a role and even be a possible driving force (Wolff & Chan, 2016). In this respect, a number of academics have identified how the use of technology can provide a variety of teaching and learning modes to facilitate and improve law students' learning experiences (Henderson 2012, Henderson 2007, p. 467; Wolff & Chan, 2016).

The above-mentioned dominance of lecturing in law education and the general absence of digital technology was also previously the situation in the observed case-context of criminal law. An interesting entrance to our case of 'criminal law' is that it also provides an opportunity to make empirically-visible characteristics emerging from this redesign in terms of teaching and learning activities in trying to achieve several of the recommendations presented in the review above. The intention of integrating a range of disciplinary and procedural aspects in

this part of the law programme allows us therefore also to explore efforts in changing learning environments towards a student-centred and practice-oriented setting.

6.3   Empirical context and data

The Faculty of Law has around 550 students participating in the five-year Master's Degree Programme in Law. The programme receives students annually from abroad to study on the programme, and students regularly go on exchanges abroad. This case-report is confined to the course in criminal law, which is in the fourth year of this five-year master's programme. This course in criminal law includes the subjects of human rights law (6 ECTS.), methodology (2 ECTS.), ethics (2 ECTS.), criminal law (15 ECTS.) and procedural law (20 ECTS. including criminal procedure 10 ECTS and civil procedure 10 ECTS.). The course in criminal law was selected for observation in this case, as this part of the programme contained a variety of teaching approaches where elements from several different topics were incorporated.

In particular, the course in criminal law introduces students to fundamental principles of criminal judicial issues, and encourages students to critically apply and analyse these notions in the contemporary, social and political context. The goal is to give students basic knowledge of criminal procedural principles and skills in solving criminal matters in a reasonable fashion from the perspective of the defence, the police/prosecutor and the judiciary. Although the topic structure is selectively constructed, the intention is that students gain a broad understanding of crime and justice issues as well as learning how to practically approach criminal law cases. Students encounter case-based approaches to learning and are facing a range of practical examples and exercises concerning how to act and operate within criminal law practice in a problem-centred way.

The knowledge the students must achieve during the course has a clear practical orientation. They must learn about the accused's rights and obligations, the victim's legal position, rules on detention, and principles for the treatment of criminal cases, including the positions of the prosecutors and the court. They learn about how evidence can be traced and requirements related to evidence. They also learn processing skills in order to be able to identify and solve criminal law cases in a methodical manner and applying to principles in treating criminal cases. They are required to learn the specific steps in court proceedings and are expected to understand and analyse the roles and responsibilities of the various parties in a courtroom setting. This includes analysing and relating to ethical standards relevant to the actors involved in the legal process. Students are also supposed to apply their knowledge, identify and analyse relationships between key principles for proceedings, perform extensive independent work (both orally and in writing), solve problems and challenges individually and in co-operation with others, and communicate legal reasoning within jurisdictions of the department in a clear and precise manner.

All the data were collected during the 7th semester of the students' five-year master's programme. Teaching and learning activities were observed by participant observation and some highly interactive activities are videotaped with the agreement of the students involved. The population selected in this specific case observation of the course in criminal law totals 156 students. Of these 156, 99 attended the course teaching which is the observed setting and

therefore the relevant cohort of this case. 'In-depth' informants followed more closely are the teachers involved in the course and two collaboration groups of 4–5 students recruited from the same student population. The teaching in the observed course involved three teachers, who participated in planning and redesigning the course, as well as doing the teaching and supervision. All these teacher informants hold a PhD in law.

The main part of the data collection mainly occurred during the autumn of 2016, with the exception of end interviews with teachers and selected student group interviews, which took place during autumn 2017. This data collection includes four teacher interviews, interviews with current and following course leaders, as well as two student groups involving nine informants in total. The main data in the case comprise observations from teaching activities. These data were partially based on field notes and partially video recordings collected during a range of instructional settings during the autumn of 2016. These observations were conducted though field visits during one semester. Table 12 provides an overview of the empirical data collected during this period.

Table 12 Overview of teaching-learning activities, participants and dataset (criminal law)

Information on the teaching-learning settings	
Number of staff teaching the course	4 teachers
Number of students enrolled on the course	99
Observation period	10 weeks (the whole course lasted three months)
Main assignment features	Case-based assignments (development of legal arguments in different ways); Oral presentations, project work, procedures
Teaching and learning activities	Lectures: 3 types of lectures; online, traditional lecture hall and procedural lectures, Seminars: writing seminars, assignment seminars, procedural seminars Field visits and professionals visiting from the field
Information on the research study (participants, data types)	
Number of groups/students that participated actively in the study	8 teacher-led seminar groups. 6 groups were organised by the teachers. 2 informal study groups were interviewed more closely. Two groups also filmed themselves during their group work (8 students in total)
Types of data	**General course material**: course plan, syllabus, lecture slides, task descriptions, resources provided via the LMS (Fronter). Additional data: course documents and descriptions, student assignments, documents related to the procedural seminars and written student assignments **Observation protocols**: 7 lectures (14 hours), two procedural seminars (3 hours) and five assignment seminars (10 hours) were followed and observed more closely by filling in protocol annotations **Video recordings**: 4 lectures (6 hours), 2 procedural seminars (2 hours), 4 assignment seminars (8 hours), 2 group work/student-collaboration setting (1.5 hours) **Documents/Products**: Evaluation report, Assignment texts, exams, Syllabus, logs from discussion forum **Interview data**: pre and post interview with teachers (4 hours), group interview with leadership (1.5 hours), two student group interviews (3 hours) **Field notes/social media data**: field notes from site visits; all course related interactions and online resources organised within the Learning Management System **Student survey**: End of the course, questions about experience of teaching-learning environment, approaches to learning, self-efficacy, 64 out of 99 responses

6.4   Characteristics of the teaching and learning environment

The course content and focus in criminal law includes four overarching principles: first, the notion of responsibility (ansvarslæren); second, how to respond to criminal behaviour (reaksjonslæren); and third, how to execute responses to criminal behaviour (fullbyrdelseslæren). Finally, the project includes how to handle the relevance of multiple laws involved in a criminal act (konkurrens). The course syllabus consisted of one textbook, articles and reports; the course activities also combined several different knowledge resources such as presented legal cases and web-based law data that the students are expected to manage. A compressed presentation of the main intended learning outcomes of the course follows here:

- To attain advance knowledge about the specific methodological aspects in criminal law involving all of the four overarching principles described above
- Advanced knowledge and insight into criminal law involving sexual, corporate and material crimes, including knowledge about societal reasons causing crime
- Being able to explain and reason for methodologically sustainable treatment of criminal law cases, understanding their relation to central societal institutions and being able to explicate the theoretical basis of the law

The overarching goal of the course is to provide a teaching and learning environment where students learn about the discipline in an integrated manner, by developing their judicial knowledge through work-related and student-centred approaches. Attempting this goal, the course is balanced between two main teacher-organised activities – lectures and seminars – as illustrated by the two largest pieces in the following cake diagram. This diagram is generated on the basis of reviewing the course syllabus and course schedule in combination.
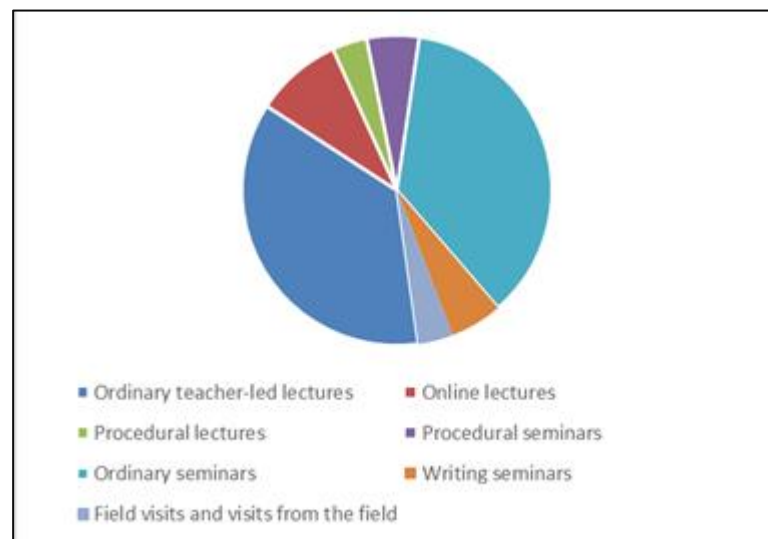

Figure 7 – Main planned activities in the course

As we see from this overview, the course provides a range of instructional activities, in addition to a larger portion of overarching lectures. In total, these instructional activities range from online lectures, ordinary teacher-led lectures and procedural lectures to different kinds

of seminars. A more detailed description of the main instructional activities is presented in the next section.

In the group interviews with the teachers, it was clear that the main planned activities were followed with some few exceptions. Along the way some of the students complained that there was too heavy a workload and that they did not get enough input, especially lectures, but also seminars (the surveys revealed that these were the same students who were also dissatisfied with their own contribution to the course). This feedback from students led the teachers to make a few changes, as they added some more seminars and lectures than they had originally planned. Some students felt they 'missed some of the content', as they had fewer lectures and seminars, and some seminars were also cancelled.

Several assessment forms were included in the course, but these followed the same structure as previously and before the redesign of the course. One of these is a compulsory oral presentation, that students need to complete either in the procedure seminar or other seminar settings. These presentations are usually related to assignments presented by the teachers. These presentations are assessed as either approved or not, and are commented on by the course teachers and the external expert directly after their performance. Other written assignments were voluntary. The course teaching in criminal law was followed by an obligatory practice period, where the students hand in a mandatory internship report at the end. This report was partly written during the internship and handed in approximately two weeks after ending the internship period. At the end of the course, the students have a home-based examination followed by oral examinations. The home examination ranges over four days where the students submit a written assignment that can be a practical or theoretical task, limited to 15 pages. The submitted work is assessed by an internal teacher and an external examiner and given a preliminary grade (A-F) which is possible to adjust based on the students' performance in the following oral exam. In addition, the students go through two school-based exams: first, solving a case-based task over 8 hours, and after a day's break (or more if it is a weekend), they get a 6-hour theoretical oriented assessment, assessed by one internal and one external examiner, each of which is separately graded (A-F).

6.4.1 Different types of lectures

There appear to be three main types of lectures: first, online lectures, traditional content-driven 2 x 45-minute lectures in a large lecture hall, procedural lectures, and practical lectures with invited guests representing different parts of professional life.

Online introduction lectures

The online lectures were used to introduce to, and provide an overview of, the course focus and content in specific topics. The video-recorded lectures were professionally produced in a studio, with shorter more clear-cut content, made available to students before they entered the traditional lectures or seminars. These lectures were normally made available to students on the LMS (Learning Management Systems). These lectures were teacher-led, with the intention of preparing the students and motivating them to find out more about the content before

they met the teacher and students. The teacher focused on explaining and exemplifying the content of the subject. PowerPoint was extensively used in these presentations.

Teacher-led lectures in the auditorium

The main body of lectures were face-to-face lectures in the lecture hall. These lectures functioned mainly as introducing and providing a more detailed overview of judicial themes and how these themes have been managed in judicial processing and convictions. The lecturers often draw on concrete articles, clauses and sections of the law, combined with examples of judicial processing. The lecturers often tell stories about dilemmas and challenges in actual cases. The lecturers also often pose rhetorical questions; i.e. questions where they mainly do not receive direct answers from students, but which are followed by silent pauses. Most of these questions problematise unclear and uncertain features in the body of law which have created debates and challenges in the judicial system. From both the observation schemes and the interviews with the students and teachers it is clear that the lectures were mainly monologues and can be considered as traditional (with some minor variations between teachers). Some of these lectures were also podcast and made available for the students after the lecture, to be used for repeating the content or followed in a more flexible manner. These characteristics of monologue-based lecturing and how these are perceived by the students are addressed in further detail below in this case report.

Procedural lectures

Procedural lectures are less frequent (3-4) and focus on going through specific student assignments and working procedures in the programme. The teachers here often suggest how to approach and handle assignments and tasks, but also comment on finished work. These lectures draw more directly on student input, questioning and response. The lectures in these settings also use student responses more actively in the sense of incorporating their contributions in their explanations and conclusions. These lectures can be considered as more dialogic and practical with regard to student work. A marked difference between the more ordinary teacher-led lectures and procedural lectures is that the lecturer directly comments upon students' assessment work, thereby introducing a more dialogic dynamic into the teaching.

6.4.2 Different types of seminars

The other main teacher-led activity was different types of seminars, which can be divided into the following categories:

Procedural seminars

In the procedural seminars the students prepare and engage in judicial processing. These seminars are simulation settings similar to courtroom proceedings. This is arranged though students assigned either as the counsel or prosecutor and presenting legal arguments related to a realistically-constructed case involving a wide spectrum of legal documents with involved parties. The students are presented with the documents 2–3 days prior to the procedural

seminar and thereby experience a realistic time frame for presenting the argument. The procedural seminars are based on students' optional enrolment as prosecutors or defence, involving around 16 students, which represents around 18-20% of the student population. The rest of the student population participated as audience and engaged in writing the pronouncement of verdict after the procedure, allowing the rest of the students to participate actively in the process. The decisions were commented on by teachers in plenary sessions (see procedural lectures above). The physical setting of the procedural seminars occurred in realistic surroundings representing the seating and structure of a courtroom.
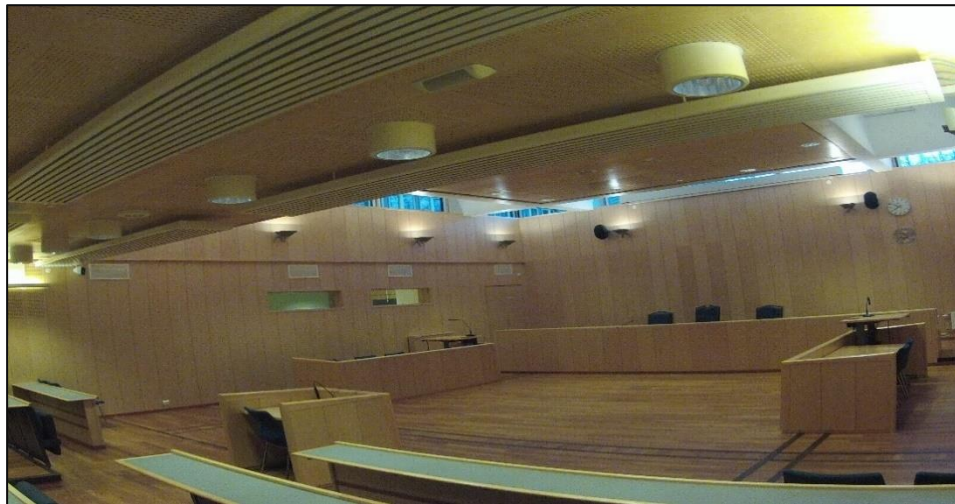
Illustration 5 – Physical setting of the procedural seminar

The procedural seminars were mainly based on the students' own prepared presentations, simulating legal hearings, but all the students received the same documents as their knowledge base for these preparations. The teacher role was more withdrawn, acting as a judge in the situation. In addition, an external representative from the judicial system participated as an observer, commenting on the students' procedural presentations. The students received an interesting triple-feedback opportunity on their procedural performance. First, the student-prosecutors and defenders presented their cases in two sequences; they first presented their argument which was followed by a counter-argument by the opposing party. This means that all the initial presentations were followed by a rebuttal by the opposing parties. This two-cycle structure (first round – prosecutor/defender present their argument; second round – prosecutor/defender responding to the other's argument) implied that each party received a reaction on how their initial statement was presented. This procedure thereby also functions as a sort of peer feedback. This was described by the students as a very valuable learning experience. Second, the external invited expert provided comments on the student's procedural performance from the perspective of a representative of the public prosecutor, which allowed the students to receive feedback on how realistic the student presentations appeared. Finally, the course teacher acting as a judge provided feedback to the students on more specific principle and disciplinary issues. In this respect, the whole session emerged as

a rich arena for student feedback. The students' experiences from these sessions are very positive, especially the realistic framing of the assignment with real documents and a visiting representative from the judicial system.

In the procedural seminars, students work in pairs, but this group work is not formally organised by the teachers. In the assignment seminars they do to some extent discuss in groups on an ad hoc basis. Informally, the students extensively organise their self-study in colloquia, which is a distinctive feature in the students' learning environment in this law education programme. The students' experiences from working in pairs in the procedural seminars are very positive, and the informants report that they perceive their participation in colloquia as essential.

Assignment seminars

Assignment seminars focus on supporting students in handling and writing judicial assignments concentrating on specific cases. The course provides in total eight parallel seminars usually held 1–2 times per week, depending on other activities in the course. Prior to each seminar week, the course teachers made accessible 2–3 cases on the LMS. The expectation or premise for the seminars is that the students prepare by going through these cases before the seminar sessions, consider possible approaches and start planning how to approach them. The seminar teachers on the other hand expect the students to be prepared, and based on that present specific ways of handling the cases. This relates to both identifying relevant information, identifying judicial problems and how to present and construct a written argument. These seminars were optional, but the course teachers experienced an acceptable student attendance at approximately half of the student population.

In the assignment seminars, students were mainly engaged in preparing to discuss cases and suggesting/planning an approach to handling the reasoning that these cases required. This was communicated as a preparation task for the students. The teacher role in these seminars was to suggest and present a way to solve these tasks from a teacher perspective. The teaching activities in these sessions were therefore mainly to go through and demonstrate through several stages in how to approach these cases as written student assignments. These seminars frequently opened up for students' questioning, clarifications and discussions of legal issues related to the cases, which allowed addressing issues which typically are not often discussed during lectures. The seminars were therefore teacher-led but more dialogic and open for student participation compared with the lecturing format. Opening for more active student comments, discussions and clarifications served here as an opportunity to receive feedback on writing strategies, disciplinary principles and legal practice. Some assignment seminars were coupled to judicial procedures, settings where students can voluntarily choose to write assignments or present an argument. These are specifically presented in the seminar courses or gone through by the teacher in the lecture hall. The students work is assessed collectively by course teachers with comments on how to improve their work. Work from the procedural seminars is also voluntarily handed in (domsavsigelser) for teacher feedback.

Writing seminar

At the beginning of the course, the students attended a writing seminar focusing on developing students' writing skills, with teachers giving feedback on students written texts. The writing seminar focused on students writing legal cases and learning how to structure and create written arguments. In this setting, the students received individual and collective feedback in order to address their different queries concerning writing. The intention with this seminar was therefore to provide an opportunity to exercise writing-skills based on relevant assignments before the students started doing 'actual' assignments in the course. The students also had the opportunity to follow up and develop their writing skills further in the assignment seminars (see above) where the teachers commented on drafts by actively referring to the principles the students had trained on in the writing seminar.

6.4.3   Field visits and visits from the field

Practical lectures and work-related field visits were an important part of the teaching and learning activities. The course provided more work-related aspects in different fashions: 1) work-related lectures with invited guests from different parts of professional life. Guests were problematising different aspects of the study content, addressing practical issues and realistic accounts of criminal law practice, court routines and the involvement of investigative work etc.; 2) field visits with invited speakers. The students visited a police station and attended lectures outside campus given by lawyers who worked closely with practical criminal law cases. Some of the lectures addressed the practical handling of cases, others focused on explaining how the court system works, while others again addressed related institutions, such as health-care, social work, policing etc.; 3) Work-related debate. The intention with the work-related debate was to engage students in a '*real-life situation to contribute to a closer understanding of how things actually work*'. The work-related debate was arranged to support the students' general skills of discussing different arguments from different viewpoints, as well as reflecting on ethical issues. The students were given roles to play to enact the different roles and received feedback from the teacher throughout the session.

In the field visits and the visits from the field the students were expected to learn how to identify and solve criminal law issues in a methodical and professional 'real life' manner through meetings with experienced practitioners from related institutions outside the university. This also gave the students an opportunity to ask outside experts about their views on difficult matters in the students' learning process. In these meetings the students were also expected to participate actively and apply knowledge taught in the programme when presenting legal arguments orally.

6.4.4   Technology resources and use

Several video lectures were available for the students meant as preparation to lectures and seminars (inspired by notions of flipped classroom, but this is not systematically followed as a method). The Learning Management System (Fronter) provides the students with group

tasks/challenges/information like online documents that the students can use during preparation (such as law databases/Lovdata etc.), that facilitates an activity-based structure. PowerPoints are used during lectures (one teacher uses Prezi), and the largest auditorium has facilities to podcast the lectures. The students also used their laptops actively during lectures and seminars.

Table 13 – Overview of technology used (criminal law)

1 Offered by the course/teacher		2 Approached by students (own initiative)	
Type of technology	*Context of use*	*Type of technology*	*Context of use*
Power Point Prezi	Lectures Information sharing, full class PowerPoint (very often)	Lap top The teachers pp. in an extended version after class was used	Laptop during class in both the lectures and the seminars
Fronter	LMS – organising the content digitally and make clear the structure for the students	Fronter	To get access to learning content
Media Site	Demonstration, digital 'preparing' lecture online	Media Site	Watched by students for preparation and repetition
Pod Cast	Repetition	Pod Cast	Repetition
Wise-flow	Assessment	Wise-flow	Assessment

The table illustrates how technology was used in the course to support students' learning. The table demonstrates two main features: 1) The course leaders have followed the more general recommendation proposing that law education should make greater use of technology and each student should have access to larger parts of the course content and relevant digital resources through their portable computers; 2) The observations revealed that the students use their computers very actively during lectures and seminars, taking notes and finding relevant digital resources through the use of judicial databases (e.g. Lovdata) during the teaching and learning sessions. The use of social media and other digital distractions appear to be at a minimum. The teachers mainly use PowerPoint in a traditional manner, while a few used Prezi. Teacher-led lectures in the auditorium and online lectures were podcasted and made available on the LMS (Fronter). Consequently, the use of digital technology can be argued to be extended in line with the suggestion in the ongoing debate about how teaching in legal education can be enhanced through the use of technology to facilitate learning. The use of the 'flipped classroom', where students prepare before they physically meet the teacher, is here in line with recent trends in legal education (Wallace, 2007). Despite these observations, and the fact that there were attempts to use technology in the course in diverse ways, findings from both student group and teacher interviews, as well as the students' surveys, revealed several challenges and a rather low utilisation of the opportunities digital technologies can offer.

6.5   Opportunities and challenges related to the pedagogical approaches and activities

This section discusses the opportunities and challenges identified in the case with respect to issues of quality of educational practices at the course level (see also chapter 1). Two themes will be highlighted: student and teacher experiences with the course teaching, and opportunities and challenges for knowledge integration.

6.5.1   Student and teacher experiences with the course activities

As the course description above displayed, the students in this case had the opportunity to engage with a range of different instructional settings throughout the course semester. The intention stated by the course teachers with the implemented changes was first of all to introduce more practical and realistic elements in the course, partly through visiting and being visited by professionals in the legal system. In addition, the seminar activities aimed at engaging students actively in handling practical cases through legal argumentation both in writing and oral presentations. These seminars presupposed student engagement in the sense that they were expected to prepare, perform and work with judicial knowledge and problem solving. This was especially the case in procedural and assignment seminars, while the lectures aimed at introducing students to the knowledge field and providing an overview of disciplinary areas. In the following, we go more thoroughly into how students and teachers perceived and experienced the implementation of these course activities.

Starting with the aims and learning outcomes, the students considered these as clear, but more demanding and complicated compared with earlier parts of the study programme. Students also expressed a wish for more information especially at the beginning of the course in order to prepare themselves for the upcoming learning demands and activities. Even though the students had access to extensive information during lectures and slides (content overview, syllabus, timetables, online lectures, ad hoc information and statements by course teachers etc.) made available on the LMS, the students still called for more information and overview of course activities. Some frustration was also expressed in relation to inadequate and sometimes contradictory information.

On the positive side, informants emphasised the motivational value of practical/procedural approaches in a court setting, as well as drawing on judicial knowledge content and previous judicial precedents. Concerning coherence between the various teaching activities, the students considered the lectures as a relevant preparation for the seminars and group work. They also expressed that the *'work-related aspects'* through visits was valuable for developing their understanding of the profession. One student even underlined that the '*time-pressure situation, with only 46 hours of preparation for the procedure in court, makes this "realistic" and a very positive and challenging experience*'. However, not all the work-related aspects in the course turned out as planned. Only a few students came prepared for the work-related debate at the beginning of the semester, leading to a slightly different debate than anticipated. This particular situation, and other similar examples, might illustrate possible

disadvantages with student-centred approaches heavily dependent on the students' preparations. In particular, the prepared students argue here for more and clearer demands to all involved students, referring to their experiences from seminars where teachers tend not to emphasise this sufficiently. These students also called for more professional feedback on their participation in realistic judicial sessions as role-players, when observed by visiting professionals. This was considered by several informants as a '*missed opportunity*' to learn and develop practical knowledge and procedural skills. Moreover, the students noted that the teachers to some extent approached especially the assignment seminars differently, where some tended to be lecturing-oriented while other teachers were more practically oriented towards solving assignments. This discrepancy also illustrates the importance of teacher-coordination when implementing a complex structure with different teaching approaches within a student-centred educational setting.

The students mainly expressed positive experiences with both in-class and online lectures. The student informants appear here to be less in favour of using lectures as an arena for discussion and dialogue (see comment on lecturing format above) Instead, the students seem to prefer lectures in large auditoriums confined to introduction of content knowledge, giving information and providing overview of disciplinary and thematic areas. The students we interviewed seem here to consider lectures as unsuitable for dialogue and student-engaging activities. While the students were pleased with the variation in content, practical examples and teaching in the lectures, they stressed more flexibility in making these lessons available as digital learning resources. The wish for more extensive technology use partly refers to the fact that only one teacher podcast lectures on a regular basis, and that the digital accessibility was partially troubled with technical problems. More extensive accessibility of digital material seems here to be considered as a potential resource supporting student preparation and repeating content. Regarding technology use, students specifically underline the need for clearer announcements, more extensive use of podcasts, more use of 'live' online lectures, more sharing of video cases and court decisions, and generally a more structured and predictable handling of the digital learning environment in the course.

Regarding seminar teaching, students mainly support the active elements in this setting and especially how assignments were used and worked with. The students experienced that this opportunity to observe and discuss a demonstration in how to approach written assignments in the assignment seminars was a fruitful addition on issues not readily and explicitly addressed in readings and other parts of the syllabus. The following comment from one of the student informants explains this in further detail:

> '*that you solve cases, is a way to learn how you understand the subject and it prepares you for the exam, the actual work with assignments. Getting help with this by the seminar teachers … yes it puts it in a practical perspective. Most of us need help with this. It's difficult. And in these seminars we learn to understand the more implicit details that we do not have a clue about in the beginning and which you can't read about in the books. That's what we learn in the assignment seminars*'

How assignments are shaped and formulated seems also to be important regarding students learning experiences. This is illustrated in the following comment:

'The assignments we were presented with during the course and assignment seminars were different compared with previous parts of the programme. We did not do any of the small assignments, which was typical in previous parts of the programme. Instead we were presented with more comprehensive practical assignments. This worked really well.'

The success factor of these assignments was explained partly due to the wholeness of working with judicial problems and learning about the entire process in handling legal cases. These comprehensive assignments thereby opened up the opportunity to learn how to *'grasp the complexities of the discipline'*. An additional positive aspect was the relevance of these assignments in relation to the final assessment: '*it was much better to work on these extensive assignments since they are much more similar to what we are given in the final exam*'.

Some informants did however express discomfort with the student-engaging focus in the seminars, calling for more lectures and traditional teaching. Nevertheless, this was not a dominant tendency, which is confirmed by the student survey. On the contrary, a challenge mentioned in the student interviews was a problem with passive students: '*Some of the students do not take responsibility in seminars; they lean back and just take notes. So some students do not contribute*'. The student informants suggested here clearer measures where teachers should push the students more: *'it should be stricter already in the beginning. When students are passive, the teachers should demand more from them so that they contribute. They could do this by asking questions, make them answer questions and do presentations*'. The student informants are here pointing to possible strategies for handling passive students and that the seminar teaching seems to be handled diversely by teachers: *'the teachers approach the seminars in different ways. Some hold mini-lectures while others ask questions and expect students to contribute*'. The informants here clearly prefer the student-engaging approaches in the seminars.

While seminars and assignments were considered as more challenging compared with previous parts of the programme, the students still underlined the benefits of being challenged in this way. The informants point here to the importance of devoted teachers emphasising student engagement and avoiding '*mini-lecturing'*. Interestingly, even if the students were given a range of opportunities to discuss disciplinary problems and receive feedback through seminars and assignments, the overall opinion amongst students still is to provide more feedback opportunities. According to the teachers on the other hand, feedback opportunities during the course appear to be underused by the students. The teachers point here to seminars as an important arena for meeting, discussing and giving feedback to students, both formally and informally. The slightly low student attendance at seminars (just above half of the population) might here explain some of the discrepancy between student and teacher experiences. A possible explanation for this slightly low student attendance is voluntariness: '*The students have to register in order to participate in a seminar group, but when they are registered, it is still up to them if they want to attend or not'.* Attending seminars is based on free will and a 'no-show' has no formal consequences for the students. The teachers' reasoning behind this voluntary principle is to encourage students' self-regulation, while a possible side effect might be manifested in lower student presence. However, the explanation for low attendance and how this relates to students' self-regulation is undocumented and unclear in this case, but the

question remains important given that seminars are considered as *'the very heart of their (students) learning in the course'*.

In reflecting about further course development, the teachers stress the significance of making students realise the importance of being actively engaged by preparing properly for seminars, writing assignments, contributing to discussions and engaging in orally based legal argumentation in various organised course activities. This also raises questions about how to encourage more widespread student participation especially in seminars, but also how to motivate them to participate more actively in other organised instructional settings. To some extent, many students appear to prefer a more passive role in teaching sessions due to a felt pressure to perform well, but also in preferring the lecturers' input rather than participating in student discussions. The teachers mention that this expectation of active participation should be more clearly communicated in the beginning, even before the students begin the semester.

In summary, the students' overall impression of the course is a rather large workload related to various teaching activities and assignments. This workload is perceived by many of the students as positive, especially regarding practical elements and visits, more extensive assignments, assignment seminars and collaborative procedural work, while some students consider this workload as less profitable, preferring more individual studying. The implementation of more extensive assignments is considered as especially fruitful both with respect to learning the complexities of the profession and in preparing for the final exam. Slightly surprising is that the final assessment has been kept unchanged during the course reform. A possible explanation for this is that the extended assignments presented and worked on in the seminars emerge as a retrospective course alignment between seminar work and final assessment. However, this last aspect remains unclear as it is not commented on by the course leader and teachers.

6.5.2 Opportunities and challenges for knowledge integration

In this discussion, we approach the last two research questions presented in the introduction of this report: What challenges do the students and teachers face with the given pedagogical approaches and learning activities, and what can we learn from the case that matters for quality in educational practices?

A basic premise for the implemented course activities in the criminal law course was a previously experienced challenge of students not being engaged in practical use and application of the disciplinary knowledge in criminal law. The changes made in the course were therefore specifically aiming at introducing teaching and learning activities where the students engage actively with procedural work and practical implementation in the learning of the discipline. These changes stand out to be as challenging for both teachers and students. As several of the students were sceptical when it came to the changes made in the course design, the different data sources have revealed a need for planning how to deal with students not fulfilling their obligations to student-centred learning.

Drawing on the students' experiences documented in the previous sections, one of the main findings, which is interesting to discuss further, is the somewhat two-sided outcome

related to teaching aimed at engaging students more actively. On the one hand, students seizing the opportunities provided though active engagement, largely consider this to be highly beneficial for their own learning. These active students appear to be happy in the role of taking responsibility, making appearances and coming forward during active teaching sessions, such as in the presentation of written products, procedural performances and in discussions in seminars. On the other hand, the student-centred approach appears as double-edged in the sense that less prominent students experience a level of pressure and therefore are less comfortable in taking a more active stance. This somewhat divided feature might subscribe to what emerges as a highly competitive learning culture in the discipline of law and law education, where the exposure beyond an established colloquium with a familiar assembly of students for many can be related to some level of anxiety. In this way and due to this pressure, a part of the learning community in this discipline unintentionally might lead to the exclusion of less assertive students. A measure for handling this challenge would be to create safe arenas for exposure and opportunities for practising exposure specifically for more reluctant students. Another measure would be, based on this awareness, to safeguard support measures from teachers during student performances as well as to support and encourage students to collaborate supportively during student-centred teaching sessions.

Another challenge relates to the approaches and activities in the course involving a large variety of teaching and lesson formats. This complexity triggers a greater requirement for coordination which to some extent seems to have been underestimated by the teachers and faculty staff. The challenge for students here is to have sufficient information about the purpose behind each activity, which is important concerning making adequate preparations. The need for clarity and transparency related to the activities appeared here to be somewhat uneven and varied also to some extent between teachers. This is potentially confusing for the students and is also perceived as unfortunate by the students concerning how they allocate their time; an issue which is important in a course where time is considered as limited.

A possible remedy for the above-described problem is first to be very specific in defining the reason and purpose of all the activities implemented in the course. The complexity related to the multiple teaching structures also illustrates the importance of coordinating activities and displaying clearly how the activities are interrelated and mutually supportive. Making explicit this interrelatedness is often underestimated when designing courses in higher education, especially since students rarely take part in the reasoning and discussions building up to the final study course implementation. Moreover, the student experiences with differing teaching approaches in parallel seminar sessions adds in unfortunate ways to the confusion, a challenge which can be met through more focused and frequent coordination between teacher-staff members. Monitoring and evaluating the various instructional activities and course components would also be helpful in uncovering the students' experiences throughout the course, which in combination with frequent teacher coordination would provide a current and relevant basis for making necessary practical adjustments.

This last-mentioned aspect relates to notions of constructive alignment. In constructive alignment, a basic assumption is that a well-functioning educational path is based on explicit learning goals/outcomes describing the purpose of the course, aligned with teaching activities fulfilling these aims and stating what students are expected to contribute. These aims and

teaching sessions must again be clearly connected to what the students are expected to perform during their final assessment. If misalignment occurs between these elements, there is a danger of students paying less attention to teaching activities, in favour of prioritising a focus on the summative assessment (Biggs & Tang 2011). Clearer reasoning for course activities and teaching activities, giving explicit reasons for task assignments and how these are related to final assessment, and also how different activities are related to final assessment expectations hold here a potential for improvement. Regarding the particular course in criminal law, we observed that the final assessment has remained unchanged even after changing large parts of the teaching and instructional activities. This raises two important questions:

First, are the different instructional elements in the course explicitly thought through with respect to final assessment; i.e. in line with notions of constructive alignment? The question here relates especially to the role of assignments and assignment seminars which are experienced somewhat differently in the student population. However, this also relates to the combination of lectures and teacher-supported seminars and the extent to which different teaching approaches in seminars contribute to closing the gaps between teaching and assessment. Regardless of whether the teachers share every notion of alignment or not, there seems to be a need to clarify what role each of the instructional approaches plays in the course. Goals and course information provided to students are also noted as a challenge by the students, which also can be ascribed to the complex instructional course design. Based on the above notions on alignment, it therefore remains unclear to what extent the course teachers have thought through the consequences of students 'losing out' of the seminars, and other activities, thereby missing learning opportunities embedded in the extended assignment work.

A final challenge revealed in this law case relates to technology use throughout the course. As both student and teacher informants reveal, the use of technology during the course did not commence flawlessly. Having problems with technology-based resources during an educational programme is not very surprising and does not have to be a problem as such. What seems to have created somewhat more extensive problems in this particular context is that the digital elements such as web-based lectures etc. appeared to some extent as difficult to access or in some respects even missing. Another issue is that students were promised a podcast of the lectures, but this was not followed with consistency. These challenges especially emerged in parts of the course where digital elements function as thematic bridges between teaching activities. These limitations, partly due to complicated location and partly to timing, with students missing out on potentially valuable linkages, was here to some extent perceived as an obstacle. Again, this challenge is partly a question of coordination, but also raises more fundamental queries about the role of digital resources as part of a complex course design and programme environments. It is important here to consider the premises needed in order to make use of digital resources in preparing and connecting students. How much time do the students need in using the digital resources, and how closely linked do digital resources need to be to specific activities in order for students to see the interrelatedness and relevance of these elements? What are the consequences of missing out on these resources and to what extent do the teachers handle discrepancies when facing unprepared students during their teaching sessions? This also illustrates that digital resources, equal to other elements in a

course programme, need to be more consciously addressed and considered in relation to the overall alignment equation as described above.

What can we learn from this case that matters for quality in education and with respect to law education in particular? First of all, revealing the student-centred course activities in this case shows how students perceive and experience challenges with active engagement and involvement. Working with written assignments supported by teachers and discussing this work during lessons thereby directly refers back to the research on teaching in law with a one-sided focus on content features. The case therefore reveals that reform efforts to combine different ways of teaching is a successful prescription in how to cope with these inadequacies in revealing a specific strategy for the integration of the 'three apprenticeships' of legal education (theory, ethics, and practical skills) (Berman, 2015; Wolff & Chan, 2015).

These efforts do not emerge as flawless, and further developments are necessary to safeguard better integration and more consistent student involvement in seminar sessions, assignments and practice-oriented coursework. But on the clearly positive side, students generally experience working with realistic and extensive assignments as very rewarding. A major factor is therefore to further develop the combination of extensive assignments, supportive teaching and relevant feedback in the seminar settings. This inevitably raises the issue of how to engage students more actively and how to motivate students attending these instructional settings. Even though we lack an exact overview of these two features of student engagement in this case, paying attention to these issues emerges as important both in this particular course in criminal law, and in accentuating more principal concerns on how to develop quality in practice in higher education.

6.6   Conclusion and recommendations

In conclusion, this case has provided several interesting insights into beneficial and challenging features emerging from a course attempting to merge work-related elements into disciplinary teaching and learning of criminal law. This also concerns the innovative ways of using technology and creating an overview when involving students actively in a more compound structure of teaching and learning activities. Generally, the students reported experiences of being allowed to develop their writing skills and opportunities to develop an understanding of juridical issues in work-related perspectives. The practical elements in the course also provided opportunities to enhance skills in juridical argumentation. Also, challenges emerged with this course design, one concerning discrepancies between planned versus implemented teaching, as well as difficulties in providing an overview to students how different parts of this complex course design were interconnected. This is a reminder of the difficulties in making a complex course design transparent enough for students to understand and manoeuvre within. This understanding of the course design appears to be connected to the students' willingness to engage and take responsibility in course activities. It seems here insufficient to present overarching 'grand stories' about purposes and intentions of the course, while more extensive information about practical work and explanations about how teaching activities are interconnected appear as important regarding what and how students invest in learning processes.

Introducing new elements and combinations of teaching activities in a course can therefore cause a range of problems and misunderstandings, while intended flexibility in implementing digital technology can cause a range of technical challenges. These challenges are, however, hard to anticipate. Course teachers are therefore, especially in an implementation phase, advised to pay close attention to how students perceive the various instructional activities and to what extent these instructional surroundings are explained and reasoned for during practical teaching. These efforts could help students coping with various course demands and assignments to understand how they are aligned with assessment and learning outcomes. Achieving this in the current case requires extra attention to how seminars and lectures are interconnected and how these activities are aimed at bringing students closer to legal practice. Based on the different empirical sources presented above and from the collected material, the following recommendations can be highlighted:

- Make sure online resources, teacher-led lectures and seminars facilitate student engagement
- Make sure that demanding and time-consuming seminars and work-related activities are carefully explained and accounted for through clearly stated expectations and assignments
- Consider combining peer discussions/presentations with more specific teacher feedback
- On a regular basis discuss the planning of teaching activities in the teacher community and on a collegial basis evaluate and discuss experiences from the course teaching
- Make course adjustments based on collegial discussions and redesign parts of the course based on these discussions when larger challenges and discrepancies emerge
- Make sure that the coursework is constructively aligned by continuously assessing how course description, goals, teaching activities and assessment tasks relate to each other
- Make sure that course administration is coherent with the course information given to the students and monitor that technological resources work as intended
- Important course information must be provided early in order to achieve expected student participation and engagement. It is also recommended to offer an introduction seminar with a focus on digital activities and the role these resources play in the course

7 Online teaching and learning in an experience-based MBA programme

Trine Fossland & Cathrine Tømte

> This chapter:
>
> - Illustrates quality aspects in an online, distributed experience-based MBA within a multi-campus university
> - Discusses opportunities and challenges emerging around the design of the students learning process in an online environment
> - Provides recommendations for how to handle typical challenges in online teaching and learning processes, balancing work-related activities and student-centred approaches

7.1 Introduction

An experience-based Master's programme in Business and Administration (MBA) was selected as a case in the QNHE project for several reasons. First, it represents a type of course that involves students who combine work and studies in online experience-based learning environments. These types of courses/types of study programmes are increasing within all higher education institutions across the country, as well as abroad. We are interested in the interplay between offline and online activities and the ways in which these activities relate to work life and quality aspects involving the students' learning process. Second, the course enables us as researchers to study teaching and learning activities and ways of engaging students. This move often refers to the term student-centred, and is frequently contrasted with the term instructor/teacher-centred, which emphasises knowledge transmission (Wright, 2011). Student-centred approaches seek to involve students actively with disciplinary issues, that more strongly require students to be active participants in practices of sharing, understanding and constructing new knowledge (Baeten et al., 2014; McCormick et al., 2013). The fact that the course has been running for about ten years also meant that the first enthusiastic phase of starting an online course was passed, and that diverse challenges and discussions of improvements were identified and accomplished. Third, the course gives an example of a study programme developed as a joint initiative from several faculties and institutional units across the university. Fourth, vital for the selection of this course was its geographical location

in the circumpolar region in Norway, which has extended experience with providing online education to the region. However, facilitating an online course is a complex phenomenon that needs a follow up within different learning areas. Unlike conventional higher education where face-to-face teaching is the dominant format, the online courses offer teaching and learning opportunities for students independent of time and space. Even if the flexibility of the pro- gramme is seen as positive and rewarding, the online facilitation of the learning process is not necessarily engaging and activating the students deeply in their learning process. The last reason for selecting this case is the fact that Master of Business and Administration pro- grammes (MBA) are under pressure to improve efficiency, lower tuition, and offer an updated and revised curriculum that is of high quality and regarded as relevant by the marketplace (Busing and Palocsay, 2015). In an online experienced based master's programme there are pedagogical, social and relational challenges that need to be solved, in addition to challenges being addressed by regular students within the university. When studying after many years of working outside the university, this often refers to specific challenges and opportunities related to adult learners attending an online learning design: issues that will be addressed in the next theoretical section.

For all the above-mentioned reasons, this case has been selected as an illustrative example of a course that aims at activating students online with relevant knowledge of the discipline and general scientific skills through a range of teaching and learning activities, use of disci- pline-relevant technology and formative feedback. The case allows us to study how an online course design unfolds and what challenges and opportunities both teachers and students en- counter. Particularly, we explore the pedagogical aspects that are relevant for activating and engaging students productively with the knowledge domain of their field within the selected online environment. In line with the reasons presented above and the research focus dis- cussed in chapter 1, we address the following questions:

- What characterises the teaching approaches and ways of engaging students in the course?
- What challenges do students and teachers face with the given pedagogical approaches and learning activities?
- What can we learn from this case about issues that matter for the quality of educational practices?

Before presenting the course design and activities of this case, we give a brief overview of the educational practices that are typical in the discipline and what is relevant for understanding the pedagogical practice of teaching and learning practices within an online MBA.

7.2   Previous research on online experience-based education pro- grammes

Pedagogy for adult learners has been approached in many ways over the years (Lindeman, 1926; Knowles, 1980; Courtney, 1989). Whereas often referred to as 'andragogy' ('to lead the man' from Greek) and comprising a holistic approach in which personal involvement is con- sidered crucial for learning. Lindeman is considered as a pioneer within this field of research, after he published 'The Meaning of Adult Education' in 1926. Two key points derives from his

work; first, adults learn best through practice and from their own life experience. Second, adult learners are not necessarily different from younger learners (adolescents), but their pedagogical approach may differ from conventional education. Following that, young people might also benefit from learning situations that are linked to their own life experiences, but this is seen as crucial in adult learning. These perspectives have formed the basis for most of the later contributions to the field. Knowles (1980) proposed a further concretisation of adult learning by breaking this into three underlying areas: 1) as a process, i.e. the learning of adults as a process; 2) organised activities at different places of learning specifically aimed at adults; 3) a combination of 1) and 2) looking at adult learning as a form of social practice that includes both individuals and institutions (Knowles, 1980). Furthermore, these perspectives are further explored in terms of how to approach adult learners (Courtney,1989; Skaalvik et al., 2000; Grepperud 2010; Tøsse, 2011). According to Galbraith and Mondal (2017), Master of Business Administration graduates are seeking a better future, upward mobility and satisfying jobs upon graduation. At the same time, they are online students, disconnected from their university with fewer opportunities to take part in diverse academic communities that may provide unexpected challenges along their learning process.

7.3 Online learning designs for adult learners and the importance of presence

When it comes to designing online learning for adult learners Cercone (2008) argues that the characteristics which have implications for the development of these designs are their significant differences in learning, like the importance of self-direction, flexibility, and the emphasis on the process of learning, rather than the content. Knowles (1980) recognises adult learners as highly motivated and self-directed learners. Instructors need to consider their context of learning and understand that culture and society shape the adult learner and add to his or her individuality (ibid.). The organisation of technology use in various MBA programmes may range from 100% online learning designs, to different combinations of online and campus-based designs, to almost 100% campus-based designs. The actual learning design needs to frame the planning process as well as the technological and pedagogical choices (Fossland, 2015). The temporal and spatial separation among teachers and learners and the absence of social contexts in online learning designs can often lead to a sense of disconnectedness or isolation in online courses (Kruger-Ross and Waters, 2013). To provide online learners with a sense of belonging and presence comparable to that in face-to-face instruction, social engagement with teachers and peers seems crucial. The importance of 'online presence' has been highlighted by numerous studies (Garrison & Cleveland-Innes, 2005). In asynchronous online learning environments, as the selected MBA course, the communication and learning situation can be understood in line with the analytical framework known as the Community of Inquiry Model (CoI) (Garrison et al., 2000). CoI was first introduced by the early pragmatists Peires and Dewey, concentrating on the nature of knowledge formation and the process of scientific inquiry, and then broadened by Dewey, applying it to educational settings (Lipman, 2003, p 20–21), and further developed by (Garrison & Cleveland-Innes, 2005). In later years, emotional presence has also been added to the framework (Rienties and Rivers, 2014;

Cleveland-Innes and Campbell, 2012) in addition to the traditional highlighting of cognitive, social and teaching presence.

The point is that the different aspects of presence underline the importance of feeling like a participant and identifying with the community or course you are a part of as a student. The elements are also found to be important to enable students to communicate purposefully in a trusting environment, and to develop what Garrison (2011) calls inter-personal relationships by ways of protecting individual personalities. Teaching presence means the design, facilitation and direction of the cognitive and social processes for the purpose of personally realising meaningful and educationally worthwhile learning outcomes (Anderson, et al., 2001). Cognitive Presence is the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse (Garrison, Anderson, & Archer, 2001). Important findings suggest for example that asynchronous discussions facilitate active student participation, but this depends on structures placed by the facilitator (Palloff & Pratt, 2007; Garrison & Cleveland-Innes, 2005). Critical reviews of studies that apply this framework demonstrate however that only a very few investigate student learning (Rourke & Kanuka, 2009).

7.3.1 Research on asynchronous and synchronous communication and learning activities

Compared with the amount of research related to asynchronous communication, less research addresses the learning situation in synchronous online learning environments (Asterhan and Schwarz, 2010). One possible explanation might be that technologies that support real-time participation, such as chat and videoconferencing systems, are newer, as is the research in this field. Some studies report however more intense interaction for students in synchronous learning environments compared with asynchronous (Hrastinski, 2008; 2009), for example by using videos, smartphones and social media which have increased document sharing and synchronous meeting technologies (Anderson et al., 2007), allowing teachers to follow individual or specific group needs more closely. From research, we know that technology has changed teachers' practice (see for example Kirkwood, 2009; Bergström, 2012; Fossland, 2015), in that technology has emerged as a distinct competence needed for teaching and learning processes. Teachers are to find the appropriate mix of different knowledge fields, such as pedagogies, subject-related expertise and technologies (see for example Koehler, Mishra & Yahya, 2007; Krumsvik, 2008). Moreover, studies report that HEIs that apply ICT in teaching and learning actively are most likely to include professional learning communities involving teaching staff and technology-savvy staff (Unwin, 2007; Tamin et al., 2011). Studies indicate a strong relationship between conceptions of teaching and practical implementation (Price & Kirkwood, 2014). These findings reveal a tendency where teachers with a transmission focus on knowledge and learning appear to implement technology as supplementing devices to existing practices. Teachers that have a more student-centred approach tend to use technology in more innovative ways by focusing on how digital resources can be used to transform previous teaching into more student-engaging processes, and experiment with technology in ways allowing students to manipulate, question, reflect and create knowledge products (Kirkwood & Price, 2013). How technology is applied in higher education is to some

extent related to knowledge perspectives in specific disciplines. Enhancement is here related to what teachers and educators believe to be beneficial related to ideas and notions dominant in their disciplinary field. One example is how the selected MBA programme is organised in a 'flipped learning' manner, as a student-centred approach to learning that is supposed to increase active learning for the student compared with traditional classroom-based instruction (Colbert & Arboleda, 2016). A flipped learning pedagogy has, according to Arduser (2016), moved beyond the more simplified idea of doing 'school work at home and home work at school'. She refers to the Flipped Learning Network (ibid. p. 224), that links the approach to the following pedagogical concerns: 1) an adaptable environment in which instructors create flexible spaces for learning; 2) intentional content instructors created for students to explore on their own; 3) instructors who observe students during class, provide in-the-moment feedback and are able to 'tolerate controlled chaos' in their classrooms; and, 4) a learner-centred culture that actively involves students in knowledge construction (op. cit.). According to Graham & Whalen (2008, p. 66) this flipped learning design is particularly beneficial for teaching business and professional writing students how to develop new media products, because it involves a dynamic, creative, intuitive and nonlinear processes.

7.4   The empirical context and data

The experienced-based master's programme was a joint initiative, as the organisation of the programme is a collaboration between the Faculty of Humanities, Social Sciences and Education and the School of Business and Economics (HHT), that have their faculties and students located at all the four campuses at the University. Due to the profile of the master's, as an experience-based MBA, it had a diverse student intake, but all students had workplace experience. The division of the duties and responsibilities varied over time between the faculties. In the first period, the BFE faculty had most of the administrative duties, and in the next period the HSL faculty had taken over the main responsibilities for administration. From the beginning, both faculties had collaborated in diverse ways. These students normally study for 2 ½-years, and the fact that it is 'experience based' also means that it does not qualify for applying for a PhD programme. This experience-based Master's of Business Administration consists of five modules/topics (60 ECTS in total) and a master's thesis (30 ECTS) that combine practical business expertise with soft skills to give students the well-rounded education that many employers are looking for. The online course within the MBA that we followed more closely had 89 students enrolled, and was named 'Economic management and financial analysis'. It included 10 ECTS of the 90 ECTS in the whole master's. The programme also consisted of the following courses: marketing management, economic management and financial analysis, organisation and leadership theory, scientific method, strategy and management challenges in businesses, and different subjects related to their master's thesis. The MBA has five full professors involved, but the actual course was led by two teachers, associate professors with background from the business sector. The selected course took place in the first year, during the students' first semester of their MBA programme. The second course within the master's programme was selected and more closely followed, the reason being to avoid initial issues addressed in the first course, such as registering, establishing and getting used

to becoming a student again after many years of work and such. We also wanted to select students who had started their studying properly, and had some experience with collaboration and attending online and offline activities. The duration of the course was eight weeks, and the empirical data were collected in autumn 2016 and early winter 2017. The course is organised in two overall domains: 1) financial accounting and analysis, and 2) economics and business management. Each domain includes five subtopics, so the course is organised in 10 'steps' or modules. We followed step 1 and 6 in detail, as highlighted in the following overview of the course, in Figure 8.
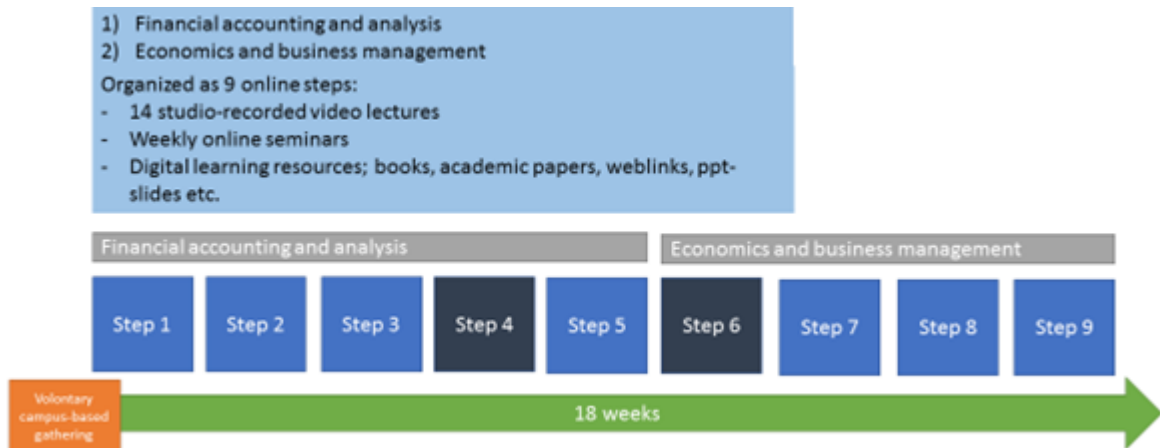
Figure 8 - Overview of the MBA course

7.4.1 Data collection

All data were collected during the first semester of the students 2 ½-year MBA programme. Even though this indicates that these are 'experienced' students, some have not been studying for many years. All students and teachers were given information about the study, and an opportunity to decline participation. Everyone agreed to participate in the study and both personnel and students gave their consent to be observed and interviewed. The rest of the students in the course were passive participants and were informed about our study. The student population in our particular case included 89 students. The data collection followed the overall design and approach outlined in chapter 1 of this report, and included interviews with the teacher before and after the main activities in the course, observations of course activities, and both individual and group interviews with students. Four student groups were observed in their online learning environments and four groups were later interviewed (only two of the groups were 'stable' groups, meaning that they always worked together). The following data were collected, as illustrated in Table 14.

Table 14 – Overview of case and collected data (MBA course)

Number of staff	2 university lecturers with extensive work experience
Number of students enrolled in the course	89
Course period	18 weeks
Main assignment features	Assignments on different content: four in all, but one mandatory with the intention to develop the student's academic and practical understanding by investigating challenges connected to a real-life organisation
Teaching and learning activities	Online lectures and seminars. Online assignments. Voluntary group work
Number of groups/students observed	3 groups, 3 students in each group
Types of data	General course material: course plan, syllabus, lecture slides, task descriptions, resources provided via the Learning Management System Fronter, diverse online material, specified for each of the ten steps within the course, teacher's evaluation of the course
	Observation protocols: a total 10 online lectures, where four online lectures and four real-time conferences were followed and observed more closely by filling in a protocol. Chat logs from ten online sessions were observed
	Video recordings: 10 hours online lectures and 6 sessions of real-time online conference with the teacher were video recorded; 1 video recorded interview with 1 teacher, 4 video recorded interviews with students.
	Audio recordings: 2 start-up audio recorded interview with the 2 teachers involved, one end interview with one of the teachers. 4 audio recorded interview. All recorded material was transcribed
	Documents/products: teachers'/adm. evaluation report, assignment texts, exams, syllabus, notes and reminders posted at the LMS/Fronter, logs from discussion forum linked to Fronter
	Interview data: pre-interviews with the two teachers involved, one post interview with the main teacher; group interviews with four groups; brief individual ad hoc interviews with eight of the other students
	Field notes/online data: field notes from every site visit; all course related interactions and online resources organised within the Learning Management System and Facebook interactions
	Student survey: end of the course, questions about experience of teaching-learning environment, approaches to learning, 13 responses, as well as the 'Studiebarometeret'

7.5 Characteristics of the teaching and learning environment

As mentioned, the content of the course is divided into two subtopics: 1) financial accounting and analysis, focused on the traditional Norwegian 'cost model', and; 2) economics and business management, where students are presented with diverse decision-making and management models, including central aspects concerning budgets and management. A compressed presentation of the main learning outcomes of the course is that the students are supposed to acquire knowledge of subjects such as finance and accounting (for instance 'the financial statement', its purpose, use and accounting principles involved). This includes different economic models and their limitations, decision-making, economic planning concerning budgets and the management of strategic processes in 'goal management', to mention a few central topics. The students are expected to manage the main principles involved, make their own corrections and provide relevant financial information using different models, and critically analyse information.
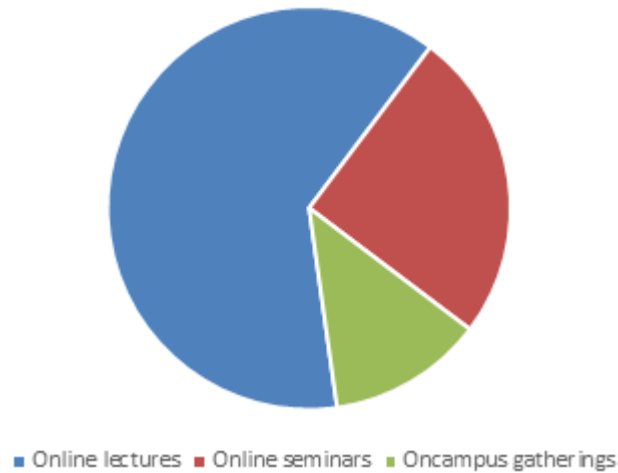
Figure 9 – Main planned activities (MBA course)

The course included the following main teacher-led activities; one voluntary on-campus gathering, online lectures and online seminars (weekly online synchronous seminars focusing on relevant queries and solving earlier exams). Figure 9 illustrates these main teacher-led activities, but as this was an online course with relatively little synchronous contact between the teacher and the students, much of the teacher-led 'facilitation' of the course was also distributed to the students without meeting the teacher in real time. Before the course started, the students also received a video lecture on the LMS that gave them some essential knowledge about studying as an adult learner. This was meant to help them sort out ways of approaching their learning process in a fruitful manner. Other teacher-organised activities facilitating the students' learning included an extended number of online resources provided at the LMS, specially designed for the students work/group work to practise different tasks and challenges related to each theme (both voluntary), and preparations for the final exam and the opportunity to get feedback from their teacher on several formative assessment tasks during the course. As the course provided several opportunities to receive feedback and formative assessment, and students were also encouraged to work together, but there were no formal requirements to assess or collaborate with peers. The students also had the opportunity to receive feedback from the teacher to improve their work.

In the interviews with the teachers, it was clear that the main planned activities were followed with some few exceptions. The teachers aimed to create a clear alignment between the learning goals, the learning activities and the provided assessments, in line with the concept of Constructive Alignment (Biggs & Tang, 2011). Both the interviews and the observations demonstrated that they did this by coupling the learning goals directly to the work-related challenges the students faced. The teachers mentioned some general challenges, related to the fact that they had moved into another building, where their technical requests were not satisfactorily met and which provided some challenges in relation to the teachers' teaching and learning activities. Some of the earlier teaching and learning sessions facilitated within the platform Adobe Connect, which allowed the teacher to challenge students in diverse ways,

discuss in diverse formats and follow students more closely, were now held in more traditional lecture halls, where there were clear challenges related to technical aspects that had implications for the collaboration with the students in the sessions. The interviews with the teachers demonstrated that students did not get the same opportunity to get multiple feedback from the teacher and students, nor to ask questions during the session in an effective way. These new experiences made the teachers reflect on changes they wanted to make in the course for next time. In the next sections, we dig deeper into the main activities in the selected course.

7.5.1 Real time introductory gathering at the university campus

The real time introductory gathering at the university campus focused on introducing the two mentioned subtopics of the course; 1) financial accounting and analysis, and 2) economics and business management. This first voluntary campus-based gathering highlighted the different elements that the students were supposed to work with in the course. The teachers also introduced the students to how they were supposed to work during the course, and what strategies they preferably could use to get the best out of studying on this course. The students were also introduced to ways of thinking in relation to the different steps and how the syllabus, the online seminars and the (voluntary) group work were meant to support their learning process in various ways. The teachers also took time to let the students know what they had learned from previous experience with the same course, and what they expected from the students. They told the students about the positive and challenging aspect of the flexibility and took time to make sure everyone was comfortable with the way the course was held, as regards both content and technical aspects. In the interviews with the students it was also clear that the students who worked together 'found' each other at this first gathering, even though there was no organised 'group matching' of the students facilitated by the teachers. The students who 'matched/ found each other' in this first meeting also maintained contact and supported each other during the study.

7.5.2 Online lectures

In total, the course included 14 studio-recorded video lectures organised in nine steps (combined with other learning resources, like notes, reading lists, repetitive tasks, finished solutions from the previous steps, and many online resources meant to support their understanding). The online lectures were studio-recorded. The content was high-quality studio-produced and presented in a prepared manner, specially meant for students working in a 'flipped-learning mode', using the online lectures to prepare for the weekly in class/online seminars. The content was presented in a teacher-centred way, as there were no synchronous options for collaboration with students. When it comes to technical and didactical issues, the design enabled students to engage in the video and other recorded content, like recorded real-time sessions or the provided online resources. The lectures had diverse pedagogical purposes; students were expected to watch the videos ahead of class, and some were made for

students to approach the content whenever they want, to extend the flexibility. One of the teachers described his teaching like this:

> *My teaching is based on the syllabus, and I go through it in the pre-recorded studio recorded videos. The students use them in a 'flipped learning' manner, as a starting point in their learning process, where they can use both the book and the videos to acquire the central part of the syllabus.*

The online lectures involved no direct interaction with students, but the teacher posed rhetorical questions, and pointed to additional learning resources (link collection) made available for them in the LMS during the lecture, meant to stimulate and activate the students 'self-directed learning'. This could typically be the voluntary assignments, tasks or learning resources, structured and aligned with the steps within the course design. Students were given the opportunity to contact the teacher about feedback on the assignments (LMS, email or phone). The students used the online lectures for learning. They appreciated the flexibility that comes with having the opportunity to watch the video recordings at their own pace. The interviews revealed that the students watched the online lectures after work or during the weekends. These lectures served the function of introducing and explaining concepts, modelling how to solve problems, and motivating and introducing students to important knowledge sources. One main function was also to give students a knowledge-based overview of the content. The online lectures also served as an important source for the students when they want to repeat the content, especially when they are doing their exams or find some part of the content extra challenging.

7.5.3   Online seminars

Online synchronous weekly seminars were based on the students' work with earlier-given assessment tasks that were discussed and solved. The students were supposed to work on their own or together in a group during the week to prepare each seminar. Students could participate either on campus or online. All these seminars were recorded and could be watched by the students after they met each other in the seminar. Several of the students also reported that it was a challenge that their weekly online synchronous seminars were held in their most hectic working hours during the day. One student expressed it like this:

> *The online seminars are held during working hours, and as this is a course that is counting on students studying after work, this is a time of the day where it's impossible to get in touch with anyone at the university. I wish that at least every second online seminar was held in the evening or there could be organised a 'help and support- hour' in the evening from time to time … or something like that.*

From the teachers' point of view, the main function of online weekly seminars was to be available for questions as well as to give the students an arena to meet other students. It was also a way of giving students a chance to get the teachers' or fellow students' view on earlier exams and to discuss solutions. This gave the students an opportunity to get triple feedback (peer, teacher and self-assessment), which could provide valuable aspects into the students learning

process. For the students who were not present, they could use the recorded online seminars in a '*flipped pedagogical manner'*. This also gave them the opportunity to see different aspects of the recordings several times or to approach their understandings together with other fellow students.

The students are expected to actively use and get support in the video lectures when they prepare for the online seminars. The day before the seminar the teacher reveals the correct solution on the learning management platform. The students get nearly 24 hours to go through the correct answer and their own solution to prepare for the online seminar the next day. Students unavailable for participation in the real time (synchronous) activities in the seminar get the chance to see their pair's discussions/work with the session on their own, as the seminar is recorded. Even if the interviews and observations demonstrated that is was 'normally' only 5–15 students participating in the real-time seminars and lectures – often between five and ten – students report that these were engaging and valuable learning resources in various ways. Many of the students appreciated watching the online seminars in the evening.

7.5.4 Group work and assignments

The forms of assessment within the course were organised as four online voluntary assignments leading up to the final mandatory assignments (related to the main contents of this particular part of the course). There were also additional tasks related to each part of the nine steps within the course, meant to prepare the students for the different assignments as well as the final exam. The students also had the opportunity to receive formative feedback from teachers as they developed their skills and knowledge. The students were encouraged to work together, both when it came to formative assignments and the final exam, but there were no formal requirements to assess or work together with peers. The interviews revealed that the students found the assignments addressing real life cases as particularly interesting, rewarding and useful. The fact that they are already involved in many of the selected cases as active citizens – with a special interest in economic/leadership issues, they feel that their assignments that confronted '*real working life challenges'* were extra interesting and useful. This also makes the connection to their own work easier. The students expressed that they also use their previous experience when working on their assignments, and that it felt useful to combine previous knowledge with updated theory and cases of current interest. Some of the students also found this useful in their work at their own workplaces. The teachers had a corresponding view, and saw these aspects of the course as very essential quality aspects. They also cooperated with relevant businesses which contributed to their assessment tasks (to create authentic assessments), and they made sure the ones that collaborated got something back. One of the teachers says it like this: '*when we recruit companies that are requested to be "exam companies", they always get two or three best answers/exams in return. The leaders always find things they think is reasonable and useful for their own company'*.

Even though the interviews with both students and teachers revealed that the work-related aspects in the assignments were highly appreciated, the interview and observations revealed that the students were facing challenges – especially when it came to getting enough

time to approach the voluntary assignments. The four voluntary assignments that the students got were not included in the final grading, but as they were only recommended to work on them with others or alone, and get feedback from the teacher sending their queries by e-mail, the interviews revealed that many of them did not exploit this opportunity. Even if the assignment challenged the students in line with the described learning outcomes for the course, and the students were provided with many relevant online resources – combined with 'real-life' authentic assignments – very few got time to complete the assignments and ask for feedback from their teachers or pairs. The interviews revealed that the obligatory and final exam was prioritised. A general point of view from the students was that they were overwhelmed by the workload, when combining work and studying. Some of the students said they had to prioritise the mandatory assessments and the final exam, to cope with their other obligations at work and at home. Anyway, the students appreciated that the voluntary tasks were work-related, and that they could easily find relevant online resources.

To collaborate, the students also had their own social media Facebook group, but this was primarily used to give each other practical information, as well as a way of connecting to fellow students across distances and to support each other, provide information and answer diverse queries. One student described it like this:

> *The students' Facebook community was in fact the key to …. I was not at Facebook before I started, but I felt I had to, so I crawled into it, and became a member to become a part of the student group. This has in fact been the most important place to be to collaborate with peers. It has not been the most important place to collaborate with the others in my group, but it has been important to get stimuli from the rest of the class. Because the class is spread out around the country, and we only have the opportunity to meet a few times in each semester.*

The students were pleased with the online organisation of the content, but underlined the importance of physical meetings, especially at the very beginning of the programme, to connect with peers in an on-campus environment. This is an important element that seems to have a major impact on the students' progress and how they collaborate during the whole programme. This provided structure, a sense of belonging that also allowed flexibility. Digital assessment was possible for all the deliverables the students gave. They thought very positively about this and mentioned especially that they did not need to travel a long way to get to the university to do their exams. Students also experienced the home exams as fruitful and something they learnt a lot from. Much of the contact between the teacher and the students was meant be through their written comments in Fronter, queries that came up in the weekly meetings or in e-mail. Their biggest challenge was to get time to *'synchronise meetings with their fellows or teachers'*.

7.5.5 Opportunities and challenges identified in the course

The case highlights various conceptions and aspects of quality. It illuminates the dimensions of culture and organisational issues and structures within the HEI that are vital for online adult learners. Seen in relation to the theory on adult learners, both opportunities and challenges can be identified when we look at our different empirical sources.

The off-campus/distance students seem highly motivated for the study programme, but they would probably benefit from better support and different 'inside translators' that make their access to the whole student-experience accessible, not only the pre-recorded content. As the students are off-campus and therefore do not have access to student information desks and the like, it is crucial that all online information and content is well structured. User interface within the LMS might be further improved for students to find their way into the system. When these students spend their time to access this information it becomes crucial to them to understand the university cultural context from which the online information derives. The students would need more specific feedback on the transferable skills they need to also approach the local cultural codes within the campus and online learning environments. The importance of consistent information and structure is evident.

First, as for pedagogical support, this group of students differs from other students and their own previous experience as 'normal' students, in that they study online while combining full time work and family. They are geographically separated from their fellow students and teachers and they mainly study during evenings, weekends and holidays. Consequently, they depend on a structured LMS where they can easily access relevant information. However, even if this infrastructure meets their needs in this respect, it still makes it difficult for them to get in touch with teachers and administrative staff including ICT support/helpdesk, since these services are on a daytime basis. During the interviews with students, we also learned that when they contacted administration and services like the helpdesk, they met limited understanding about their situation as distance students, for example, they could be asked to drop by at the administration offices during daytime to get help, papers and signatures and the like. This underlines that the awareness of distant students' needs also would have to be expressed in the students' professional surroundings.

Second, another challenge communicated by the students involves the quality of the course material. Even if the students highlight the possibilities that come with recorded lectures in terms of flexibility, the quality of the content of the recordings may vary. Students report being pleased with the content, but some of the video recordings were outdated in terms of the content being 'old news' and did not address current work life situations. This makes the students feel less prioritised compared with what they consider to be the situation for campus students within the HEI. The quality of the course content is crucial, and as demonstrated in this case, it would have benefited from being critically reviewed ahead of every new course or making sure that the content is made in a way that makes 'reuse' possible.

Valuable connection with authentic cases is important, and the opportunity to exploit this potential further seems important. Students are exposed to cases and learning situations that relate directly to work life situations, and clearly express that this is highly motivating. Through inquiry-based learning situations (see also chapter 1) where students are to solve problems that directly relate to work life, these students may discuss these matters with peers, but also with colleagues within their own work environment. The students are given several opportunities within the course to explore the diversity of knowledge fields, in that the teachers have published solid amounts of learning resources and web links to sites relevant to the course content.

Third, the interviews revealed that the social dimension is crucial within this online course. Facilitating this takes other efforts to enhance it compared with campus contexts. For most of the online students, the connection with others just does not happen out of the blue. The students report that it can be challenging to connect with fellow students, and since the physical meeting at the beginning of the course is not mandatory, students who do not participate are most likely to find it difficult to join a study group, or start one by themselves. Even though the teachers say that one main intention with the first gathering would be to connect with other students, the interviews with students revealed that some of them did not connect, and that this social dimension of the gathering was not sufficiently organised. Another challenge that caused a lot of frustration – and also demotivation – related to time wasted on unclear messages or lack of access to lectures when their time for studying is so limited. Some of the students that opted out had several reasons for doing so, however one main reason is that they did not connect with fellow students.

Fourth, the importance of relevant feedback seems even greater for students outside the university campus. This is also confirmed by the students who refer to previous campus-based studies. The students wanted more concrete feedback on their assignments, to 'move forward' and to understand how to improve their learning. Nonetheless, our study also demonstrated that some of the students reported struggling with the formative assessment tasks. As the course design invites students to participate in various ways in terms of feedback and assessment, students are given opportunities to work and get feedback on tasks and cases relevant to the course content. Some of these options are voluntary while others are mandatory. The rationale behind offering voluntary tasks is from the teachers' point of view to help students with their deep learning approaches within/towards the subject/curriculum. However, students do not involve themselves into as many of these tasks and possibilities as they are invited to. In the interviews, students explain their limited use of the voluntary possibilities in terms of time constraints. Not surprising, to progress within the course, they prioritise the mandatory tasks over the voluntary ones. Anyhow, the students wanted a closer connection with their teachers. Some mentioned that they missed contact with teachers when they had time to study after work, to get someone other than their peers to ask or discuss with if they had trouble. This corresponds with the challenges on teachers' presence as addressed in online communities by Garrison and colleagues (2000), in the Community of Inquiry framework. One part of the picture is that they face challenges related to how to cope and organise their daily life and other obligations to get enough room and space to study. Consequently, the students have to be more self-regulative in their teaching and learning mode. This finding corresponds with what previous studies have suggested as main challenges for adult learners (Skaalvik et al., 2000; Cercone, 2008; Grepperud, 2010; Tøsse, 2011). Our study demonstrates that the students are mature, motivated and personally involved, but are balancing on a tightrope between online activities and work-related actions.

Fifth, the call for more varied activities and assessment forms designed to connect the adult students more closely to their own working life is another solution that may seem motivating and something from which the students can more directly benefit. In this way, the different knowledge forms and different learning results the students produce is even closer and more relevant for their working life. This may secure a more positive attitude for the students' use

of time on their study, and both parts see the meaning and usefulness of the tasks done. More importantly, this also may ensure that students can balance their sense of belonging between working life and studies in a more productive manner. This does not mean that providing more systematic and constructive feedback provided by professional supervisors at the university is less important. The students' connection to the university and the importance of receiving adequate, professional feedback seems crucial, and one of the most important quality aspects involved. To manage this task for a large student population it seems like a mix of more general but professional feedback given to all students using digital technology (not that time-consuming), and in-depth, precise and personal individual feedback on especially important assignments, is crucial. The students must be given time to use the feedback to get out the full potential of their academic development.

To sum up, our findings demonstrate the importance of creating more supportive online learning environments through technology use, and of involving students in work-related tasks and challenges. The research-like activities are important as well as practical, work-related ways of developing the quality of experience-based higher education. For most of the students, it is a long period of time since they attended university, and this is something on which they really need support. Many of the students have interesting ideas and extensive knowledge and are involved in important learning processes within their actual workplace. Anyhow, they may need help to bring these ideas further and incorporate them with the interplay of structures and learning challenges within a research-based framework (master's thesis) within their relevant academic knowledge domains. The observation forms, the interviews with both the leading teachers and the students revealed that there is a challenge to create active dialogues in the online seminars. One of the teachers expresses it like this:

> It becomes a bit static. I will really try to make the dialogue better. The students following in class are easier to get into a discussion. But, I have the possibility to create a closer dialogue with the students following online too. When it comes to online teaching the dialogue is the tricky part' (1M, p.3).

As researchers, we recognise the course as a rather traditional way of online and distance learning, in which most communication is asynchronous and with a teacher-led way of instruction.

7.6 Conclusion and recommendations

The analysis of the online MBA case addressed several characteristics of teaching and learning educational practices in a typical online course that we will see more of in future Norwegian higher education. The case was selected to highlight the complex quality dimensions interwoven in distributed online courses, and has demonstrated the importance of studying both the teachers' and students' perspectives, but also understand this in relation to the online facilitation, information and content framing of the course. To succeed in engaging students in the processes of knowledge construction and preparing them for future work situations characterised by open-ended problems, shifting contexts of collaboration, and new demands for expertise, this case analysis has demonstrated that facilitating teaching and learning processes

online demands something completely different from 'campus-based' students, since these students never attend campus and are highly dependent on the learning management platform to get access to peers, teachers, course content and administrative information regarding their situation as students. It has also proved the importance of professionalising both the administrative and academic staff when it comes to address what 'quality aspects' in online experience-based courses really mean. In line with this, we would suggest that leaders at different levels within the HEI should understand, address and motivate their staff to operationalise how to approach this group of students and how to handle their needs. This involves including these aspects within steering documents and strategies throughout the chain of leaders and staff involved in matters concerning online studies:

- Ensure that educational leaders and academic staff discuss the overall goal within the study programme and establish incentives to promote collaboration among colleagues to systematically improve their digital competence and approaches to teaching and learning in the online environments
- Ensure that teaching approaches and ways of engaging students exploit the motivating aspects involved in balancing the academic challenges and the students' practical experience at work. This requires a close connection to students' professional activity and general experience-based motivation
- Make sure the content is updated (if used multiple times, make sure old examples are not included and that the content is made well adjusted for reuse)
- Ensure a good connection between digital learning activities, feedback and assessment methods and ensure that these are adapted to the intended learning outcomes within the programme and involved subjects
- Ensure that aspects of social belonging are safeguarded, without threatening the students' and teachers' flexibility, and the need to be online at exact hours during day-time (can be solved through online 'personal' messages with both social and professional content)

8 Problem-based learning in a field course in ecology research

Heidi Hyytinen

> This chapter:
>
> - Gives an example of the use of learning-focused approaches in the context of natural science
> - The teaching and learning activities of this research method course are based on problem-based learning (PBL)
> - The course design allows students to employ critical thinking and knowledge construction at the beginning of their university studies

8.1 Introduction

The present case report focuses on the use of problem-based learning and how it provides opportunities for first and second-year biology students to enhance their critical thinking as well as their understanding of research methods. During university studies, students are expected to learn both subject-specific knowledge and generic academic capabilities necessary for their future work. Critical thinking is one of the crucial generic capabilities for academic experts in order to be able to work effectively in changing contexts and find solutions to the professional challenges. Critical thinking is considered as a key capability for deep learning and for enhancing one's expertise during university studies (Hyytinen, Toom, & Postareff, forthcoming/2018; Utriainen et al., 2016).

This case describes the teaching and learning activities of a three-week intensive field course in ecology research. The course is designed for first and second year students. The aim of the course is to prepare biology students to conduct ecological research and at the same time to contribute to students' critical thinking, such as analytical reasoning, problem-solving and argumentation skills. To achieve that aim, the learning activities of the course are based on the idea of problem-based learning (PBL). In PBL, a group of students define the problem and formulate shared learning goals under the supervision of a tutor, and after that collaboratively construct knowledge and understanding of the content to solve the problem (Hmelo-Silver, 2004). It requires from students advanced thinking skills, argumentation skills and teamwork skills (Aarnio, 2015). PBL has thus proved useful for enhancing student learning

and understanding while also developing their critical thinking skills (Aarnio, 2015; Hmelo-Silver, 2004).

Furthermore, this case provides insights into how to design and enact a learning-focused approach in the context of natural science. Empirical evidence shows that teaching and assessment practices in the hard sciences (including biology) tend to be more often content-focused than learning-focused (Lindblom-Ylänne et al., 2006; Postareff, Lindblom-Ylänne, & Nevgi, 2008; Halinen et al., 2013). A learning-focused approach is described as a way of teaching in which teaching is seen as facilitating the students' learning processes and knowledge construction, while a content-focused approach sees teaching more or less as passive knowledge transmission from the teachers to the students (Postareff et al., 2008). A learning-focused approach to teaching is often related to higher quality learning outcomes and deep learning processes (Postareff et al., 2008). From the pedagogical point of view, the present case represents a teaching and learning environment which aims to enhance students' thinking skills, understanding and deep learning processes by adopting a learning-focused approach to teaching.

From these perspectives, the course we report here allows us to deepen our understanding of the elements of the teaching and learning environment which either enhance or impede students' understanding learning critical thinking and knowledge construction. It also gives us an opportunity to examine and identify what kind of challenges and advantages students and teachers face during the course relating to a learning-focused approach to teaching. This case further sets out to identify what we can learn about issues that matter for the quality of educational practices.

8.2 Review of the relevant research literature

8.2.1 Review of the research on biological education in higher education

Biology is a natural science, together with chemistry and physics. This field of science has recently been under transformation: the research paradigm has changed from linear reductionist thinking to complex and interconnected systems (Goldenfeld & Woese, 2007). At the same time, biology teaching has become less theoretical (Matthews, 2014). In Finland, biologists are educated in five universities. University students in biology are selected for degree studies through the entrance examination. Less than 10% of applicants are accepted. At Finnish universities students can study for bachelor's and master's degrees and scientific postgraduate degrees, such as a licentiate or doctorate. The extent of the bachelor's level degree is 180 credits, taking three years of full time study. The master's degree is 120 credits and is planned to take two years full time study.

The students who participated in the course presented in this case report are beginning university students. The first year of studying is found to be important for academic progression and student engagement (Korhonen et al., 2017). Previous studies among Finnish biology students have shown that deep-level processing (i.e. thorough understanding through active studying) in learning in the first study year predicts study success in the end of bachelor's studies (Rytkönen et al., 2012). Furthermore, organised studying (i.e. how students organise

their studies and how they manage their efforts and time) and peer support have found to be related to students' academic progression. Recent research has shown that biology students' conceptions of learning emphasise learning as integrating new knowledge with prior knowledge and evaluating different views. Only a minority of students consider learning solely as reproduction or memorisation of knowledge (Asikainen et al., 2013).

Previous research has shown that teaching and assessment practices in the hard sciences (including biology) are described as content-focused rather than learning-focused (Lindblom-Ylänne et al., 2006; Postareff et al., 2008). In addition, previous studies have drawn attention to the fact that teaching and assessment practices in biology tend to support memorising rather than understanding (Asikainen et al., 2013; Halinen et al., 2013). Nevertherless, assessment practices have been identified as a critical factor contributing to students' learning outcomes (e.g. Hailikari et al., 2014; Halinen et al., 2013; Biggs & Tang, 2011). Recent research shows that biology teachers focus on factual and content-centred knowledge in assessment rather than critical evaluation and understanding (Halinen et al., 2013). Results also indicate that biology students' grades do not necessarily reflect the quality of learning outcomes in a reliable manner (e.g., Asikainen et al., 2013; Räisänen, et al., 2016). For example, some students have achieved the highest grade without ever reaching a thorough understanding of the course's content. Previous studies have also found that both biology teachers and students have sometimes experienced the assessment as unreliable (Hailikari et al., 2014; Räisänen et al., 2016).

Recently, some researchers have stated that there is a risk that the content of science courses remains fragmented in the students' minds because of the content-focused nature of teaching (see e.g. Durrant & Hartman, 2015). To overcome these concerns, attention should thus be paid more than before to the content of courses as well as to the teaching methods used. Among other things, researchers have highlighted the importance of field courses. Field courses are intensive courses that typically are organised outside of univeristy campuses, for example in biological research stations. Typically they are practical courses. Field courses offer an ideal teaching and learning environment for problem-based learning. The class size of field courses is typically smaller than in regular courses. Therefore, field courses provide students with an opportunity for professional development, to build on existing skills and knowledge with *close interaction* between students and teachers. Because of the core characteristics of the field course, such as allowing students to work in a small group with high degree of interaction, it offers a learning-focused teaching and learning environment (see e.g. Durrant & Hartman, 2015; Harlan et al., 2006; Malam & Grundy-Warr, 2011) which:

- gives an opportunity for students to perform some elements of an authentic research project
- facilitates a different range of skills, such as teamwork, problem-solving skills, critical thinking, from traditional lecture and laboratory-based learning
- changes student role from passive recipient to active learner
- enhances students' metacognitive skills
- removes students from their comfort zone
- encourages students to connect new knowledge to prior knowledge
- encourages students to make connections across different learning experiences

Eston and Gilburn (2012) found in their study that attending field courses has positive effects on students' later study success and learning gains.

8.2.2 Review of the research on critical thinking

Academic education consists not only of information on a major subject, but also of the thinking skills for using that information. Critical thinking is considered as the core capability required from the very beginning of university studies to further on in working life (Hyytinen et al., forthcoming/2018). Critical thinking refers to self-disciplined thinking in which the student assesses and interprets relevant information to the problem, drives well-reasoned conclusions by testing them against relevant criteria, thinks open-mindedly with alternative solutions and communicates effectively (Halpern, 2014; Hyytinen et al., forthcoming/2018). Recent empirical evidence shows that university students differ from each other in terms of critical thinking (Badcock, Pattison, & Harris2010; Hyytinen et al., forthcoming/2018), and a higher education degree does not necessarily guarantee advanced critical thinking skills (Arum & Roksa, 2011). One potential reason behind these findings might be that teaching in university can focus more on transmitting subject-specific knowledge rather than developing students' abilities to utilise that knowledge. In addition, although the significance and importance of critical thinking is generally noticed, it is not necessary explicitly acknowledged in curricula and course outlines. Thus, there is a risk that the decision of whether or not to address this issue in teaching is likely to depend on the view that each teacher holds about the importance of teaching critical thinking. Implicit teaching systems without clear expectations of what kind of pedagogical practices should accomplish can leave some students without the necessary competencies in this area. The literature suggests that to enhance critical thinking, pedagogical practices should enable students to actively use these skills and challenge students properly (Arum & Roksa, 2011). Moreover, teaching practices should focus explicitly on critical thinking (Halpern, 2014).

In sum, based on the previous research, there is a need for university courses in which learning critical thinking is an integral part of teaching and learning practices. The current case report addresses this concern and responds to it by giving an example of how teaching critical thinking is integrated in the course design and the course implementation. This chapter also provides insights into how to design a learning-focused approach in the context of biology. The focus of the course reported here is thus not on the transmission of factual knowledge nor the content, but rather on beginning university students' learning processes, thinking skills and knowledge construction. This focus makes this course different from the typical content-focused science course. The next section presents the data collection and methods. After that characteristics of the teaching and learning environment are presented. The final section provides an overview of the identified opportunities and challenges relating both to teaching critical thinking and implementing a learning-focused approach in teaching.

8.3   Empirical context and data

The course is an eight credits (1 ECTS equals 27 hours of work) field course in ecology research which is offered annually during the summer holiday period. It is designed for first or second year students in biology or environmental sciences. This research method course is compulsory for students majoring in ecology and evolutionary biology, whereas it is optional for the environmental science students. The prerequisite for the course required that students had taken the basic course on statistics. The first-year courses are for the most part compulsory and they comprise mainly lectures. Studies also include practical laboratories, seminars, and web-based teaching. The purpose of the first-year studies is to familiarise students with different areas and phenomena of biology. The most common method of assessment is a written exam at the end of the course.

The extensive data set was collected from this field course in ecology research. Altogether eight teachers (i.e. one lead teacher and seven associated teachers: 5 female; 3 male) and 61 first and second-year students (49 female; 12 male) in biology or environmental sciences at a large Finnish research-intensive university, participated in this study. Pre and post-course interviews with teachers as well as post-course interviews with three student groups were conducted. Furthermore, six individual student interviews were conducted at the end of the field course. The students were at the same phase of their studies, that is, in the end of their first or second study year. At that point of their university studies, the students had mainly participated in lecture courses. This ecology research course was their first experience of a field course.

Group activities and lectures were observed by two researchers and one research assistant. The research materials included video-observation data (i.e. total duration of video-recordings of lectures and seminars was 14 hours; video-recordings of students' group work totalled 87 hours), all products and resources the students worked with (i.e. students' reports, electronic resources, syllabus, presentations, exam answers), course documents (i.e. course plan, curricula), students' grades, and researchers' observation notes. In addition, students completed the modified versions of the HowULearn survey (see Parpala & Lindblom-Ylänne, 2012) and the Inventory of Learning styles (ILS; Vermunt, 1994) survey after the course. The items of surveys were adapted to measure student learning at the course level. The HowULearn provides internationally and disciplinary comparable information about student learning, self-efficacy beliefs, and their experiences of the teaching-learning environment. The items of the ILS focus on students' self-regulation skills. The questionnaire used also included three open-ended questions, in which students were asked to describe what they learnt during the course and to grade their own learning (scale 0-5), give rationale for the grade, and give course feedback. Table 15 below provides an overview of data.

Table 15 - Overview of teaching and learning activities, participants and dataset (ecology course)

Information on the teaching and learning settings	
Number of staff teaching the course	8 teachers
Number of students enrolled in the course	64
Course period	Information session two months before the field period, three weeks field course period, final exam after two months
Main assignment features	1) Participating in the group work actively, participating in the different phases of the group work 2) Writing a field report in groups 3) Attending seminars and lectures 4) Oral group presentation 5) Peer feedback 6) Final exam; individual work
Teaching and learning activities	PBL; Group work; Lectures; Seminars; Presentations; Formative assessment and feedback; Summative assessment
Information on the research study (participants; data)	
Number of groups/students	1 group, 8 students
Types of data	**General course material**: Course plan, syllabus, lecture slides, task descriptions, resources provided via the Moodle **Observation protocols**: One 90-minute information session two months before the field course; 14 hours of lectures and seminars during the field course; one group of eight students was observed by three researchers during the three weeks field course at the biological field station (total 90 hours). **Video recordings**: A total of 101 hours of video-recordings all students' activities; which consist of 87 hours of group work and 14 hours of lectures and seminars **Audio recordings**: 8 hours of group work was also audio recorded (overlaps with video) **Documents/Products**: Drafts and final versions of the field report, slides of presentations, comments and feedback to the peer group, teacher's feedback, pictures and other visualisation generated by students for the purpose of presentation and the field report **Interview data**: Pre and post-interview with the lead teacher (each 2h); Post-interviews with three associate teachers (each 1.5h); Post-interviews with six students from the observed group (each 1h); 3 focus group interviews with students after the course (each 1.5h). The interview data are transcribed. **Field notes/social media data**: Field notes (total 61 pages); course-related communication via email and Moodle **Student survey**: HowULearn and ILS inventories in the end of the field course including questions about experience of teaching-learning environment, approaches to learning, self-efficacy, self-regulation in learning, 61 responses (95% response rate)

8.4 Characteristics of the teaching and learning environment

8.4.1 An overview of the course design

According to the course plan by the end of the field course in ecology the student knows: (1) the basic principles of ecological research; (2) how to formulate research questions; (3) the basic principles of how to plan a study, use research methods, collect data, handle the research materials, report the results and conclusions, and (4) the basic principles of how to report

research findings in writing and how to present findings orally. However, in the pre-interview, the lead teacher emphasised that the course is planned so that the general intended learning outcome is proficiency in critical thinking. To achieve the formal learning objectives mentioned in the course plan students need critical thinking skills. Therefore, the field course in ecology differs from traditional research methods courses:

'Traditionally many courses [in the university] concentrate on the methods and applying these methods so that "you should take the pipette into the hand and then by using it you transport [the liquid] here and there". And then students assume that doing research is like that. Partly it is, but I think that this kind of technique can be taught in schools, vocational schools, or polytechnic but in the university doing research must be something else. The university is a place in which the main learning outcome is to learn to think. The students have gotten used to the fact that the teacher says what to do and what to think starting from the comprehensive school. Thus independent thinking too often remains so low'.

(Lead teacher's pre-interview)
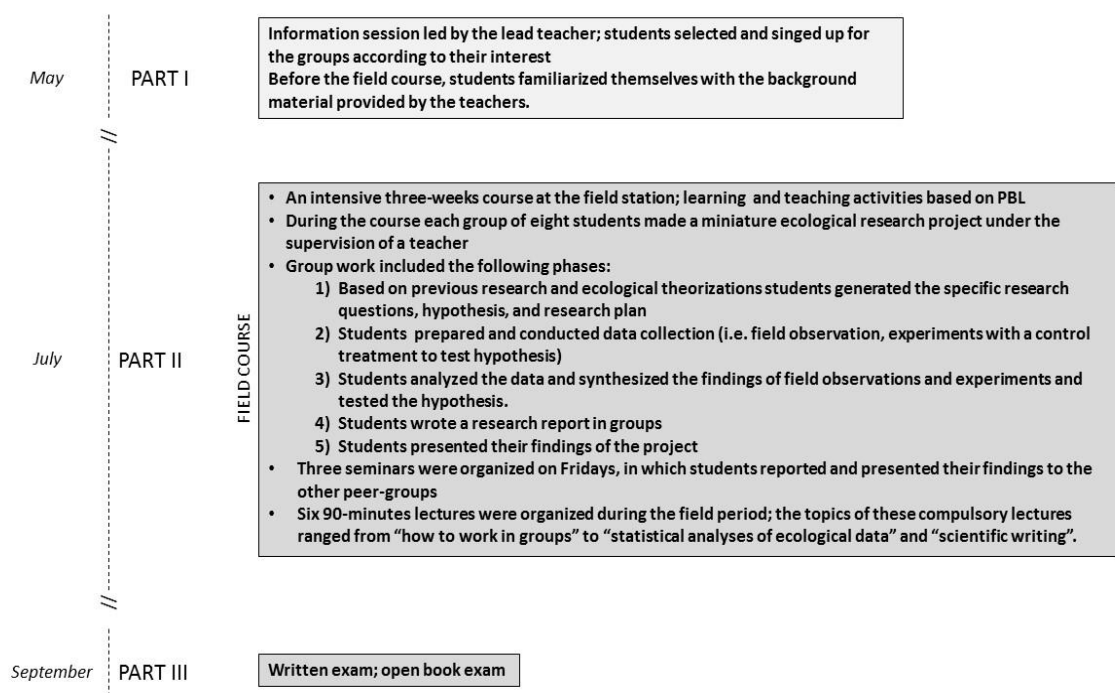
Figure 10 The structure and timeline of the field course in ecology

A visualisation of the structure of the course is outlined as a flowchart in Figure 10. The course was planned from the teachers' side to consist of three parts. In the first part, students were informed about the content and aims of the course and the research themes. This took place two months before the field period. In this phase, students according to their interest chose the small group and research theme in which they wanted to work during the field period.

Each small group of students focused on a different ecological problem, such as behavioural ecology, ecotoxicology, plant ecology, and urban ecology. The teachers who supervised the groups were experts in these research areas. Before the field period students were expected to familiarise themselves with background information about ecological research. These materials were available at the Moodle virtual learning environment. The second part of the course is the field period, which was arranged in the biological field station located outside the campus. During the field period students worked in parallel groups of eight students. The field period includes the following main activities: group work, lectures, and seminars with student presentations. The third part of the course was the final exam.

■ Lectures ■ Student group work ■ Seminars with students presentations, peer feedback ■ Final exam
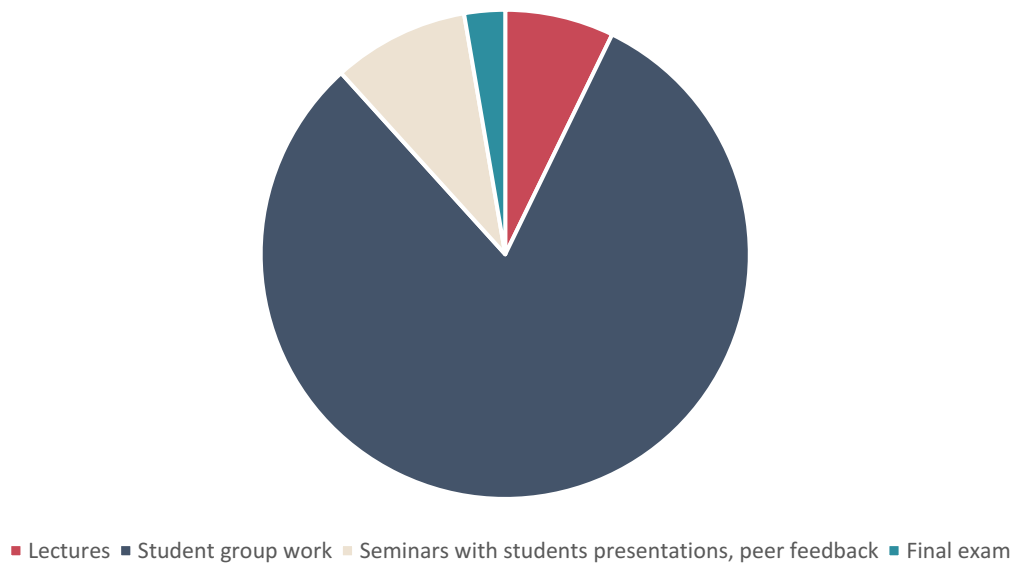
Figure 11 An overview of the planned main activities (ecology course)

As Figure 11 above illustrates, the field course was heavily based on student-organised activities such as working in groups. Less than 10% of the workload consisted of teacher-organised activities such as lectures. However, the whole course structure was designed around the group work, and lectures and seminars were directly linked to them, providing the students with resources, instructions or feedback on their group work. According to the principles of PBL, each group of students was supervised and tutored by one of the teachers (see more below). The lead teacher emphasised in the interview that the course was designed to follow learning-focused principle of teaching, meaning that teaching is comprehended as facilitating the students' learning processes and knowledge construction. Based on the observation data students were informed before the course as well as at the very beginning of the field period that this course required from them both intensive working in a peer group and working independently, not passive listening. In the pre-interview the lead teacher reported that students' active learning is promoted:

'from the very beginning of the course students active learning will be emphasised so that we'll [teachers] only facilitate their learning processes. We'll try to help and support their learning in all the possible ways but students need to engage themselves with active learning'.

Based on the teacher interviews and observation data the course was implemented for the most part as it was planned. In the pre-interview the lead teacher highlighted that it was very important that the structure of the course was well planned: '*there is no time for readjusting*'. Next, we first provide details pertaining to the pedagogical approach, namely PBL, and then describe in more detail the characteristics of the main teaching and learning activities of the course, and how these activities were enacted and experienced.

8.4.2 Problem-based learning

The teaching method of the course was problem-based learning (PBL). PBL is a learning-focused pedagogical approach in which a small group of students work together on a shared task in order to jointly construct their knowledge and understanding of the content (cf. Hmelo-Silver, 2004; Aarnio, 2015). In this process students learn with and from their peers. Students define the problem and formulate shared learning goals together, and after that they collaboratively construct knowledge to explain and solve the problem (Hmelo-Silver, 2004).

Based on the observation and interview data, the PBL process required responsibility, reflection and self-regulation from the students. An ability to co-operate with other students was also involved. It follows that students needed to take responsibility for their own learning processes and knowledge acquisition. In contrast, the role of the teacher was to facilitate students' learning by supporting, guiding, and monitoring their understanding and learning processes. All phases of PBL involved various critical thinking skills from the students, such as analytical reasoning, evaluating knowledge, problem-solving, providing clarification, recognising biases and weak arguments, providing arguments, making decisions, and drawing conclusions with their peers and on their own. These perceptions are in a line with previous research on PBL (e.g. Aarnio, 2015).

8.4.3 Student group work

During the three-week field period at the biological field station the students worked for most of the time in peer-groups of eight participants under the supervision of one of the teachers. Following the principles of PBL, the group work included in total five phases. In the first phase, based on previous research and ecological theorisation the students defined the specific research questions. After that, they defined a hypothesis and generated a research plan (i.e. identifying how to access new information). Then, during the third and fourth phases the students prepared and conducted data collection (i.e. they employed field observation and experiments that were needed to answer the research questions). In the next phase, the students analysed the data and synthesised the findings of field observations and experiments and tested the hypothesis. Thereafter, they wrote a field report in which they reported their findings. The report was limited to 15 pages. Students received formative feedback from teachers and their peers on their drafts and on the final versions. Teachers *assigned a group*

grade for the written report. The last phase further included the final group presentation (see more below). In the course of this phase the students shared their findings of the project with other peer groups and teachers and received feedback. Based on the student interview and observation data, the majority of students participated actively in all the phases of group work. However, the observation materials show that some students tended to dominate the group discussions, while others opted out of discussions.

The field of ecology (i.e. the general research theme) was chosen beforehand by the teachers to avoid having the groups spend a lot of time trying to figure out what they should be doing during the course. However, following to the principles of PBL, the students' task was to define the problem and formulate shared learning goals together, and thereafter collaboratively constructing knowledge (i.e. familiarising themselves with previous research findings and other literature related to the research theme chosen, conducting data collection, analysing the empirical data) to explain and solve the problem. Based on the observation notes, the teacher actively attended the different phases of group work. He/she monitored and facilitated students' working and learning processes by asking open-ended questions, leading discussions, guiding the process of the research project, enabling the active participation of learners and engagement with ideas, providing oral and written feedback to students, encouraging critical engagement with ideas, promoting thorough elaboration of the topic, and teaching research methods. Moreover, the teacher was an expert in ecology whom students could ask questions concerning the ecological research.

The students' role was to discover for themselves the knowledge from different sources, such as journal articles, ecological textbooks, empirical data, while the teacher helped and facilitated their learning by guiding and monitoring the group work. In the post-interview, the teacher explained that from the teacher's point of view the most challenging thing was to decide on when to intervene and when to allow time and room for the students to solve their questions and problems by themselves before getting involved. The observation data show that the teacher left the seminar room for a short period several times. In the post-interview, the teacher explained that his absence encouraged students' involvement and interdependence as well as increased their willingness to share uncertainties and disagreements.

Table 16 illustrates the phases and content of the group work.

Table 16 - Illustration of group work (ecology course)

	The group of eight students	The teacher	
During the 1st week	- defined the study questions and the study design in a given field of ecology - identified what they already know and what they need to know. - planned time schedule and defined roles - planned and prepared data collection - wrote a weekly report in groups - participated in two lectures and a seminar, and as a part of the seminar students reported their progress	- monitored and facilitated students' learning processes - guided the process of research project e.g. listened to students' discussions and if needed led the discussions, helped with generating research questions and planned the research design - provided continuous formative feedback	 Students are designing preliminary research questions with their teacher on the first day in the field station. Students are generating independently their weekly report.
During the 2nd week	- employed field observation and experiments - wrote a research report and a weekly report in groups - planned time schedule - participated in two lectures and a seminar in which students reported their progress	- facilitated students' learning processes - guided the process of research project, e.g. helped students with data collection - provided continuous formative feedback	 Students are employing independently their field experiments.
During the 3rd week	- run data analyses, refined the research questions - wrote a research report and generated pictures to visualise the findings in groups - gave formative feedback to their peer group's research report - took into account peer feedback - prepared group presentation - participated in a lecture and a final seminar - presented their study and its main findings in a final seminar	-facilitated students' learning processes - guided the process of research project, e.g. helped with data analyses and report, promoted thorough elaboration of a topic - provided (oral and written) formative feedback on students' work	 At the beginning of 3rd week, students analysed the data and refined the research questions. To synthesise their findings they provided this visualisation, in which study design, research questions and the results are summarised.

Each group of eight students organised their research project independently with their teacher. For this reason, knowledge resources and technologies adopted varied between the groups. Students reported in interview that feedback given by the teacher comprised the most important knowledge resource for the students. According to observation data, the teacher who supervised the student group gave constant feedback and supported the process of the research project. The feedback focused both on the product and process. It aimed to support students' learning processes, deepen their understanding and enhance critical thinking skills.

The observed student group employed all the knowledge resources provided in the course (i.e. instructions for the report and other materials provided by teachers, syllabus, other ecological research literature relating to the topic of group work, research database) and other external sources (i.e. students contacted experts, they also utilised search engines, such as Google and Google Scholar, and also used Wikipedia). Students also used several technologies in their group work. For example, cameras were used in the documentation of the different phases of data collection. The data collected and coded by the students were analysed using SPSS and Excel. Google Docs and Dropbox were used to share the different versions of reports and other documents as well as for working in parallel during the group work. Drawing software was used to generate pictures and other visuals for the report and final presentation. In addition to face-to-face communication and group discussions, students communicated with each other using email and several social media applications, such as WhatsApp and Facebook Messenger. As a part of their group work they also used a whiteboard to make notes and other visualisations of their work. The whiteboard helped them ensure that everyone knew what *they* were doing and why.

8.4.4 Lectures

In addition to group work, the field period included six 90-minute lectures. The main purpose was that the knowledge offered by lecturers was internalised, worked with and used in the group work. The topics of lectures were closely connected to group work. According to the lead teacher, the lectures were intended to provide the basic knowledge needed to conduct the research project. The contents of the lectures were: (1) introduction to the course; (2) how to do group work; (3) statistical analyses of ecological data; (4) oral presentation; (5) graphs (how results can be shown in graph form); and (6) scientific writing. The lectures were mandatory for the students and they were held in an auditorium.

The observation data show that the lecturing concentrated on the factual information which includes principles, concepts, ideas and theoretical knowledge about a given topic. Discussions and activating teaching methods occurred occasionally. The main way of engaging students during the lectures was questions addressed by the lecturers. It is worth mentioning that some students emphasised in the interviews that these 'traditional' lectures were a welcome change: '*it was very nice just to sit and listen, because after the intensive group work we were so exhausted*'. The students' experiences with the lectures varied. Some students said in the interview that lectures were insightful, while others claimed that the benefits of the lectures remain unclear. Some students also expressed that the lectures could have been better tailored to help them with conducting the report, for example especially in analysing the

quantitative data. The timing of the lectures was not optimal for all groups, because each group of students followed their own schedule, as one student expressed in interview: '*I think the placement of the lectures was a bit weird as we had already started some things before we had a lecture on the subject*'. For example, the students had lectures on statistical analyses of ecological data after some groups of students had already progressed past this issue in their group work. A notable number of students had not participated in the basic course of statistics before the course, despite it being a prerequisite. Therefore, many students struggled with this issue. However, from the teachers' perspective it was almost impossible to plan perfect timing of the lectures for everyone, when each group of students had its own flexible schedule.

8.4.5 Seminars, presentations and peer feedback

All students also met each other on Friday afternoons in the weekly seminar. Each group of eight students prepared a group presentation in which they reported their progress. Teachers and other students provided feedback and made suggestions for the groups. In the interviews, the students expressed that the seminars had an important role in their learning. Preparing a presentation made their progress visible. The students also said that it was important to hear what other groups have done and it was also nice to meet other students and to receive feedback.

At the beginning of the third week each group received and gave peer feedback and written comments on the field reports. During the last week time was also allocated for the groups to prepare group presentations for the final seminar. Students were advised to make sure that each student had approximately the same amount of information to report and the sections of presentations were divided equally. On the last day in the field station the students gave group presentations about the main findings of their research project. This group presentation was compulsory for all students. Each student was evaluated/assessed individually. Teachers thus *assigned an individual grade for oral presentation.*

Illustration 6 - A group of students present their findings on the last day in the field station

PowerPoint was used for the information sharing during the lectures and seminars by teachers and students (see Illustration 6). Based on observation data, the students used their laptops, phones and tablets during lectures and seminars. Laptops, phones and tablets were used for making notes, but also for other activities, such as playing games and updating Facebook.

8.4.6 Assessment and exam

Based on the observations, course documents and teacher interview data, assessment combined both formative and summative elements. As noted before, students received formative feedback from the teachers on their progress and advice on how to maintain or improve it during the whole group work. The lead teacher reported in the interview that the formative feedback was the most important part of assessment practice and the summative assessment was tied in with the course outline. The summative assessment of the course comprised the following aspects: the course grade was based on the student's course activity (25%), written report (25%) and oral presentation (25%), all these were assessed by the teacher at the end of the field course, and a final exam (25%) given for students two months later. The grading scale of the course followed the six-level grading scale from 0 to 5. The grading scale is directly comparable to the ECTS grading scale.

Students had a compulsory home-based examination in the beginning of the autumn semester. Each student took the exam individually. The final exam included three essay questions designed to focus on the core content of the course. The exam was an open book exam, meaning that the students could use all course materials. The exam was available on the Moodle platform for one week. Once the student started the exam, she/he had 3 hours to complete it. On the Moodle platform there were available altogether 8 questions. Each student was allowed to select three questions to answer. The questions were general, such as 'what is the difference between a science article, a science article in the "Helsingin Sanomat" newspaper [Finland's largest and oldest newspaper], and a science article in the social media?' and 'Explain the challenges and advantages of multi-method research'. No feedback for the exam was provided, except the grades. The lead teacher emphasised in the interview that the purpose of the final exam was to make visible for students what they have learnt and to summarise the course. The students said in interview that they were positively surprised how the exam was conducted. The exam was totally different from what they were used to during their first study year in university: they needed to think independently, apply and synthesise knowledge in problem-solving, give a rationale for their conclusions, and not just reproduce the knowledge or the content of the course. Thus, to complete the exam critical thinking skills were required.

There were no concrete assessment criteria or rubric available for the teachers or the students. The lead teacher reported in the pre-interview that based on the student feedback the assessment practices of the course were developed several times. For example, the students' course activity was added as a part of assessment some years ago. However, student interviews suggest that the students found the assessment still challenging. They reported that the different forms of assessment were not in balance. First, although the group work comprised over 80% of workload, only 25% of the final grade was based on the group performance.

Complicating this issue, the group performance was based solely on the written report. Students expressed that neither group processes nor individual contribution were necessarily apparent in the written report. For example, some students took more responsibility for the group work than others. Second, students thought that the final presentation was over-estimated in the assessment. The reason for that was the fact that students were individually evaluated as a part of group presentations, and the presentation was allocated so that each student had only two minutes to give her/his section of presentation. Third, the summative assessment focused mainly on the products (i.e. the work students produced such as written reports, exams, and presentations). The process (i.e. how students worked, namely course activity) only counted for 25% of the final grade and was based on individual performance while the grading criteria remained unclear. In a similar vein, the teachers also emphasised in the post-interviews that the summative assessment was not necessarily fair.

8.5 Students' overall experiences of the course

The interview data suggest that PBL was demanding for beginning university students. However, at the same time, it was a rewarding learning method for them. Based on the student interviews, engagement was promoted in the following ways:

- Students had high expectations of the course. The course has a good reputation among students
- Challenging, relevant and authentic task/assignments were used. It means that the course was highly practical, and students appreciated that. Students saw that they were able to put theoretical knowledge into practice
- Students reported in interview that the course helped them to make connections and synthesise the course content with their prior knowledge. Furthermore, students said that the course helped them to recognise and make connections between different concepts which were taught during the first and second study year (cf. Durrant & Hartman, 2015)
- The teaching and learning environment also supported students' autonomy by giving them more opportunities to make their own decisions and choices than in their previous courses
- Students did not have other courses at the same time, thus they were able to concentrate solely on this course
- Students shared the meaningful learning goals for the group work
- Teacher encouragement, support and formative feedback were provided throughout the field period. Students experienced that responsibility for monitoring their own learning processes and to regulate the group work processes was a challenging task, but at the same time it was a strength of the course. The students emphasised in interview that the teacher's support and external regulation for the group work was crucial. PBL can be a very demanding learning activity especially for beginning university students. Therefore, it is obvious that students needed teacher facilitation in their learning processes (cf. Aarnio, 2015)
- Co-operation among students. All students participated in the group work and knowledge constructions during the course. Observation data shows that group cohesion developed during the course. For example, a process of collective action 'against' the other groups

arose, illustrating that students started to highlight the difference between 'we' and 'them'. A recent case study of group cohesion by Hendry, Wiggins and Anderson (2016) demonstrates how a process of collective action against the others impact positively on group dynamics

In contrast, students also reported that there were some other aspects which diminished their engagement:

- Heavy workload
- Too tight schedule. Some students found that three weeks were too short timeframe to conduct the research project
- A lack of personal feedback. Some students wished for more personal feedback. As one student explained: *'I wanted much more personal feedback about my performance in group work'*
- Variation in prior knowledge and a lack of prerequisite knowledge and skills, such as statistical knowledge. Some students reported that too-difficult learning activities, such as statistical analysis of data, were not as effective at engaging them in learning
- Imbalances in group work. The observation data suggest that some students tended to dominate the group discussions, while others opted out of discussions

8.6   Discussion

This case report provides an illustrative example of how a learning-focused approach is applied and enacted in the context of biology. This section provides an overview of the opportunities and challenges identified during the course. This case implies how a learning-focused pedagogical approach can provide students with an opportunity to facilitate learning critical thinking and employ knowledge construction early at the beginning of university studies. However, it is worth noting that PBL is not synonymous with critical thinking. In all probability, critical thinking occurs if the students are supported, assessed, encouraged and given feedback as they are using critical thinking skills (such as analysing and evaluating arguments and knowledge, recognising biases and weak arguments, providing arguments and making decisions) with their peers and on their own. In order to promote critical thinking the use of authentic, complex, open-ended assignments including knowledge construction and problem-solving have been suggested (see Arum & Roksa, 2011; Halpern, 2014).

8.6.1   Enhancing students' critical thinking in PBL

Learning to think critically is an important learning objective. Critical thinking is found to be an essential factor for university students in the progress of their studies (Arum & Roksa, 2011). It is thus important to find ways to enhance these abilities early on in higher education. Previous research shows that critical thinking involves skills, knowledge and dispositions: a critical thinker needs to have the knowledge of what is reasonable to the context or task, certain skills to evaluate and use that knowledge, as well as sharing the critical spirit to do so

(Hyytinen, 2015; Halpern, 2014). In the literature on critical thinking the following key aspects of teaching are promoted: (1) teaching and learning activities should focus explicitly on critical thinking skills (e.g. teaching explicitly encourages and challenges students to analyse and evaluate arguments and knowledge, to recognise biases and weak arguments, to provide arguments and to make decisions); (2) teaching and learning activities should develop a disposition for effortful thinking and learning; (3) teaching and learning activities should focus on learning activities that increase the probability of transfer; and (4) teaching and learning activities should focus on metacognitive skills (Halpern, 2014). The observation data suggest that these aspects run through the course: in PBL students assessed, evaluated, and interpreted knowledge from different sources, they drove well-reasoned conclusions by testing them against relevant criteria, and they needed to think open-mindedly with alternative solutions and to communicate their findings effectively. Simultaneously, the teacher supported, asked open-ended questions, and gave feedback, encouraged critical engagement with ideas, and promoted thorough elaboration of the topic. The field course also provided for students an opportunity to conduct an authentic research project. The envisaged design of the course thus followed the main principles of teaching critical thinking.

The reports of both teacher and students implies that the course design also allowed students to employ conceptual knowledge in new contexts and make learning visible through conducting a research project. Students felt that they were able to put factual knowledge into practice. There is research evidence that PBL provides a suitable context for transferring what one has learnt in one context to other contexts or situations (Aarnio, 2015). In PBL students are also expected to gain a deeper understanding of the domain-specific knowledge that often appears to be very abstract level. Based on the observation data the course also taught students to cope with uncertainty and stress by not giving students a clear picture of the problem. The course, especially writing the field report and presenting findings, taught students that it is not enough to know, but that they must be able to use the knowledge in a meaningful way. The field course enabled students to work autonomously, to enjoy learning relationships with others, and to feel that they were competent to achieve their own learning goals. The course thus offered an educational experience for students that was challenging and enriching, and at the same time extended their generic academic abilities.

8.6.2 Alignment of the objectives, teaching and learning activities and assessment

As illustrated by this case, PBL offers a good starting point for designing and implementing learning-focused teaching and learning activities in biology. In line with the research literature, this case shows that PBL highlights the students' active role in the learning processes (cf. Aarnio, 2015). However, regardless of the *teaching method* used, enacting learning-focused courses requires thorough planning in order to attend to the alignment of the different elements of the teaching-learning environment (Biggs & Tang, 2011). In this course, the lead teacher engaged with this task in a thorough manner: the teaching and learning activities, such as group work, seminars, topics of the lectures, feedback and home-based examination

were specific to the learning objectives. The observation data suggest that the envisaged design followed for the most part the principles of constructive alignment: objectives, teaching and learning activities, and assessment were in line with each other and the objectives clearly emphasised what kind of knowledge students were supposed to learn and why. However, the reports of both teachers and students implies that some part of summative assessment could be further developed. For example, the graded tasks could be better linked back to course objectives via clearer assessment criteria and rubric. This would also increase the visibility and fairness of the assessment.

8.6.3 Challenges in group cohesion in the PBL environment

As noted before, some students tended to dominate the group discussions, while others remain more or less passive bystanders. Previous research on PBL shows that there are several reasons for inadequate participation in discussions (see more, Aarnio, 2015). First, some students can be shy in sharing their ideas in group work. However, if students opted out of group discussion, the potential differences in students' thinking remain invisible. Second, differing ideas in a group can evoke negative feelings such as tension or irritation. These negative feelings can result in conflict. Students usually try to avoid confrontation and conflict in a group (Aarnio, 2015). Third, students' orientation to the group work can differ. Fourth, students can compete with each other. Finally, in the present case, a great variation in prior knowledge and a lack of prerequisite knowledge were also reasons for inadequate participation. We know that conflict can be constructive or destructive. There is evidence that if students feel safe, they do not compete with each other, and they have a shared commitment to group work, then confrontation in group work is most likely to lead to constructive conflict (Aarnio, 2015; Van Den Bossche et al., 2006). According to the observation notes, the student group observed faced conflicts that were mainly of a constructive nature. The teacher also ensured that all students, especially those who seemed to withdraw from group work, had a task to undertake, and encouraged them to interact with other students. However, this issue should be explored in a more detailed way. Aarnio (2015) found that dealing with conflict in PBL enhances students' learning while also developing critical thinking skills.

8.6.4 Conclusion and recommendations

In conclusion, this case provides insights into a teaching and learning environment which aims to facilitate beginning science students' critical thinking skills and deep learning processes by adopting a learning-focused approach to teaching. The teaching and learning activities of this case are based on the principles of PBL, which provide a pedagogically-relevant foundation to the course. According to its theoretical underpinnings, PBL as a teaching method develops students' knowledge by applying it to authentic situations. It further promotes students' problem-solving abilities and self-regulation skills by addressing genuine problems from the respective discipline (Aarnio, 2015). Based on this case the following recommendations can be provided regarding PBL courses:

- Carrying out the course described in this case report requires many resources: PBL courses are time-consuming and they require a heavy workload both from teachers and students.
- This case illustrates that it is important that students are informed beforehand that the PBL requires them to work intensively both in a peer group and independently. This helps students to orient themselves to the expectations.
- In order to ensure a successful learning experience for beginning students, it is necessary that teachers who are involved in a PBL course need to have relevant pedagogical understanding about group work, i.e. they need to know how to facilitate students' learning processes, how to promote active and equal participation in the discussion, and how to promote a safe atmosphere in the group. At the same time, teachers need to be experts in subject and content. The teachers' task is to ensure that any misconceptions, vague notions or superficiality about the topic are challenged (see more Aarnio, 2015). These aspects need to be taken into account when recruiting teachers and tutors.
- When planning the PBL course it is important to consider whether the level of the learning objectives is appropriate and realistic in light of the learners' prior knowledge, level of development, and time available. It is important to ensure that students meet the requirements with regard to knowledge and skills necessary for the course. A lack of prerequisite knowledge can cause problems in PBL and break group cohesion.
- PBL alone does not enhance deep learning processes or critical thinking of students, meaning that teaching and learning activities need to be in line with the objectives of the course, contents and assessment procedures (Biggs & Tang, 2011). The problem presented in the PBL has to be challenging. Furthermore, in order to promote critical thinking, students need support when they are using critical thinking skills to solve a problem

9 Large class lectures and essay writing in legal education

Heidi Hyytinen & Anne Haarala-Muhonen

This chapter:

- Gives an example of a lecture-based course for a large group of students, and how lectures and essay writing can enhance students' understanding of legal methodology
- Discusses opportunities and challenges related to lecture-based courses, and in the area of legal methodology more specifically
- Illustrates challenges both in pedagogical approaches to the teaching of methods and in what is meant by methodology in a specific knowledge domain
- Provides recommendations on how to develop a lecture-based course in legal methodologies

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9.1   Introduction

The present case report focuses on the use of large class lectures and essay writing in a course in legal methodologies and how these activities provide opportunities to deepen master's students' understanding of legal methodology and reasoning. One of the main required competencies for legal professionals is advanced legal writing and reasoning skills (Kowalski, 2010). However, previous research has shown that implicit teaching is often a primary way to support students' development of legal methodology and reasoning (Mertz, 2007). The reasons for this might be that the methodology of law has been described as difficult and opaque, for example, compared with natural science (Hirvonen, 2011). It follows that there are several definitions and conceptions of what is meant by legal methodology within the domain of law. In addition, it has been described as non-strict and pluralistic (Hirvonen, 2011). Also in the legal methodology literature there are different ways to talk about legal methods. On the one hand, the concept of methodology is used as a synonym for the general legal method and reasoning which is needed in practice and interpretation in law (Hirvonen, 2011). On the other hand, legal methodology can also refer to the different research methods to conduct legal research and to develop a legal theory of knowledge (Hirvonen, 2011). It is suggested as important that students learn to apply legal methods and understand different aspects pertaining to legal methodology during their university studies (Bager-Elsborgh, 2017; Hirvonen, 2011).

The course presented in this report is a new course in which these different aspects of legal methodology are taught explicitly. The course combines both content-focused lectures and students' independent learning. This course was selected as highly representative of lecture-based teaching and learning. Given these characteristics, the course we report here allows us to deepen our understanding of the elements of a teaching and learning environment which either enhance or impede students' understanding learning critical thinking and knowledge construction. students' understanding of legal methodology and reasoning. It also gives us an opportunity to examine and identify what kind of challenges and advantages students and teachers face during the course relating to combining lectures and students' independent learning. This case further sets out to identify what we can learn about issues that matter for quality of educational practices. Before presenting the course design and activities of this case, we give a brief overview of the educational practices that are typical in the discipline of law and what is relevant for understanding teaching legal methodologies.

9.2   Previous research on legal education in Finland

Finnish law is part of Nordic law, and in the classifications of legal systems it could be located in the civil law legal family (Husa, 2012). Legal concepts and legislation are typical Nordic law, however the Nordic legal system and thinking seems to be pragmatic (Husa, 2012). This has an influence on the teaching-learning environment of law and reflects to disciplines' own teaching and research traditions. In legal studies it is important to learn the theory and knowledge needed for practical processes, judgements and solutions (Neumann, 2001; Neumann, Parry & Becher, 2002). Exercises where knowledge is applied to professional practice, such as case studies, are commonly used in the teaching of law (Becher & Trowler, 2001; Neumann, Parry & Becher, 2002). This is relevant also in Finland.

Students in the Faculty of Law of the large research-intensive university where our case study is located are selected through discipline-specific entrance examinations and on the basis of their National Matriculation Examination grades. Each year, approximately 20% of applicants are admitted to the faculty and 250 new law students begin their studies at the university. These students have the right to complete both the lower (BA 3 years) and higher academic (MA 2 years) degrees after passing the faculty's entrance examination. At the bachelor's level law studies have been organised in a school-like manner, and most of the courses are compulsory. The courses are organised as mass lectures for the whole cohort (250 students), and summative assessments with written examinations are mainly used. The learning environment especially at bachelor's level has been experienced as very demanding, because studying for a degree is mainly based on independent work and in some courses the examinations are extensive (involving up to thousand pages to study). At the master's level, students have more freedom of choice on their courses, and the MA degree consists only of a few compulsory courses together with more optional courses.

Lecturing is a widely used teaching method in the higher education teaching and learning environment, particularly with large groups of students. For example, law teachers have been shown to experience lectures which give knowledge of basic structures of discipline as very necessary (Bager-Elsborg, 2017). However, in recent years lectures have been critiqued as

inefficient in activating students to use a deep approach to learning, where the student's intention is to understand the meaning of texts and integrate new information into his/her existing knowledge (Bligh, 2000). These diverse concerns about the problems of lecture-based teaching ask teachers to draw more attention to pedagogical practices which can be used to support students' active learning in mass lectures, such as small discussion during lectures, clickers, and interactive tools of various kinds (e.g., Lonka & Ketonen, 2012; Mayer, 2011).

In legal education, the curriculum is commonly based on theory and knowledge that students must learn in order to solve legal problems. Generally speaking traditional lectures can be seen as quite teacher-centred in nature and do not support the task of problem solving very well, nor help students to construct their own understanding of subject matter (Bligh, 2000; Kember & Kwan, 2000). Therefore, teachers in legal education have been encouraged to develop their teaching and create a learning environment which improves students' active learning and promote interaction. In the pedagogical literature, there are some encouraging examples of how the learning-centred pedagogical approaches can be practised in teaching large courses. For example, the problem-based learning (PBL) method has been used in some bachelor's level law courses (Bärlund, 2013; Lindblom-Ylänne, Pihlajamäki & Toom, 2003). PBL is traditionally created for small group teaching, but it has also been used very successfully in a private law compulsory course with 180 students in a modern classroom (Bärlund, 2013). The classroom was planned to support active teaching methods with flexible tables and ICT tools.

Previous research has also shown that Finnish law students experience their teaching and learning environment generally more negatively than students in other faculties (Parpala et al., 2010). In a similar vein, there is research evidence that students in legal education often experience a lack of support and feedback from teachers, and they feel the need to be responsible only for themselves (Haarala-Muhonen et al., 2011). Thus, it has been suggested that students need to get feedback from their teachers that is realistic, supportive and useful for their learning (Hattie & Timperley, 2007). In Finnish legal education, it is common for students to get feedback only in the form of course grades. On the other hand, during teachers' weekly office hours students have an opportunity to receive feedback, and some teachers have also arranged feedback sessions after examinations, but students very rarely take advantage of these opportunities.

Although learning legal methodology and legal reasoning are experienced as the core competencies of the legal profession (Bager-Elsborg, 2017), the pedagogical research on this issue is very limited. Thus, this case provides new information by showing and examining a mass lecture course which focuses on legal methodology and its teaching practices. The next section presents the empirical context and data. After that, characteristics of the teaching and learning environment are presented. The final section provides an overview of the identified opportunities and challenges relating to implementing the method course in a law programme.

9.3 Empirical context and data

The course we focus on in this chapter is within a master's degree programme in law. The target duration of law studies is five years: three years for the bachelor's degree and an additional two years for the master's degree. The bachelor's degree has limited relevance for the labour market, and thus, the goal of nearly all students is to graduate with a master's degree. The majority of Finnish law students (90%) graduate as Masters of Law and their dropout rate is one of the lowest among different degree programmes. However, the length of time required by students to graduate has increased in recent years. The average study time (bachelor's and master's) at the Faculty of Law has varied between six years and six and a half years (Kota-database, 2009). It has been shown, that only a quarter of law students have graduated in the expected five years study time (Haarala-Muhonen et al., 2017). On the other hand, it is possible to complete the whole degree (i.e. including both bachelor's and master's degrees) very quickly, in less than five years, according to the University Register. The master's programme courses comprise mainly lectures, but seminars and workshops are also offered. Most of these workshops are organised together with stakeholders from the professions. The assessment methods vary from written exams and learning diaries to oral presentations and legal problem solving.

This case study is based on a 9-week-long legal methodology course (3 ECTS; 1 ECTS equals 27 hours of work) at a large research-intensive university in Finland. Seven different teachers taught on the course. The course is compulsory for the students majoring in law; it is designed for master's level law students. The course introduces the students to fundamental principles of legal method (including both the general legal method and specific research methods), as well as encouraging students to apply legal method. The course was new and offered for the first time at the time when our study started. The teaching languages of the course were Finnish and Swedish.

An extensive data-set was collected from this legal methodology course. The total number of students who completed the course was 191. Of these 191 students, 103 participated in this study on a voluntary basis. This group of students were heterogeneous in terms of what year they had started their studies in the Faculty of Law (M=2012; the range from 2004 to 2016) and how many ECTS they had earned during their study path (M=210). Pre and post-course interviews with two lead teachers as well as post-course interviews with five students were conducted. All lectures were observed by one researcher. The research materials included video-observation data (i.e. totalling hours of video-recordings of lectures 30 hours), all products and resources the students worked with (i.e. students' essays, assigned reading materials, lecture slides, reminders and feedback posted at the Moodle), course documents (i.e. course plan, curriculum, essay description), students' grades, and researchers' observation notes. In addition, students completed the modified versions of HowULearn survey (see Parpala & Lindblom-Ylänne, 2012) and the Inventory of Learning Styles (ILS; Vermunt, 1994) survey after the course. The survey items were adapted to measure student learning at the course level. HowULearn provides internationally and disciplinary comparable information about student learning, self-efficacy beliefs, and their experience of the teaching-learning environment. The items of the ILS focus on students' self-regulation skills. The questionnaire used included also two open-ended questions, in which students were asked to describe what

they learnt during the course and give written course feedback. Table 17 below provides an overview of data:

Table 17 Overview of teaching and learning activities, participants and dataset (legal education)

Information on the teaching and learning settings	
Number of staff teaching the course	7 teachers, two of them with a special responsibility
Number of students enrolled in the course	280, 191 of them completed the course
Course period	9 weeks
Main assignment features	Attending lectures; assigned reading materials; writing an essay
Teaching and learning activities	Studying assigned reading materials; lectures; essay; assessment and feedback
Information on the research study (participants; data)	
Number of students	103
Types of data	**General course material**: course plan, syllabus, lecture slides, essay description, resources provided via the Moodle; assessment criteria **Observation protocols**: filled for in total 13 lectures (30 hours) **Video recordings**: 13 lectures (30 hours) **Audio recordings**: Interviews with two lead teachers and 5 students. All recorded material was transcribed **Documents/Products**: essays; grades; notes, reminders and feedback posted at the Moodle **Interview data**: Group interview with the lead teachers before the course started (1 hour); post-interviews with the lead teachers after the course (each lasted 1-2 hours); post-interviews with five students (each 1–1.5 hours) **Field notes/social media data**: Field notes (in total 26 pages) from every lecture; course-related communication via Moodle **Student survey**: HowULearn and ILS inventories with two open-ended questions in the end of the field course including questions about experience of teaching-learning environment, approaches to learning, self-efficacy, self-regulation in learning – 103 responses (54% response rate)

9.4 Characteristics of the teaching and learning environment

9.4.1 An overview of course design

According to the course plan provided by the main teachers, the aims of the course were:

- to prepare students for the completion of a master's level thesis and eventually for work as a researcher or a legal professional
- to understand the purpose of research and become aware of principles of theory of knowledge
- to familiarise students with knowledge required to conduct research, with general principles of argumentation

- additionally, the course gives an induction to the methods of doctrinal jurisprudence as well as comparative law, legal history and sociology of law

Therefore, by the end of the course, the students should know: (1) the basic principles of theory of knowledge; (2) the principles of general and legal argumentation and reasoning; (3) the principles of legal theory of interpretation; (4) the basic principles and the purpose of legal methodologies; and (6) how to produce scientific legal text.

In the pre-interview, the lead teachers emphasised that the reason why the course was developed and offered is that both teachers and students in the Faculty of Law have noted that teaching legal methodology has been inadequate: '*first of all, there's been a lot of bad feedback on the previous situation and second, according to the lecturers [of the master's seminars], students are unprepared to conduct research, they are incompetent*' (Teacher 2). In addition, lead teachers noted that learning methods take place implicitly:

> '*the students have no education on methods before the [master's] seminars. They have not been given any information on what methods mean. They might have a very naive view on methods and they are not [generally] interested in what methods are because they think that they don't need any methods [in their working life]*' (Teacher 2).

Because of that, the lead teachers have found that students do not have the necessary knowledge and skills to complete a master's thesis. In addition, students often struggle with writing argumentative texts: '*on essays' idiosyncrasies, so here it's typical to do very descriptive work and not justify arguments*' (Teacher 1). Furthermore, according to the lead teachers, the stakeholders from the profession have proposed that the argument skills of law students should be improved. Therefore, the lead teachers highlighted that one main aim of the course was to enhance students' argument skills.

The lead teachers highlighted in the pre-interview that the most crucial aim of the course was that '*the students learn how to conduct [master's] theses, learn to write, and learn to conduct research*' (Teacher 1). They also thought that this course aimed to prepare students to analyse legal texts and to conduct arguments:

> '*it's important for students to participate in the research scientific community's discussion or in this argumentative conversation, so it's not enough for them to describe something or some of our professor's perspectives or views on what it is said in the law, what another professor has said, what some judge has said. Students should be able to form arguments and justify them and they have to be able to analyse different texts they use with some sort of arguments. So it's an argument which is justified and they have to be able to analyse it*' (Teacher 2).

To reach these main aims of the course, the lead teachers had divided the course into teacher-led activities and students' independent learning.

The lead teachers also explained that this course was designed for students who are starting to write their master's thesis: '*of course it does not matter if students complete this course earlier, however, the course has especially been designed to support the writing and completion of the master's thesis*' (Teacher 1). The lead teachers also emphasised that '*the idea [of this course] has been so that the students complete this course first and then participate [master's thesis] in seminars and start with the theses*' (Teacher 2).

In sum, according to the main teacher interviews and the observation data, the course focused both on disciplinary content (e.g. to understand the principles of legal methodology) and partly on more general skills (e.g. to be able to write independent, scientific legal texts and provide convincing arguments). A visualisation of the structure of the course is outlined in Figure 12. The course was planned from the teachers' side to consist of three parts. The first two parts consisted of nine compulsory lectures. The third part of the course was essay writing. In the pre-interview, the lead teachers emphasised that:

> *'the idea is that the knowledge content of the course is taught first, so students are not just made to write essays, instead they are first told what research is and what methods mean, what are methods' role in research, how to participate in the scientific discussion' (Teacher 1).*

The course thus combined both content-focused and learning-focused approaches utilising the sequential strategy in which lecture-based teaching was complemented with students' independent learning, such as studying assigned reading materials and writing an essay.
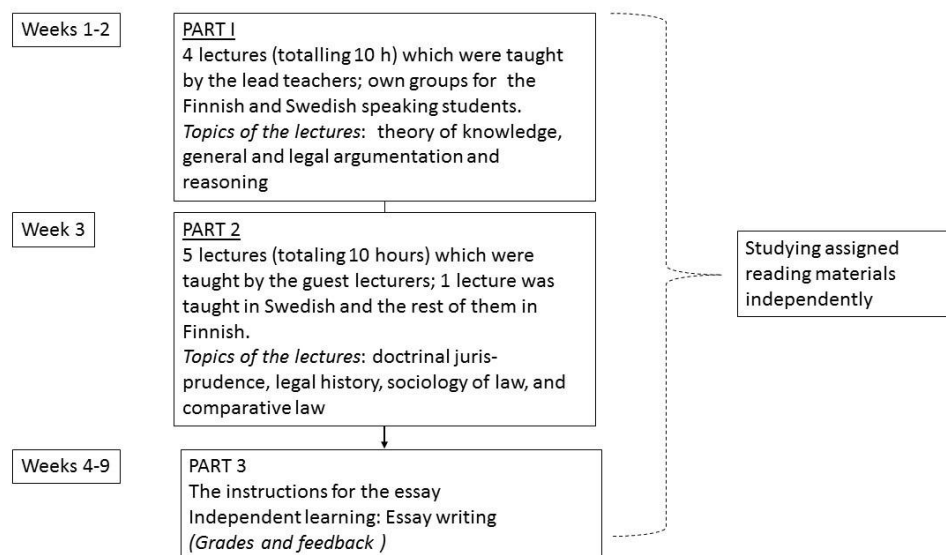
Figure 12 - The structure of the lecture-based course in methodologies in law

According to the interviews with the main teachers, the main activities of this method course comprised lectures, studying assigned reading materials, and essay writing. Figure 13 gives an overview of these planned activities and how much time of the 81 hour (workload for a 3 ECTS course) was allocated for each activity from the students' perspective. A quarter of the workload was planned for teacher-led activities (i.e. lectures). However, most of the course's workload was assigned to students' independent learning (such as studying assigned reading materials and essay writing). Based on the teacher interviews and the observation data, the course was implemented for the most part as it was planned.
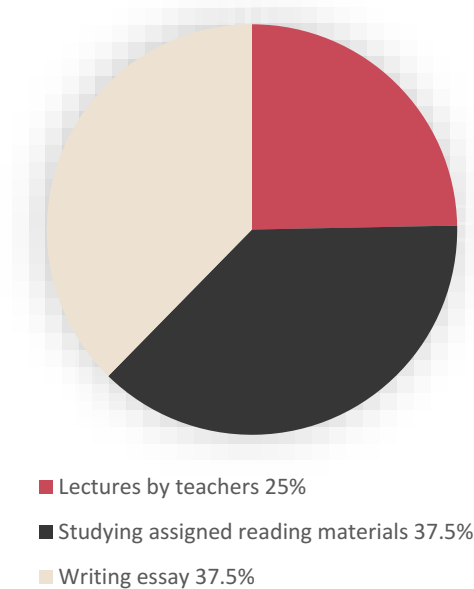
Figure 13 - An overview of the planned main activities (legal education)

Next, we describe in more detail the characteristics of the main activities of the course, and how these activities were experienced from the students' side.

9.4.2 Lectures

Observation data and teacher interview data showed that the course included two main kinds of lectures: first, traditional content-driven lectures, and second, slightly more practical lectures with invited guests, who represented different traditions of legal methodologies (see Figure 12). All lectures were planned to relate thematically to each other. The lectures were held frontally and they took place in a large lecture hall (see Illustration 7). All lectures aimed to give an introduction to different principles of legal methodologies and conducting legal research, aimed at providing background information to the essay writing and independent learning. The content of the lectures mostly comprised factual and theoretical knowledge relating to the topic, but also examples of the teachers' own research and class exercises/problems were provided. Guest lecturers also addressed practical issues relating to the topic. All teachers also tried to engage students in the lectures by encouraging them to ask questions. Other student-activating methods, such as group discussions, were used during one lecture. In addition, in the end of the first four lectures, students in the Finnish speaking group were asked to write take-home messages (i.e. briefly summarise the key findings of lecture). The lead teacher who was responsible for these four lectures provided feedback for students based on their take-home messages. The feedback was posted on the Moodle platform. The same teacher also delivered the feedback in the beginning of the second, third, and fourth lecture. No further activating methods were used. PowerPoint was extensively used in the lectures.

Illustration 7 - All lectures took place in a large lecture hall

The number of students attending the lectures varied from approximately 140–230. According to observation data, the students used their laptops actively during lectures and took notes. Based on the pre-interviews, the lead teachers highlighted the active role of students:

> *'students have a big role because we try to help them with the completion of their thesis. Students are often afraid to do their thesis, they know it's hard and involved with pressure. So, like I [as a teacher] try to help them through this course. I somehow wish they'd understand that they have to take more responsibility themselves. Students have quite an active role here. They have quite a heavy workload and an active job with learning from this now. They need to put a little effort in. So, I think this is a course where which requires skills rather than knowledge. It requires them to practice and do things. So yes, students have a big role in the course' (Teacher 1).*

According to the student interview data, the students shared the idea that implicit teaching has been the primary way to teach legal methodology and reasoning. Thus, the students emphasised that it is important that teaching practices, and especially how legal methodologies are taught, are developed. However, the timing of the course was not perfect from the students' perspective. The students wished that the knowledge content of the lectures, especially argumentation, should be taught at the beginning of the bachelor's level studies, not as a part of master's level studies, as one student expressed: '*It was nice to know all of that logical thinking, that was good, it was very alright. However, it would be more useful to do this course already before the first [bachelor's thesis] seminar*'. In a similar vein, the other student said:

> *'The teaching practices should develop in our faculty so that at the beginning students should have all of that stuff on argumentation and not just memorisation [of facts] and, at some point, there has to be that change, because at the master's level we should be able to see things in a larger scale and more critically. But maybe legal professionals lack in critical reading abilities, so that they take things literally from the textbooks, it is the authority and the legal source. So, it's how it says in textbooks.'*

The student interview and feedback data suggest that the students had mixed experiences with the lectures. Some students reported that they learnt during the course new knowledge about legal methodologies and general principles of how to conduct legal research. However, the others highlighted that the knowledge content of the first part of lectures remain too abstract, whereas the lectures of the second part just gave a short induction into the different legal methods. Thus, they felt that they did not learn how to utilise the knowledge content of this course in practice, i.e. in their thesis writing. One student described his expectations about the course in the following way:

> *'I was expecting that we would have gone through methods used in various research far more deeply, and now doctrinal jurisprudence was emphasised a lot, which I know already as I've completed my seminars earlier for my bachelor's thesis. I had to write a bachelor's thesis in which I used that method, but I have no idea what it meant. So, now [after this course] I know a little better what doctrinal jurisprudence refers to but I have only little knowledge on the other legal methods.'*

Some students also described the content of the lectures as difficult and, to some extent, opaque. Some students also reported that the knowledge content of the course repeated previously-taught issues. Students also reported that the relevance of the class exercises/problems, which were designed to get them to enhance their skills in judicial argumentation through group discussion, remained unclear for the students.

According to students' written feedback and the interview data, not all students understand the structure of the lectures, and some students highlighted that the lectures did not form a coherent whole, as the following quotation describes:

> *'I was also a bit lost on what the purpose of the different parts was. Quite often it's been useful if a visiting lecturer interested in the matter has explained some things. But quite often during this course I missed the common thread on what the purpose was. I think that in this course more or less everyone [lecturers] caved in and used juridical knowledge and a lot of fancy words like 'hermeneutics' and so on. Thus, it stayed on a general level, although it was not enough. When you think of the coherence of the whole course, it would have been better if we'd have had one lecturer who had at least some knowledge of all of the lecture topics and saw the course as a whole so that you don't always have to start from the zero when teaching.'*

At the end of the first four lectures, students were asked to write take-home messages, that is, the most important piece of information they learnt during the lecture. One of the lead teachers provided feedback on these messages. The students were positively surprised that they received feedback as a part of lecture-based teaching. In general, receiving feedback from teachers is very uncommon, as the following quotation from the student interview data shows: '*maybe like the only feedback I've received during my studies has been like from a bachelor's seminar or from some optional courses where we've done like group presentations and other group work*'.

9.4.3 Studying assigned reading materials

The syllabus and further information on assigned reading materials were available in the Moodle platform for the students' preparation for lectures and for deepening their understanding of the topics. The assigned reading materials consisted of two textbooks and five legal methodology articles. According to students' written feedback and interview data, they used very different approaches to working on their individual assignments. For example, students differed in the amount of time spent on the assignments (including studying assigned learning materials and essay writing) and the different resources they used. Although the lead teachers had carefully organised the Moodle platform and learning materials to follow the general structure of the course (i.e. the different resources and reading materials concerning the topic of each lecture were presented in separate sections), the students had mixed experiences with this issue. Some students were highly satisfied with the content of the resources provided in the Moodle, while others experienced the structure of platform as confused, and they had difficulties in finding relevant information from it. As one student explained: 'Usually we have these lecture slides which are given to us on paper, they are shared by email or then just on the Moodle, so there is just one pdf document which is used throughout the lecture. But now Moodle included "20,000" different small pdf files [spread over different sections] and I think everyone's been a little confused with it.' The students also highlighted in their written feedback that parts of the reading material, such as legal methodology articles, were too challenging for them, although the contents of articles were discussed during the lectures.

9.4.4 Essay writing

One week after the last lecture, the students received the instructions for the essay. In the preinterview the lead teachers provided the following rationale for the timing:

> *'The reason why we give the essay instructions at the end is that if we'd give them at the beginning they'd start doing them straight away and forget to focus on the lectures. We still give them quite a lot of time for it after the teaching ends. This is one of the things we try to change here, before they've done essays like this without getting any teaching for it. So, now first, they get teaching on what to write in the essay and then they do the essays. We want better essays and it's about improved practice for their thesis, rather than when afterwards realising that "ahaa, I've done everything wrong" so they should understand little beforehand.'*

According to instructions provided by the lead teachers, the students' task was to write a 5–6 page (7800–9360 words) long essay using the knowledge content (including assigned reading materials, reminders and feedback posted on the Moodle, lecture slides, and student's own notes) provided during the course. In their essays, the students answered one of the following questions:

1. Doctrinal jurisprudence is called the legal scholar's own method. What is it as a methodology, what kind of results can it produce and what problems are involved with it? On what grounds can the quality of this kind of research be assessed?

2. Argumentative analysis: explain and assess the court's rationale on conclusions N.N. answer Finland[9].

The lead teachers noted in the instructions that the essay needed to be critical and analytical. The assessment focused on mastery of the taught perspectives. Students were informed that mistakes on information were less serious than the lack of arguments. The students were also informed that the essay cannot be just a list of facts, instead the purpose was for the student to exhibit his/her learning by processing the different perspectives by him/herself. Their own contribution needed to be exhibited by a critical literature review (i.e. reviewing, combining and comparing different knowledge resources). This entailed the classification of different knowledge sources in terms of topics, understanding problems, defining these problems and combining the content with these problems.

In the 2nd essay topic choice, the term 'argumentation analysis' referred to the validity and accuracy of an argument. The lead teachers highlighted in the instructions for essays that it was essential to evaluate the argument. Students needed to take into consideration whether opposite arguments could be made with the same or different presumptions. The materials and resources did not have to be analysed in a vacuum: the teachers expressed that while conducting research it is normal to seek other cases as well as commentary literature, and use these as additional sources.

Data from our observations and interviews showed that the lead teachers assessed the essays and provided general feedback for the students. The students were provided with the assessment criteria at the same time as they received the course grades. The course grade was based on the essay. The grading scale of the course followed the six-level grading scale from 0 to 5. The assessment focused on the following aspects:

- Knowledge content: how the comprehension of lectures, course material, relevant methods, argumentation and research techniques were considered.
- The texts' structure and format: did the essay form a complete picture, was academic language used, how had the student managed to write paraphrases (vs. copied original text) and to combine independent thinking as well as resources.
- The versatile and appropriate use of resources in the essay, how they were referred to.
- The level of argumentation: critical examination of justified conclusions.

Some students reported in the interview and the written feedback that they found it problematic that they received the essay instructions after all the lectures were given. In a similar way, some students found it problematic that they received assessment criteria at the same time as they were provided with the course grades. These students expected to get more detailed information about evaluation criteria before their started to write their essays: '*If the purpose of this course was to produce essays which indicates my competence then I would have liked to have known the assessment criteria beforehand*'. Based on the student interview and observation data, students' overall engagement was dependent on the workload caused by their other parallel courses and duties. Some students admitted that they did not follow the activity flow

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[9] http://hudoc.echr.coe.int/eng?i=001-145768

intended in the course structure, but instead postponed work on the individual assignments until the last week before the final deadline.

Students used a different variety of knowledge resources (mainly provided via the Moodle platform) when working on their essays. While some students used information from the textbooks and the presentation slides from the lectures, other students also used additional literature in their essay, such as scientific journal articles and other textbooks. Furthermore, some students used additional ICT tools that were not required by the teacher, such as GoogleDocs, they were familiar with from before.

9.5 Opportunities and challenges related to the pedagogical approaches and activities

This case report provides an illustrative example of design legal methodology course for a large group of students, and how a lecture-based course can demonstrate understanding of legal methodology. This section provides an overview of the opportunities and challenges identified during the course.

9.5.1 Opportunities for learning legal methodology

The course was designed and offered as a response to previous critique about the implicit way of teaching legal methodology. At the same time, such methodology is seen as a core competency for legal professionals (Bager-Elsborg, 2017). The course also aimed to provide students with necessary skills and knowledge to work as legal professional or researcher. Thus, one interesting question is how these different aspects of legal methodology were made explicit and available for students during this course.

From the teachers' side, the course was designed to move from general issues regarding notions of the development of knowledge in the legal domain towards more concrete methodological issues. However, this case report indicates that the students have trouble in understanding the meaning of the concept of methodology and what counts as a part of legal methodologies. It seems that the purpose of the different lecture content as well as its relevance remained, at some point, unclear for the majority of students. This may be related to the teachers' way of communicating the purpose of the topics. However, it may also relate to a lack of clarity in what kind of methods the course entailed. The knowledge content of the course could be divided roughly into two parts; the first part focused on procedural knowledge about legal problem solving, whereas the second part related to research methods (more or less) in the social science tradition. The first part is not necessary unrelated to research at all. This may cause confusion for students as what types of methods they need to know during their master's studies as well as when they work as legal professionals. On the other hand, the reasons for students' mixed experiences with the content of the course may also relate to the character of the discipline of law itself. As noted before, in the legal literature, there has been considerable debate whether law is a science or not, i.e. the logic of knowledge advancement in this field differ from many other areas of research (Hirvonen, 2011).

9.5.2 Alignment of course elements

The course was structured in a way that the content-driven lectures came first and the essay writing started after all the lectures were given. One could understand the rationale of providing students with the information necessary for working on the essay questions before they start. However, at the same time, the opportunity for integrating what was provided in the lectures in students' ongoing work became limited, and it might have been easier for the students to understand the relevance of the lecture topics had they known from the start what their essay writing would be about. In addition, the course structure allowed students to postpone working on their individual assignments until the last weeks before the final essay deadline.

As the lead teachers emphasised in the interviews, the existence of content-driven lectures is not sufficient in itself to enhance students' understanding and skills to conduct research. However, based on observation and student interview data, it seems that not all students understood (or it may also have happened that some students intentionally ignored) that the course involved active and intensive independent learning for them. On the one hand, this may be related to the teachers' way of communicating the intended learning outcomes of the course. On the other hand, it may relate to the fact that all students did not necessary have the skills and knowledge to study a complex issue of legal methodology independently. Furthermore, based on the student interviews, their written feedback and observation data, the different activities of the course (i.e. lectures and essays writing) did not support each other from students' perspective. As an example, the students felt that different teachers who provided lectures did not share an overall understanding of the course aims and activities.

Based on this case report, it can be asked whether courses in which the students can do practical work on the use of methods are a more effective way to learn and teach methods. At least, the opportunities to receive more formative feedback during the whole course, not only as a part of lectures, are needed. Pedagogical research has shown that students also benefit from the use of various pedagogical practices which support their active learning, such as small group discussion during lectures, clickers, and different interactive tools (see e.g. Lonka & Ketonen, 2012; Mayer, 2011). Furthermore, it seems like students would prefer to learn legal reasoning and methods for legal work earlier in the programme. In addition, the lead teachers expressed that the research methods should be seen as a preparation for their future thesis work. As such, one can ask whether the best way of organising explicit teaching of legal methodology is to organise these topics in one course, or whether the topics of legal methodology should be integrated throughout the programme in a more explicit way, i.e. different issues regarding legal methodologies need to be addressed in several courses across the curriculum, not only in a specialised course offered as a part master's-level studies.

9.6 Conclusions and recommendations

In conclusion, this case provides insights into the use of large class lectures and essay writing in a course in legal methodologies. The first part of the lectures focused on the general issues regarding notions of the development of knowledge in the legal domain and aimed to enhance students' skills in judicial argument. Then, the second part of lectures mainly concentrated on

the research methods in the social science tradition. Finally, the third part of the course was essay writing. The assessment of essays focused on mastery of the taught perspectives. Although these different parts of the course were designed to relate each other, it seems that, from the students' perspective, the different elements of the course remained incoherent.

Based on this case the following recommendations can be provided:

- Make more explicit, for the teachers and students involved, what types of methodologies the course entails and possibly how methods for legal work and research relate to each other
- Communicate at an earlier stage to students what the essay writing and assessment criteria will focus on. It is also important that students are fully informed that the course requires them to work independently both in lectures and in essay writing. This would help students to orient themselves to the expectations
- Consider whether the students' active work and essay writing can be integrated better with the lectures
- Ensure that students achieve the intended learning outcomes; formative feedback during the whole course is needed
- Ensure that the different teachers who provide lectures share an overall understanding of the course aims and activities
- Clarifying the way students' intended learning in the course relates to other courses and to their longer learning trajectory throughout the programme as well as later in working life. This would help students to better understand the relevance of the course

10 Quality of educational practices: Lessons learned and recommendations for the future

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In this chapter, we will return to the perspectives on educational quality presented in the Introduction chapter to this report and relate these to the course characteristics and challenges identified in the eight case studies. The overall aim is to highlight what we can learn from the cases about issues that matter for the quality of educational practices in higher education. Teachers, course leaders, programme leaders and students in higher education are the key target groups for the report, as recommendations will be provided for the development of course and programme designs. However, the identified challenges and recommendations are also useful for actors and stakeholders involved in creating framework conditions for teaching and learning, as well as for monitoring the quality of such practices. As described in chapter 1, the cases were selected to provide insights into the use of different pedagogical approaches within various types of programmes and knowledge domains. This was motivated by a review of research presented in a previous report by the QNHE project (Damsa et al., 2015), which summarised what we know about the learning potentials of different pedagogical approaches and illustrated the need for in-depth studies of how they are employed in different disciplinary and study programme contexts, as well as the challenges teachers and students face in this regard. We selected eight higher education courses, including six from Norway and two from Finland, as cases. The courses were distributed across the bachelor (BA) and master (MA) levels. They included a set of approaches that engaged students in knowledge exploration and collaborative knowledge construction, but also more traditional activities, such as lectures and seminars. They also included several forms of technology use. Together, the cases cover the use of case-based, project-based and problem-based learning; simulation pedagogies with and without technology use; field work; portfolio work; and online activities. All courses used several approaches, and they often combined different forms of inquiry or work-related activities with lectures and teacher-led instruction. An overview of the cases and the chapters in which they are described is provided in Table 18. The first six case studies, which were conducted in Norway, are presented in chapters 2 to 7, while chapters 8 and 9 describe the case studies conducted in Finland.

Table 18 - Overview of the courses and pedagogical approaches covered in the eight case studies

Chapter	Course and programme context	Level	Key pedagogical approaches
2	Program development course in a Computer Engineering programme	BA	*Project-based learning*
3	Ecology course in a Biology programme	BA/MA	*Portfolio-based course comprising different assignments*
4	Personnel management in an Organisation and Management programme	BA	*Case-based learning and role play simulations*
5	Supervised practice in a Nursing programme	BA	*Technology-based simulation*
6	Criminal law course in a Law programme	MA	*Moot courts, collaborations with the professional field*
7	Economic management and financial analysis in an experience-based MBA programme	MA	*Online teaching and learning, combined with campus activities*
8	Field course in ecology research in a Biological and Environmental Sciences programme	BA	*Problem-based learning in collaborative research projects*
9	Research methods course in a Law programme	MA	*Lectures and essay writing*

When considering the case studies as a whole, we can observe several similarities and common challenges. First, it is striking that most of the courses used rather complex course designs, comprising a range of activities that needed to interplay in productive ways for the envisioned teaching and learning activities to be realised. Furthermore, the course designs required extensive student engagement and active participation. In most cases, the activities needed to be adjusted during the course period, either to adapt to students' (sometimes unexpected) forms of engagement or to simplify the range of course elements to make the designs more feasible. This observation confirms the well-known fact that educational practices rarely manifest exactly as planned. Unexpected things happen along the way, and the need to adjust is more the rule than the exception. We also noticed an interesting variation in the students' engagement and experiences. Such variation was visible in a range of contexts, from the proportion of students attending organised teaching to the patterns of engagement in group processes and the various experiences students reported from the same activities. This finding reflects not only how student engagement and experiences vary in general, but also the increased diversity of today's student body of higher education. It also draws attention to the challenges of supporting learners with varied needs, as well as the importance of securing a shared understanding of course design and its activities among teacher(s) and students.

In the sections that follow, we will unpack these issues with examples from the case studies and discuss how the cases can inform our understanding of quality in educational practices. We take as a point of departure our initial perspective on the quality of educational practices,

which was described in chapter 1.2 in this report and which guided the empirical studies. The discussion is organised into six themes, which relate to the perspectives presented in chapter 1, but which, at the same time, lend specificity to identified opportunities and challenges in the use of student-centred pedagogical approaches. The themes we discuss are: a) ways of supporting students' exploration and construction of knowledge; b) ways of introducing students to 'real-world' problems in educational settings; c) challenges related to supporting learning in a diverse student population; d) forms of coherence and alignment among course elements; e) teacher collaboration, team work and the division of responsibilities; and f) productive technology use. We end by summarising a set of recommendations for further work with pedagogical approaches that engage students in knowledge exploration in course designs and study programmes and by suggesting needs for further research.

10.1 Supporting students' exploration and construction of knowledge

Both policies and research on higher education focus heavily on engaging students in processes of knowledge construction and preparing them for future work situations characterised by open-ended problems, shifting contexts of collaboration and new demands to expertise. The emphasis on so-called 'student-centred' approaches to teaching and course designs should be understood against this background. It implies that attention should be given to the ways in which tasks and activities are designed to nurture students' active exploration and construction of knowledge, as well as the learning opportunities such engagements entail (Land, Hannafin and Oliver, 2012; see also Chapter 1 in this report). Activities often include forms of inquiry-based learning (IBL), which emphasise students' investigative work with knowledge (Aditomo, Goodyear, Bliuc and Ellis, 2013). Such investigations, however, can take different forms. Activities could engage students in exploring existing knowledge, solving complex problems or generating knowledge products through inquiry processes. The types of activities often vary with the knowledge domain, as they reflect specific ways of 'doing knowledge' within each discipline (Aditomo et al., 2013; Damsa and Nerland, 2016).

The courses presented in this report took different approaches to engage students in inquiry activities. Some courses are largely organised around students' construction processes. This was the case for the engineering course presented in chapter 2, in which students' project work formed a main activity structure throughout the course, and the biology course presented in chapter 8, in which student groups worked together on a research project organised as problem-based learning. Other courses included smaller explorative activities in their course structures. This was the case in the use of role play in chapter 4 and the moot court exercises in chapter 6. In the portfolio-based course (chapter 3), several inquiry tasks were organised to build on one another in the students' learning processes.

Common to the inquiry activities in the selected courses was that they were typically organised as group processes. This means that they entailed collaborative learning and collaborative knowledge construction. While such processes have been found to be conducive for learning when students manage to work well together, they are also demanding in the sense that they require students to monitor and handle both the epistemic and the social aspects of

the collaborative process (Damsa, 2014). For instance, students are challenged to plan their joint construction process and keep their development of knowledge products on track, while simultaneously sorting out ways to work together and handle disagreements among group members. These aspects of collaborative work also need to be learned and require pedagogical support from teachers and/or the wider instructional environment. The case studies presented in the previous chapters illustrate different strategies and challenges related to providing support for collaborative knowledge construction, as well as how these strategies and challenges depend on the nature of the collaborative task itself. In cases in which students were to produce concrete products through activities that stretched over time (e.g. in chapters 2 and 8), the pedagogical support could more easily relate to the emergent knowledge construction and assist the students in different phases of the construction process, such as problem framing, exploration and solving. Through these steps, the teachers could demonstrate ways of thinking and doing in the discipline and help to establish common grounds for the student groups from which the social processes could be organised.

At the same time, the way in which this support was organised varied. In the engineering case (chapter 2), there was a clear division of labour between actors and learning contexts, such that lab sessions and coaching sessions were organised regularly and provided different kinds of support. In the Finnish biology course (chapter 8), each student group was assigned a single teacher who followed and supervised their work over time. Here, the sequencing of phases in problem-based learning formed the organising principles for the pedagogical support. In the portfolio-based course (chapter 3), the students were offered continual support, organised as peer review exercises, written feedback provided in the learning management system and voluntary feedback sessions related to the different course assignments. In cases that involved smaller explorative tasks, such as simulation exercises and role plays, the pedagogical support took a less formative character and was provided in the form of task guidelines (such as those described in chapters 4 and 5) and reflective discussions after the task was accomplished (chapters 4 and 6). Whilst these smaller explorative tasks also offer productive learning opportunities, they pose challenges for teachers and students, who must find ways to explicitly connect the activities to the students' overall learning processes within the course.

Seen together, the case studies point to the importance of clarifying the overall learning purposes of different inquiry tasks and explorative activities and considering how different activities can relate to other course activities in productive ways. The analyses indicate that activities that stretch over time and that are sequenced in ways that include greater teacher support across several phases will provide better opportunities for active knowledge construction and for making ways of 'doing knowledge' in the discipline explicit to the students. Moreover, activities that involve the construction of products (i.e. students creating or making something that is materialised) offer opportunities to explicate the learning process and monitor achievements for students and teachers alike. Hence, we suggest that more discussion-based tasks should encourage the materialisation of discussion outcomes so that the learning process becomes visible, interim achievements can be further explored and developed and the social organisation of collaborative processes can be supported.

In sum, the case studies presented in this report support the idea that designing student-centred learning environments is a general route to develop quality in higher education practices, as such environments allow for active knowledge exploration and profound learning experiences when they work well. However, they also demonstrate that putting such learning environments into practice is not straight-forward. The use of inquiry-oriented and knowledge-generating activities is demanding for both teachers and students. Different approaches involve different opportunities and challenges (see the preceding chapters for details) and require the careful organisation of tasks, content and processes by the teacher. Hence, the idea of student-centredness should not be uncritically embraced, and both the roles of the teacher and the student and the character of the knowledge domain need to be acknowledged and explicated in the design of learning environments. Moreover, the very notion of student-centredness requires an unpacking of how *students* are understood. In particular, it matters how we understand this term in relation to the (assumed) student population (and its characteristics) for which a programme or course is offered, the dynamics of the student groups within a course, and the individual students' learning over time. These issues will be further discussed in the following sections.

10.2 'Real-world' problems and the need to decompose practices for learning

Higher education courses and activities are increasingly expected to have greater relevance for work. This has led to a general call to include tasks and activities that resemble 'real' work practices in higher education courses and to provide opportunities for students to experience what skilful participation in these practices entails. Forms of inquiry-based learning are also often used for these purposes, organised around what have been termed 'authentic' tasks and problems (Levy and Petrulis 2012). The case studies reported here used different approaches to realise this objective, including simulation exercises, project work, explorations of real-world problems in the context of problem-based learning or research activities and efforts to integrate students' work experiences into educational activities. Together, the case studies highlight several opportunities and challenges related to how these activities may support student learning.

First, the courses that included simulation exercises illustrate how these exercises provide opportunities for strong experiences of real-life situations that may affect students' sense of self. In both the nursing case (chapter 5) and the organisation and management case (chapter 4), we observed that students began to reflect on their own capabilities and potential for professional work. For the nursing students, the high-fidelity simulation with a manikin patient appeared very realistic, and the students' fright over 'letting the patient die' was emotionally intense. In this activity, the time organisation and the sequencing of events that called for the student nursing team's immediate attention helped to make the task realistic. Related experiences were evident in the moot court exercise in the Norwegian law case (chapter 6), though, in this course, students volunteered to take different roles, meaning that it was possible to take part in the activity from an observer's position rather than playing one of the professional court roles. In the management course role play, the students took different roles

in simulating a personnel recruitment process. Interestingly, the students in this course expressed more anxiety when playing the role of a job applicant, even though the exercise was about recruiting new personnel to a work organisation. This reaction can be understood in relation to the students' current life situation. On average, the students were relatively young, and their most pressing life challenge was to succeed in getting a job. By contrast, visualizing themselves as HR managers seemed distant and unrealistic. These examples illustrate the importance of being aware of what types of practice are practiced in a simulation exercise and clearly communicating the purpose of the activity. Moreover, it seems important to be explicit about the potential value of learning from failure. One of the clear advantages of simulation environments is that it is possible to try out 'real' work activities without taking the risks that failures in working life may imply. Despite this, both our studies and other research have shown that students seem to be afraid of failing in these environments and that teachers also seem to be concerned about avoiding experiences of failure, which they believe could undermine students' trust in their own capabilities (see, for instance, Jensen, Lee, Percy et al., 2016). For students to be comfortable in these situations, therefore, it seems important to plan sufficient time for debriefing activities and reflection exercises that can address their experiences and provide feedback and support that the students can build on in their further learning.

Another way to enhance the relevance of learning activities is to include tasks that allow students to work on real-world problems or take part in professional practices in the educational context. As noted earlier, student-centred learning environments typically include different types of inquiry tasks and knowledge-generating activities. In several courses, such as in the engineering case (chapter 2) and the two biology cases (chapters 3 and 8), we saw that complex inquiry tasks, or sets of inquiry tasks that ran over time, were highly dependent on students' engagement. These activities also included the use of profession-specific tools and resources, such as software and tools developed specifically to support knowledge-generating practices in these domains. Hence, another facet of these activities is that the extent to which an activity resembles practices in working life depends on the students' knowledge levels and skills. More advanced students may more easily develop projects and solutions that incorporate professional standards, while the projects of students who struggle to understand the knowledge domain may be less complex. On one hand, this can be seen as a promise of inquiry-based learning in the sense that the activities can accommodate different student groups and enhance participation at different levels (Northedge, 2003). For instance, students may be introduced to knowledge resources and procedures from the world of work without taking full responsibility for 'real' work processes. On the other hand, students' different opportunities to engage more fully with complex tasks and problems may reinforce the differences in their understanding and skills.

This also brings attention to a third issue: namely, the paradox of how the work on complex problems and tasks can be prepared for and trained in educational contexts. Creating tasks that resemble real work situations in education implies presenting students with realistic problem complexes, which are typically multifaceted and bring several problems to the fore at once. Learning new skills and ways of participating in professional practices may, on the

other hand, require that the practice be decomposed into parts and specific skills or that segments be isolated and addressed one at a time. Ways to balance these concerns for the parts and the whole must be considered when developing and specifying each learning environment, as should opportunities for progression during the activity. Students may also benefit from experiencing the same types of activities across courses in the programme, as, for instance, the engineering students did in terms of project-based work (chapter 2) and the management students did in more permanent collaborative groups (chapter 4). Hence, a quality issue related to real-world problems and practices involves developing progression principles not only for knowledge content, but also for ways of working in the study programmes.

10.3 Supporting learning in a diverse student population

The student body in higher education is often described as increasingly diverse (Gale and Parker, 2014). Although countries and institutions differ in their admissions systems and entrance requirements, the general tendency in the last decades is to enrol more students of increasingly diverse backgrounds in higher education programmes. The two country contexts included in this report represent different systems in this regard[10]. In Finland, university admission is quite restrictive, and only a limited number of students are accepted for university programmes each year after various types of entrance examinations (Hyytinen, Toom, and Postareff, forthcoming/2018; Postareff et al., 2017). Finland also has a clearer demarcation between institutional types in post-secondary education. In Norway, there is a general political agreement that large student cohorts should have access to higher education provided by universities or university colleges. Both types of institutions are required to provide research-based education and to combine academic and profession-oriented responsibilities, and both also offer programmes on the master and even PhD levels. Institutions in both countries also tend to accept many students for admission via a relatively open system, in which the selection of students for further academic career tracks happens during, rather than in advance of, admission. Hence, students in Finnish courses are assumedly more similar than those in Norwegian courses when it comes to educational background and previous knowledge in the domain. Nevertheless, research has shown that there is still considerable variation in Finnish cohorts when it comes to how students engage in courses and experience their learning environment (Parpala, Lindblom-Ylänne, Komulainen et al., 2010). Moreover, such variation is found to vary with discipline, suggesting that the knowledge domain and its related learning challenges matter for how diversity occurs (ibid.).

The case studies presented in this report illustrate different challenges related to supporting learning in diverse groups of students. First, they show the challenges that arise as a consequence of differences in students' pre-existing knowledge. For instance, in chapter 2, there was substantial variation in the students' programming skills and command of programming knowledge. This was, to some extent, prepared for by allowing students to form project groups themselves and thereby aligning their project ambitions and plans. The coaching sessions and forms of support offered in this course also needed to be adjusted during the course to accommodate the various needs of the students. In the Norwegian biology case (chapter 3),

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[10] See also chapter 1 in this report.

for example, the students' range of knowledge and understanding generated different needs for support. In this case, the students came from different programme contexts at the outset, with some coming from the master level and some coming from the bachelor level. The variation was related, in part, to the organisational features of the study programmes. Nevertheless, the variation turned out to be greater than the teacher expected, as students from various disciplinary backgrounds enrolled in the course.

Second, the case studies display variations in students' ways of—and willingness relating to—engaging in various course activities. In the cases in which lectures were a main activity, we noticed that many students did not follow these when they were optional. For instance, in the management case described in chapter 4, about half of the students regularly attended the lectures, and in the engineering case (chapter 2), we noticed a clear decline in attendance during the course as the project work intensified and other activities took priority. Similarly, in the experience-based MBA case (chapter 7), the number of students attending real -time online lectures and seminars was limited; however, in this case, the activities were recorded and could, therefore, be reviewed at a later stage. In the biology case (chapter 3), there was variation in whether and how students made use of the offered opportunities for feedback and supervision. As described in this chapter, such engagement seemed to relate to the students' aspirations for receiving good grades.

Variations in engagement were also present in students' group activities. These variations related to students' prior knowledge and ways of contributing to shared production processes (e.g. in the Finnish biology case in chapter 8), but also to their willingness to be exposed to fellow students and teachers in simulation exercises and role play (chapters 4, 5 and 6). Several cases showed examples of students who resisted taking on the more active role implied by student-centred approaches and who expressed preferences for more teacher-led activities and teacher-based decisions. Inquiry activities and student-active approaches are demanding for students and can involve several dilemmas. For instance, ways of challenging students may conflict with other concerns, such as the concern of keeping all students 'on board' or the desire to create an emotionally safe learning environment (Scager et al., 2016). Hence, finding ways of supporting learning in the student group as a whole while simultaneously catering to more diverse learning experiences may be seen as a subtle balancing act.

Finally, several cases also displayed an interesting variation in students' perceptions of the course activities. These variations concerned experiences of the feedback and teacher support provided in the courses, as well as the perceived purpose and relevance of the activities. In chapter 4 , we noticed student groups varied extensively with respect to how they perceived the feedback provided on group assignments and even whether they experienced having received any feedback at all. Differences in ways of perceiving and working on feedback were also highlighted in the Norwegian biology case (chapter 3), and in both this case and the Finnish law case (chapter 9), we noticed that students differed significantly in their perceptions of the purpose of the activities. In sum, our case studies support previous research showing that students often struggle to understand the feedback they receive and that the ways in which they engage with feedback are critical to their ability to make productive use of this feedback in their learning processes (Winstone, Nash, Parker, and Rowntree, 2017; see also

Esterhazy and Damsa, 2017). Hence, being explicit about the purpose of activities and including opportunities for students to work on feedback and improve their products in the course design are crucial for improving the quality of educational practices.

In sum, our case studies illustrate that there is no 'one size fits all' in higher education practices and that supporting learning among students with diverse backgrounds is an ongoing challenge. The emphasis on student-centred approaches does not solve this challenge; on the contrary, it may be said to intensify challenges by increasing requirements for and dependency on student engagement. These pedagogical approaches require social, emotional and epistemic investments, and the best ways of supporting individual students may collide with the overall prerequisites of the group. At the same time, teacher-led and content-focused activities are not solutions, either. What is needed is guided and teacher-supported engagement in the knowledge domain, which is organised in line with the specific knowledge content and practices being worked on in the course and the learning challenges the students face. As argued by Northedge (2003, p. 17), "neither traditional 'knowledge delivery' models of teaching, nor a purely 'student-centred' approach, adequately addresses the challenges of student diversity." Previous research has also shown that students do not see these pedagogical approaches as contradictory, but, rather, understand more content-focused, teacher-led activities and learning-focused, student-driven activities as reinforcing each other in high-quality education (Elen et al., 2007). More careful consideration should, therefore, be devoted to how these modes of teaching interplay in productive ways in specific course settings, with attention given to the types of diversity that characterise each student group.

10.4 Forms of coherence and alignment across course elements

The eight case studies presented in this report display how course elements have been organised or structured in different ways within different contextual settings. We have seen how different disciplinary fields, variations in emphasis on practical activities and focuses on the development of professionalism and the variety of types of students seem to impact the curriculum logics at play. The case studies highlight some overarching similarities across cases, such as how most students report having a clear idea about the defined learning outcomes, the structure and the learning activities of the courses studied. This resonates well with how the students' teachers seem to be highly focused and engaged in questions about course design. The case studies display practices of planning and teaching that can be characterised as oriented towards facilitating and supporting student learning through the conscious organisation of course elements. In the data material, we also see how difficulties related to course elements centre mostly on assessment and feedback and the alignment between teaching and learning activities, formative assessment and feedback and final exams. Another issue highlighted by the case studies is how to organise course elements to bridge theory and conceptual knowledge with practical examples and experiences to strengthen knowledge integration.

As described in the first chapter of this report, there are some leading ideas about how elements of teaching and learning activities and assessment should be combined to achieve high-quality higher education. These ideas promote alignment of elements in education (e.g. course plan, course design), teaching and learning activities and the choice of formative and

summative assessment (Biggs and Tang, 2011). On the surface, aligning education planning, teaching and learning and assessment may seem like an obvious and straightforward thing to do. However, the presented cases provide a range of illustrations concerning the complexity of aligning course elements. The eight case study courses are characterised by high degrees of complexity involving a broad range of course elements and teaching and learning activities that often overlap or are intended to work simultaneously to support teaching and learning in multiple ways. As such, the cases illustrate how the multitude of elements introduced to achieve quality teaching and learning in different ways can be combined and aligned in productive ways; however, they also show how the introduction of too many elements can lead to competition among elements within a course and with elements in parallel courses that students attend.

Within the studied courses, we have observed how competing course elements can challenge ambitions for alignment among course elements, such as teaching and learning activities and formative assessment and feedback processes (see, for example, the cases addressing portfolio-based work and project-based learning in chapters 2 and 3). Within courses involving coherent elements that follow a disciplinary structure (e.g. in teaching about central terminology or conceptual knowledge), we find that elements might collide or even become blurred and unclear for the involved students when combined with course elements that are more contextually coherent and oriented (Muller, 2009). This can be seen when teachers introduce more real-life and authentic activities for professional development, in which students are expected to show independence in assessment situations or integrate theoretical and conceptual knowledge in practical situations. This well-known dilemma illustrates how well-developed course elements can become internal barriers to important knowledge integration processes if their purposes, interconnectedness and expectations are weakly communicated (see, for example, chapters 4, 5 and 6 on case-based learning, simulation exercises and moot court exercises).

Further, the explicit roles and functions of formative and summative assessment seem to be particular issues throughout the eight case studies. Assessment is, in general, a powerful course element, whether utilised as an instructional element (i.e. as formative assessment) or as a summative assessment (i.e. at the end of the course). A main finding concerning formative assessment is that this form of assessment is often offered in a voluntary manner and that a substantial number of students do not take advantage of this opportunity in their courses. In several of the case studies, this was an experienced problem, as these feedback situations provided students with strong learning opportunities in dialogic settings with both fellow students and teachers and also allowed for different forms of knowledge to become integrated and 'actionable' in the students' further work (Markauskaite and Goodyear, 2016). On one hand, the students appreciated this flexibility, particularly when they were also juggling family and work responsibilities. Thus, the lack of participation may reflect the diversity of the student body in Norwegian higher education, which comprises students in very different life phases and with different abilities and interests in attending all available teaching and learning activities. This finding raises questions about the volume of teaching offered and how flexible course designs can and should be. On the other hand, it also challenges ideas about designing courses with very stringent and tight alignment among course elements, as illustrated

by students not taking advantage of voluntary but important instructional elements. The recommendation to preserve opportunities to make adjustments in course design, as reported, for example, in chapter 2 on project-based learning, seem to be highly important for meeting students' requirements and ensuring a reasonable workload for teachers. Further, the studies of case-based learning in chapter 4 and the moot court exercises in chapter 6, in which teachers redesigned courses, exemplify the need to keep an open approach to allow for experimentation and revisions during the course. Aiming for alignment among course elements, as we have seen with the cases studied here, resonates well with contemporary theories on curriculum planning and course design for quality teaching and learning. Nevertheless, our study also provides examples of the complexity among the elements of the eight in-depth studies, not only in the various course elements of planning, teaching and learning activities; formative assessments and feedback; and final exams, but also in how overlapping, parallel and interwoven activities and conceptual and contextual knowledge can work coherently or incoherently (i.e. to create situations of misalignment).

It is a challenge to make solid inferences about what can be learned from such a varied selection of cases; however, there are a few issues that were observed across all of the case studies. In general, it seems important to be highly attentive to the complexity of course elements and the chosen teaching and learning activities and assessments in course planning and course enactment. The alignment between course elements and activities is not limited to a linear progression of course events over time, but also entails an alignment between teaching and assessment at different stages and different levels as both the horizontal and the vertical dimensions of each course interact. We have observed the integration of a great number of varied activities that are in line with contemporary ideas about quality teaching; however, integrating too many activities into a single course might create unintended effects that could weaken, rather than support, the course quality. In consequence, it seems crucial for teachers who are planning and designing courses to critically question the number of elements and activities in each single course. This dimension should also preferably be considered at the programme level, as students typically attend several parallel courses. Another aspect observed illustrates the importance of being explicit to students and fellow teachers about the underlying curriculum logic, the purposes of course elements and the interconnectedness among elements, activities and content. Being explicit about these aspects in communication with students can help them understand the meaning and purpose of different activities and support their prioritisation of different elements including voluntary activities. Communicating the curriculum logic more explicitly can also help teachers to see their course outlines more clearly. Another issue related to communicating with students that can significantly support their own work with the course is being repeatedly explicit about the purpose and reason for each choice of formative and summative assessment, the expectations following each assignment and the accompanying assessments. The aspects highlighted here can seem overwhelming, but they are primarily related to the work of planning and designing courses and clearly communicating the curriculum logic to students to enable students to share their teachers' understanding of the overall course design. In the end, the planned course provides only some degree of direction and predictability for teachers and students. Our cases clearly show the importance of making adjustments when necessary to balance the

complexity of elements, activities and content across student and teacher workloads. An open and explicit approach to course alignment might invite students and fellow teachers into a meta-discussion about course elements and activities that can contribute to quality teaching at the course level.

10.5 Teacher collaboration, team work and the division of responsibilities

With the introduction of more student-centred teaching and learning in higher education, several requirements emerge (Damsa et al., 2015). In the foregoing, these requirements have been highlighted in terms of how course elements and activities should be aligned to support student learning (Biggs and Tang, 2011). However, aligning course elements necessitates not only a defined structure and an explicitly communicated curriculum logic, but also a coherent enactment of the curriculum logic by involved teachers and teacher assistants in instructional practice, seminars, feedback sessions and guiding students working with practical cases (Ashwin et al., 2015; Ramsden, 2003). A central aspect in this regard is how teachers collaborate with fellow teachers within and across courses in the larger programme structure. This aspect includes questions regarding how single courses are related to other courses that they precede, interact with in parallel or build on and that require teachers across single courses within a programme to communicate with one another and with students about how elements are meant to form an educational unity. Courses with varied teaching and learning activities, such as combinations of lectures, project work, seminars and other activities, often involve several teachers and potentially teacher assistants. The involvement of several teachers requires collaboration not only in planning, but also in coordinating teaching, assessment and feedback activities.

The eight case studies exemplify varied approaches to teacher collaboration, team work and the division of responsibilities. For example, in chapter 2, which examined a project-based course, we saw how a combination of lectures, coaching sessions and lab sessions in which peers and teacher assistants played a central role in giving feedback on project work allowed for more tailored guidance when student groups needed extra support. The students highly appreciated the availability of teacher assistants because they could provide support and help with practical project work. In such courses involving several teachers, teacher collaboration is crucial for avoiding breaches of the lead teacher's curriculum logic. Breaches can occur, for example, when ambitions of letting students investigate and explore various solutions are challenged by other teachers in the same course who provide students with ready-made explanations or procedures. Another example of the importance of collaboration and the division of responsibilities among involved teachers can be seen in the portfolio-based course reported in chapter 3. This course was designed around nine different assignments that involved students in a wide range of different learning activities and tasks that covered a range of topics, but that were challenging for the students in terms of how they were related to one another. This variety was paired with a highly complex semester schedule, several

deadlines for handing in drafts and the involvement of different teachers in organising activities. In such cases, students are confronted with an authentic academic experience in which they must manage their own time and relate to various knowledge contents, deadlines, peers and teachers. This way of challenging students could benefit from being supported by information about the connections among various teachers' activities to ensure that the ambition of challenging students with hectic and authentic work life experiences does not overshadow other ambitions for student learning activities, such as students' prioritisation between important but voluntary feedback sessions and other mandatory activities.

The courses we studied varied in the number of involved teachers, ranging from one to several teachers as well as the support of teacher assistants. Few participants in the case studies directly highlighted issues related to the division of responsibilities among involved teachers. Nevertheless, we saw examples of varied teacher roles, such as teachers acting as lecturers, facilitators, operators and supervisors. In the nursing case on human patient simulation (chapter 5), we saw how the same teacher can take on two or more of these roles. In the moot court exercises focused in the Norwegian law case (see chapter 6), external professionals worked in teams with teachers during training sessions, but the division of responsibility among the involved teachers remained undefined or implicit. Similar challenges occurred in the Finnish law case described in chapter 9. Whether this trend was a result of the focus of our study or the questions we asked or whether it indicates a lack of explicitness in these matters is hard to say. Nevertheless, the case studies indicate that the responsible teacher for each course seems to be the sole decision maker when it comes to course design, as well as the initiator and coordinator of the underlying ideas of teaching, the choice of activities and the individual contributions of the involved persons. This observation raises the question of how the ideas of teaching are shared among the involved persons and what happens to the quality of teaching if a course has only one responsible teacher who "owns" the ideas of the course's basic elements. Since the unity among course elements in the enactment of the curriculum logic can be considered to be important for student learning, a lack of teacher collaboration or clarification of the division of responsibility might represent a lost potential in securing course alignment.

By contrast, we observed a variety of ways of distributing responsibilities between teachers and students across cases. For example, most of the courses included activities that encouraged or required students to work collaboratively, as described previously in this chapter. Such activities were, in general, appreciated by the students. As described by one student in the project-based engineering case (see chapter 2), it is better to learn by working with different themes in practice than to hear about the themes second-hand. The use of varied forms of collaboration among students also facilitates arenas for student interaction and dialogue that can be considered high-quality learning situations, as described earlier in this chapter. It also enables teachers to emphasise students' responsibility for their own and their peers' learning processes in activities that require both content knowledge and process knowledge about how to solve an assignment together. Several case studies have shown that this is a challenging and complex activity that often require structures and support from teachers. The studies presented here display a broad variation in how coordinated this activ-

ity might be as an instructional element in a course, from being a fully supported and organised activity with mandatory teacher-defined groups, feedback sessions and requirements for handing in project work (see chapter 2) to being a teacher-facilitated but voluntary arena to meet with fellow students and connect for student-initiated group work (see, for example, the MBA course described in chapter 7). The variations in the teacher-led coordination of student collaboration can be interpreted as different ways of using group work as an instructional element. For instance, group work varied from being considered part of the central instructional environment (see, for instance, the management course described in chapter 4) to more of an activity that students should engage in on their own initiative to support or supplement other instructional elements. In some cases, voluntary approaches seemed to create problems for courses' curriculum logic, as students who could be considered to be in need of stronger support systems and connections with fellow students did not always do this without teacher coordination or mandatory activities (see, for example, chapter 7 on online teaching and learning). In other cases, we saw how students could question the degree of teacher-organised mandatory student collaboration, such as when students questioned the teacher's legitimacy in setting up defined student groups (see chapter 2 on project-based learning).

The division of responsibilities between teacher- and student-led course activities seems to require a careful consideration of degrees of coordination dependent on the anticipated function of the activity within the course. Further and again, being explicit about the activity purposes (e.g. student collaboration) and functions (e.g. as an instructional element or part of the curriculum logic) seem to important. As pointed out in the introduction to this chapter, the cases we studied seemed to be characterised by a complexity of course elements and activities. Regarding the question of teacher collaboration and the division of responsibility, the cases presented seem to illustrate that students struggle when the complexity of course elements rises and that high degrees of complexity require not only teacher collaboration and explicitly communicated divisions of responsibilities among teachers, but also the communication of the purposes and functions of course elements and divisions of responsibilities to students.

10.6 Productive technology use

Greater use of digital technologies for educational purposes has, for some time now, been seen as a means for enhancing the quality of higher education. In the Norwegian policy context, this was highlighted in the 'Quality reform' of 2003, which focused particularly on the opportunities ICT provides for flexibility in access to education and for distributed activities across geographical boundaries. Since then, the use of digital technologies in educational contexts has continued to be an issue of concern. For example, the most recent white paper on quality enhancement in higher education stated that "all students should experience stimulating and varied learning and assessment methods that exploit digital opportunities" (Meld. St. 16, 2016–2017). Digital skills and advanced ICT proficiency are also seen as important generic competencies required for participation in today's society and working life. Research on technology-enhanced teaching and learning is growing rapidly and highlights how technology-rich learning environments differ in their forms and functions and how technological tools

need to be adapted to the knowledge domain and integrated into learning activities in order to be conducive for learning (Damsa et al., 2015; Fossland, 2015; Kirkwood and Price, 2014). Moreover, though they are supportive in several ways, digital technologies do not solve teaching and learning challenges *per se*. Rather, they must be carefully integrated into course designs, and their use must be facilitated by teachers (Henderson, Selwyn and Aston, 2017; Land et al., 2012).

The case studies presented in this report illustrate different forms of technology use and the opportunities and challenges they imply. Two of the courses were selected on basis of their type of technology-based learning environments (i.e. the online activities in the MBA programme described in chapter 7 and the technology-based simulation in nursing described in chapter 5). The other courses also included digital technologies, though of different kinds and to different extents. All courses used learning management systems, such as Fronter or Canvas, for administrative and communicative purposes, including sharing not only course materials and requirements, such as lecture slides, texts, assignments and video lectures, but also teachers' feedback on students' work. Some courses, such as the Norwegian biology course (chapter 3) and the MBA course (chapter 7), also encouraged peer discussions and peer assessment in these environments. However, across the cases, we observed a tendency for students to prefer other and/or supplemental social media and generic technologies for sharing and communicating around their work. For example, many students formed Facebook groups for these purposes, and technologies like Google Docs were used for collaborative writing and work on assignments. Even in the MBA course and the nursing practicum course, students seemed to prefer social media for sharing resources, asking questions and discussing issues related to their learning. Since they were geographically dispersed, the students in these courses also used social media to form and sustain communities of learners during their course period. These findings are in line with other studies that have shown how digital tools are becoming integral to students' way of life (e.g. Henderson et al. 2017), while simultaneously pointing to the obvious, yet important fact that students' use of digital technologies for learning is not equal to that offered by the course or study programme. Moreover, the analyses presented in this report indicate that physical meetings and face-to-face communication are important for establishing social contexts and a sense of belonging among the participants, from which online communication can emerge.

Several case studies illustrated how digital technologies are not only used to support teaching and learning, but also form important parts of a course's knowledge content. Many domains have recently experienced transformations in knowledge and required expertise due to the emergence of new technologies, such as technologies related to computerisation, new statistical methods and other research tools. Hence, learning to use such tools has become, in itself, part of the content and a learning task for developing necessary professional skills. Not surprisingly, this was evident in the computer engineering course described in chapter 2, in which students both were introduced to and used a set of domain-specific programming and project management tools. Knowledge in this domain is closely linked to versatile technologies and standardised procedures, which are often shared online and accompanied by instructions and examples of use. These tools provide students with extended learning spaces and facilitate their access to professional practice (see also Damsa and Nerland, 2016). Similarly,

in the Norwegian ecology course (chapter 3), students were introduced to discipline-specific software for ecological modelling and analysis through video tutorials and lab sessions, and they practiced the use of these tools in their work on assignments. In the Finnish course on ecology research (chapter 8), students used more general devices and statistical tools, such as cameras and SPSS, for gathering and analysing their research data; however, the ways in which these tools were expected to be used for work at the field station and for generating knowledge were domain-specific and required the teacher's guidance.

The case study presented in chapter 7 focused specifically on online activities in the context of an experience-based MBA programme. Whilst the course environment provided students with rich resources for learning and opportunities to draw on their work experiences in the various activities, this case study emphasized the challenges of generating productive dialogues among students in online seminars, encouraging students to attend activities synchronously and ensuring that they prepare sufficiently for joint seminars due to time pressures and commitments in their parallel work situations. Hence, while providing flexible access to education to this group of students within a geographically dispersed area, the online activities described in this study turned out to be more teacher-centred than intended, and the potentials of the technologies were not fully realised. This illustrates how the productive use of technology for teaching and learning depends on a range of other factors in the teaching–learning environment, as well as on students' wider life contexts. It also illustrates the paradox through which flexible learning environments may also hamper opportunities for support in the learning process when activities are optional and resources are used for personal review rather than collaborative exploration.

In sum, the case studies point to the different functions that digital technologies may serve in the educational context, from providing access to resources and increasing flexibility in participation to enhancing communication and dialogue and offering opportunities for critical and inquiry-oriented engagement in a domain's knowledge practices. Technologies may also help to increase the work relevance of educational activities, as shown, for instance, in the simulation exercise in chapter 4 and the use of video lectures and procedural lectures in legal education in chapter 7. This depends, however, on the ways in which technologies are integrated with course content knowledge and task structures, as well on the types of support and guidance provided. Hence, technology use should be seen as integral to overall course design and the accommodation of various groups of learners, and its productive use depends on how it supports and integrates other elements of the course design. This, in turn, requires extended digital competences among teachers, an understanding of the pedagogical principles and opportunities related to different tools and capacities to understand how the overall learning environment works from the students' perspective (Henderson et al., 2017).

10.7 Conclusion

The case studies presented in this report have provided a unique and detailed view into the work of teachers and students in eight courses in Norwegian and Finnish higher education. Yet, the studies are also limited by their design and scale. Our conclusions across the cases

should, therefore, be considered with this in mind (see also chapter 1 in this report). Moreover, this report presents descriptive analyses of the course environments and their respective pedagogical approaches, with an emphasis on how different approaches were enacted and experienced by teachers and students. Thus, the study did not, for example, follow students' learning processes over time. Given these reservations, the presented case studies raise some interesting overarching issues that may be valuable for future work with various pedagogical approaches in higher education.

First, we have seen how all of the studied courses combine several activities and pedagogical approaches. None are fully consistent when it comes to the underlying rationales for teaching, learning and knowledge engagement related to different activities. For instance, a course may include some activities that primarily address students' understanding of given knowledge within restricted frames for interpretation and other activities that encourage students' open-ended exploration and knowledge construction. This variation may be fruitful if the activities support rather than contradict one another, and it may offer space for students' different ways of engaging. At the same time, such variation requires that the teacher(s) pay attention to the rationales involved in the various activities in order to consider how they can interplay and support learning in productive ways. For instance, it may be more productive to plan for variation in the approaches used over time than to incorporate many different activities in a short time span. Such considerations may prevent course designs from becoming overloaded and difficult to realise in practice and contribute to making the relations among course elements more explicit.

Second, the case studies illustrate the importance of designing courses that are well planned but also sufficiently flexible to adapt to students' emergent activities. Several cases showed that the rationale for a design and its various activities should not be taken for granted; in other words, what is carefully planned and understood by the teacher(s) is not necessarily transparent for students and fellow teachers. Hence, this, too, needs to be communicated and made explicit for different actors, with a clear delineation of the division of responsibilities among teachers, students and any other participants (e.g. from working life) in the course and an outline of what is expected from the various actors.

A third insight from the case studies is that pedagogical approaches are not generic, but, rather, a set of pedagogical principles that must be adapted to the characteristics of the knowledge domain and the specific course setting. The forms of knowledge that are important to learn, the ways in which knowledge is structured and developed in the discipline and the types of learning challenges inherent in disciplinary knowledge and practices need to be taken into account when developing courses and programme designs. For instance, good performance in problem solving means different things and involves different criteria in engineering and critical literature studies, and opportunities for students to take part in 'real-world' practices or inquiry processes that resemble research vary across knowledge domains (Nerland and Jensen, 2014; see also Damsa et al., 2015). Across academic fields, however, the specific ways of 'doing knowledge' in the domain and the types of conceptual understanding and skills that this requires form important learning content. Hence, being aware of the core knowledge practices in a given discipline or profession and considering how students can

take part in these is key to developing activities and assessment forms that are conducive to student learning.

Fourth, the cases illustrate challenges in the form of gaps and conflicts that arise between courses and activities in which students are engaged. These may relate to the placement of courses and their knowledge content within an overall programme structure, such as how a given course builds on previous courses and prepares for what to come (e.g. at which stage in the programme students may take advantage of methods courses or whether the activities in a specific course require previous experiences with specific pedagogical approaches). Conflicts may also arise between parallel courses in students' life worlds (e.g. when several courses require simultaneous leaps in work load). Overall, the study underscores the importance of seeing course activities from the students' perspective and of creating progressions in ways of working across courses. This, in turn, requires collaboration across courses and collaborative investment in the planning phase. Teaching and course development can, thus, be understood as ongoing design activities (Goodyear 2015) that span several levels, from the design of specific learning activities, to course planning involving several elements to the alignment of content and activities across courses in a study programme.

In sum, we can conclude that higher education practices, and especially their more student-activating modes, are imbued with a range of dilemmas and challenges that cannot be resolved in one fell swoop, but, rather, require continuous consideration and adjustments to emerging needs. These dilemmas include the balance between mandatory and voluntary activities, tensions between challenging students and keeping everyone on board, choices between more steered and more open-ended explorative processes, and expectations between the need for 'knowing in advance' what a course will offer and leaving space for unexpected learning. In this regard, it is important to keep plans and intended learning outcomes sufficiently open to allow courses to have the necessary flexibility in their enactment, but simultaneously specific enough to direct participants' engagement (see also Havnes and Prøitz, 2016). Moreover, attention should be given to the ways in which courses and activities relate to the overall structure of the study programme and to the characteristics of the knowledge domain. The analyses presented in this report indicate that student-centred approaches are embraced by higher education teachers and provide a range of opportunities for student learning, but also involve challenges that have not been sufficiently accounted for in current policies and guidelines for quality work at the practice level. We will conclude our discussion by presenting some recommendations for the further development of courses and study programmes in higher education and academic research.

10.8 Recommendations for the development of course designs and study programmes

Based on the above discussions, we provide the following general recommendations for study programmes, course leaders and teachers engaged in developing student-centred learning environments at the course and programme levels:

- Critically consider the complexity of the course design; sometimes, 'less is more' when it comes to the range of activities and approaches;
- Use pedagogical approaches and activities that allow students to take part in the key knowledge practices of a given discipline or profession;
- Carefully consider what functions the different elements of a course design (e.g. learning activities, tasks, modes of instruction and assessment forms) are envisioned to provide in students' learning processes, as well as how these elements may support one another;
- Aspire to make clear to both (fellow) teachers and students what the rationale for the course design is when it comes to the purposes of activities, the types of coherence and the lines of progression;
- Be aware of the notions of teaching and learning embedded in different pedagogical approaches (e.g. teacher-led instruction, student-driven inquiries) in order to create productive relations among the various approaches used in course design;
- Keep in mind that ways of working with knowledge also need to be learned. What experiences do the students have with the selected learning activities from their previous courses? In what ways can the study programme organise pathways for learning in which courses' learning activities (and not only their content) build on one another?;
- Acknowledge that course designs and plans need to be realised in collaboration with the students and adapted to their emerging forms of participation. Include ways of bringing students' experiences and needs to the fore as elements of the course design; and
- Experiment with and include technologies for learning and instruction in the course design, but in ways that are in line with the knowledge practices of the domain. Generic technologies must be adapted to the specificities of the knowledge domain and its learning challenges. Careful integration of technologies in students' work with knowledge is key to making these productive and supportive of learning.

10.9 Recommendations for further research

The case studies presented in this report were conducted as a response to the identified lack of research on the everyday practices of teachers and students in Norwegian higher education and as a means to enhance our understanding of issues that matter for the quality of educational practices at the course level. Whilst the case studies offer important insights, they are limited in their number and scale, and more research is needed to continue this effort. We suggest that further research should proceed along the following lines:

- There is a need for in-depth studies of students' learning processes in different domains and programme contexts, both with regard to how students capitalise on resources and activities organised by the programmes/courses and with regard to how they deliberately identify and organise resources for learning that are available in the wider disciplinary or professional communities related to their domains of study. The integrative use of ICT and domain-specific tools is an important aspect of these processes;
- There is a need for research that investigates teachers' work on course and programme designs and generates insights into how they (collaboratively) make decisions and adapt plans in their ongoing quality work;

- There is a need for interdisciplinary research that combines expertise in specific knowledge domains with expertise in the learning sciences and curriculum development. Educational processes are complex and include both more general and more domain-specific principles for knowledge organisation and human development. Future research should, therefore, take greater advantage of the different sub-areas of the educational sciences and combine these in joint research agendas;
- There is a need for research that can grasp the learning trajectories of students through their study programmes and the ways in which these are supported by programme and course designs. This requires longitudinal research that can follow cohorts through their bachelor and/or master programmes and that can also account for the ways in which progression principles are built into these programmes via the ways that courses and activities relate to and build on one another. Emerging opportunities for learning analytics may play an important role here, but such data should be combined with process analyses to enrich our knowledge of the education–learning relationship; and
- There is a need for more research on collaborative work and communication in higher education (e.g. in teacher teams, between teachers and students and across course and programme levels). More student-centered learning environments require new forms of collaboration and divisions of responsibilities among participants, and we have only limited knowledge about how these issues are handled and what they imply for teachers' required competencies. This is also an important issue to research in online and distributed educational environments.

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Appendices

Appendix 1: Themes for interviews with teachers

Teachers' background
- Educational background, incl. pedagogical training
- Time in service

History and development of the course
- Positioning of the course in the programme as a whole
- Changes that have been made recently
- Teachers' role in the development of the course

Characteristics of the student group
- Number of students, composition of the group
- Experiences of students' prior knowledge, interests and engagement

Aims and intentions with the course
- Intended learning outcomes
- Teachers' intentions

Structure of teaching activities
- Description of core knowledge content and teaching activities
- What are teacher's intentions with regard to those activities
- How content and teaching activities in the course are related
- Forms of assessment and feedback included in the course design
- Forms of student-centred teaching
- Technology use

Experience with the course and the study program
- Experience with the teaching activities as they look today
- Ideas/wishes for changes in the future
- Content and activities in relation to developments in the wider discipline/profession
- Core challenges

Influence of wider trends in educational policy

Post-observation interviews focused on the teachers' experiences of the teaching and learning activities and assessment forms, challenges that occurred during the course and how these were resolved, and ideas for changes in the course design.

Appendix 2: Interview themes - student groups

Specific questions were developed for each course, building on observations and the highlighted pedagogical approaches

Course expectations and experiences
- Expectations to the course and how those were met
- Experiences with the course in general
- Relations between this course and other courses/topics in the study program

Learning experiences
- What did you find particularly interesting or useful
- Anticipated relevance for professional life

Teaching/instruction
- Experiences with the types of teaching methods and instruction used in the course
- How these contributed to learning
- What was challenging, what worked well

Learning environment and learning activities
- Types of learning activities used in the course
- If group work was prominent: How did the students organize their work
- Experiences with the activities and assignments
- What was challenging, what worked well

Forms of assessment
- What forms of assessments were used
- How these were experienced
- Any use of peer and self-assessment, experiences thereof

Feedback on work
- Structure, forms and timing
- Engagement with and up-take of feedback, interactions around feedback

Use of technologies: Forms and experiences
- Technologies that relate to the subject matter
- Technologies used for communication and collaboration
- Overall experiences with digital technology in the course

Individual study
- Ways of organizing own work, activities beyond the organized course contexts

Contact with teaching staff and academic/professional community

Overall strengths and challenges of the course

Appendix 3: Observation categories

Observation categories lectures

Time/Duration	Activity/Lecture components and main content topics	Detailed knowledge content	Pedagogical strategies and Communication modes (oral, written, visualizations, bodily representations,...)	Student activity	Forms of feedback	Knowledge resources used or referred to	Type of technologies	Comments, reflection by observer

Lecture date:

Approximative number of students:

Other general information:

Observations categories other types of sessions

Time/Duration	Content/themes of the session	Student activities	Questions/topics raised by students	Type of support/instruction/guidance by teacher/teaching assistant	Forms of feedback	Communication Social-relation aspects Group dynamics	Knowledge resources used or referred to	Type of technologies	Comments, reflections by observer

Seminar/Lab/Tutorial date:

Approximative number of students:

Other general information:

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