



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

The Full Circle of Powerpoint Investigating the use of digital technology in University College teaching

Kjærgard, Thomas

DOI (link to publication from Publisher):
[10.5278/vbn.phd.hum.00058](https://doi.org/10.5278/vbn.phd.hum.00058)

Publication date:
2016

Document Version
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):
Kjærgaard, T. (2016). The Full Circle of Powerpoint Investigating the use of digital technology in University College teaching: – and Deleuze inspired suggestions for development. Aalborg Universitetsforlag. (Ph.d.-serien for Det Humanistiske Fakultet, Aalborg Universitet). DOI: 10.5278/vbn.phd.hum.00058

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- ? Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- ? You may not further distribute the material or use it for any profit-making activity or commercial gain
- ? You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.



THE FULL CIRCLE OF POWERPOINT

**INVESTIGATING THE USE OF DIGITAL TECHNOLOGY
IN UNIVERSITY COLLEGE TEACHING**

-AND DELEUZE INSPIRED SUGGESTIONS FOR DEVELOPMENT

**BY
THOMAS KJÆRGAARD**

DISSERTATION SUBMITTED 2016



AALBORG UNIVERSITY
DENMARK

THE FULL CIRCLE OF POWERPOINT

Investigating the use of digital technology in University College teaching
-And Deleuze inspired suggestions for development

by

Thomas Kjærgaard



AALBORG UNIVERSITY
DENMARK

Dissertation submitted September 9th · 2016

Dissertation submitted: September 9th, 2016

PhD supervisor: Prof. Elsebeth Korsgaard Sorensen
Aalborg University

PhD committee: Professor with Specific Responsibilities Eva Irene Brooks
Aalborg University

Professor Graínne Conole
Dublin City University

Professor Antonio Moreira Teixeira
Universidade Aberta

PhD Series: Faculty of Humanities, Aalborg University

ISSN (online): 2246-123X
ISBN (online): 978-87-7112-793-5

Published by:
Aalborg University Press
Skjernvej 4A, 2nd floor
DK – 9220 Aalborg Ø
Phone: +45 99407140
aauf@forlag.aau.dk
forlag.aau.dk

Cover Photo: Jan Brødslev Olsen

© Copyright: Thomas Kjærgaard

Printed in Denmark by Rosendahls, 2016

Appendixes can be downloaded from www.vinkelvej12.dk/Phdappendix

AUTHOR CV



Thomas Kjærgaard

For the past 15 years, I have been professionally engaged in the intersection between digital technologies and education. First, as a teacher and e-learning application developer for web-based Danish courses in Hobro/Vejle (2001-2004), then as a teacher and ICT-consultant at a high school in Aalborg (2004-2008), and since 2008 I have been a lecturer and ICT-consultant at University College North, Teacher Education.

I am a Master of Arts from Aalborg University (2000), Diploma of Education (2008), and my academic subjects from the university are Danish Literature/Linguistics and English Literature/Linguistics, however writing this thesis reminded me how difficult it is to express complex matter in a foreign language.

My key interests have always been the existential understanding of the interplay between humans and the digital technologies that humans utilise particularly in education, but also in general.

I was recently reminded that this has been an interest of mine for quite some time because I found an old article in the basement that I wrote for an anthology about 'IT in teaching Danish as a second language' entitled 'Organic flex-education' (Pedersen, 2003 p: 175). The article was about being 'close, but distant' in a distance education course because of the direct connection and communication between subject, teacher and student that digital technologies in networks may provide.

In hindsight, that title, 'Close, but distant', epitomises the oxymoron of 'unifying oppositions' that I have been striving to connect for the past 15 years. To use digital technology as a leverage to get closer to people in teaching and learning contexts. And that also epitomises the intentions with this thesis.

RÉSUMÉ IN DANISH

Denne afhandling undersøger brugen af digitale teknologier i professionshøjskole undervisning med særligt fokus brugen af digitale teknologier i lektioner på Læreruddannelsen UCN. Undersøgelsen af brugen af digitale teknologier i lektioner tjener som afsæt for en serie af artikler, hvoraf fire er valgte til at understøtte afhandlingens forskningsspørgsmål. Til sidst samles undersøgelsens og artiklernes konklusioner i et forsøg på at lave en ramme til diskussion af udvikling af brugen af digitale teknologier i undervisningen i professionsuddannelser.

Afhandlingens sigte er at uddybe nedenstående forskningsspørgsmål (oversat fra engelsk):

Hvordan kan undervisere designe 'fortættede' lektioner, der fokuserer på dialog faciliteret af digitale teknologier?

Dertil lægges to understøttende interesseområde:

- Hvordan bruges digital teknologi i en lektion på UCN?
- Hvordan kan brugen af digital teknologi facilitere dialog?

Afhandlingen præsenteres i tre dele. Del 1 introducerer undersøgelsesfeltet og placerer afhandlingen i spændingsfeltet mellem relevante politiske dokumenter, strategidokumenter fra UCN og forskningsfeltets eksisterende viden om undersøgelsesfeltet. Del 1 præsenterer også afhandlingens metodologiske og metodiske fundament.

Brugen af digitale teknologier i en lektion på UCN, Læreruddannelsen i særdeleshed, undersøges udfra en kritisk realistisk tilgang og analysekategorierne i kritisk realisme udnyttes ligeledes til at analysere, hvordan og hvorfor digital teknologier bruges, som de antageligvis gør i en lektion i de undersøgte tilfælde. Del 1 undersøger, hvad 'faglig fortætning' (politisk begreb, der referer til en mulig opnåelse af flere mål i undervisningen på det samme antal lektioner) måtte betyde for brugen af digital teknologi i lektioner.

Afhandlingens anden del præsenterer artiklernes filosofiske fundament og reflektere over de fire valgte artiklers mulige virke som inspiration til videreudvikling af brugen af digital teknologi i lektioner på UCN, med særligt fokus på Læreruddannelsen. Artiklerne præsenterer aktionsforskningseksperimenter med nytænkning af forståelsen af, hvad en lektion kan være og ligeledes af, hvordan velkendt digital teknologi kan medvirke til at få faglig dialog mellem studerende og underviser i centrum af lektionen.

Afhandlingens tredje del introducerer en filosofisk ramme til udvikling af brugen af digital teknologi i lektioner med særligt fokus på fænomenet 'faglig fortætning'. Den filosofiske ramme stiller skarpt på, hvordan mere fysisk samvær mellem underviser og studerende kan muliggøres med anderledes brug af velkendte digitale teknologier, inden for de praktiske og formelle rammer, der gælder for undervisning på Læreruddannelse og til dels også andre uddannelser på UCN.

Afhandlingens anden og tredje del søger at skabe hybrider mellem e-læring og traditionel undervisning, der udnytter velkendte digitale teknologiers affordans til at facilitere øget samvær mellem underviser og studerende med fokus på de studerendes læreprocesser i og omkring lektioner.

Afhandlingen betragter introduktionen af 'studieaktivitetsmodellen' (model til planlægning af studieaktiviteter ud over de studerendes forberedelse og deltagelse i lektionerne) og begrebet 'faglig fortætning' (begge 2013) og nedgangen i antallet af lektioner på Læreruddannelsen (fra 1986-2007) som et formelt skridt i retning af en hybrid undervisnings- og læringsform, der lægger sig mellem e-læring og traditionel undervisning. Udfra denne fortolkning af udviklingen, kunne udfordringen nu se ud til at være at udvikle de pædagogiske designs, der kan imødekomme de formelle skridt.

Det er ikke afhandlingens sigte at problematisere de formelle skridt, politiske dokumenter, Læreruddannelsens lovgrundlag, eller undervisernes 'digitale kompetencer', men i stedet at foreslå hybride kombinationer af allerede kendte pædagogiske principper og digitale teknologier, som måske kan indeholde både, politiske og formelle krav og undervisernes og studerendes personlige præferencer.

Afhandlingen udnytter to filosofiske tilgange, én der peger tilbage og søger forklaringer og én der peger fremad og søger at skabe nye hybrider af kendte fænomener. Den 'tilbageskuende' filosofi er Roy Bhaskars kritisk realisme, som i starten (1975) var kendt som 'transcendental realisme', hvilket tillægges betydningen, at man søger forklaringer for et fænomens fremkomst i de mulige årsager, der har kunne fremkalde fænomenet. Altså som en sagfører, der argumenterer for en sag. Man kender 'forbrydelsen', men ikke omstændighederne, der fik 'forbrydelsen' til at ske.

Den anden filosofiske tilgang er udvalgte koncepter fra Gilles Deleuzes filosofi. Deleuze tager også udgangspunkt i den observerede virkelighed, men i stedet for at undersøge virkelighedens opståen, undersøger Deleuze mulige udviklingsveje fra virkeligheden. Deleuze's filosofi kan betegnes som 'transcendental empirisme', hvilket indikerer, at udvikling søges fra erfaring til tænkning til handling og derfra til nye erfaringer.

Deleuze kan ligeledes betegnes som poststrukturalist, hvilket indikerer, at hans tanker kan være i konflikt med Bhaskars strukturelle opdeling af ontologi. Filosofiernes opgave i afhandlingen er derfor ens slags 'forenende modsætninger'. Den ene (kritisk realisme) skal understøtte Del 1's undersøgelse og den anden (Deleuze) skal understøtte Del 2 og 3's udviklingseksperimenter, som tilsammen sigter mod en forståelse af, hvad der 'er' og hvad der kan 'blive'.

Afhandlingen antyder, at Microsoft PowerPoint er den mest udbredte undervisningsteknologi og at præsentationerne er prægede af overskrifter i punktopstilling. PowerPoints linearitet kan virke styrende for lektionernes pædagogik i en grad, der får nogle af undersøgelsens undervisere til at betvivle om PowerPoint understøtter deres pædagogiske ideal. PowerPoint har et multimodalt potentiale til at udnytte mange modaliteter, hvilket også i nogen

udstrækning er tilfældet på UCN, men i praksis ser det ud til, at tekst i punktopstilling er den fremherskende modalitet.

Selvom der både i forskningslitteraturen om brug af PowerPoint i uddannelse og i datagrundlaget for denne afhandling er vægtige kritikpunkter af brugen af PowerPoint i videregående uddannelse, synes PowerPoint at have et sådant momentum i UCN (og måske i videregående undervisning generelt), at den enkelte underviser ikke umiddelbart kan lave om på denne praksis. Det viser sig nemlig, at mange studerende bruger underviserens PowerPoint under lektionen til at tage notater i og senere til eksamensforberedelse, hvilket betyder at PowerPoint ikke kun er præsentationssoftware, det bliver tilsyneladende til et læremiddel, der bryder undervisningens emner ned i overskrifter, der kan videreføres fra lektionen til eksamen. Disse overskrifter ser ud til at have stor betydning for både studerende og undervisere. Og et oplagt emne til videre undersøgelse ville være, hvorvidt overskrifterne i præsentationerne repræsenterer dybden af de studerendes viden til eksamen, altså om overskrifterne er det enesete, der står tilbage efter undervisningen er afsluttet?

Denne udbredte brug af PowerPoint står i kontrast til afhandlingens anden antydning, der peger på, at dialog i lektionen er eftertraktet hos både studerende og undervisere. Så der kunne tegnes et billede af et pædagogisk paradoks, hvor både undervisere og studerende ønsker mere tid til dialog, mens man samtidig bruger omkring halvdelen af de fleste lektioner (ifølge datagrundlaget) til at præsentere fagligt indhold via PowerPoint. Dette er interessant set i sammenhæng med digital teknologi, fordi netop præsentation via PowerPoint og den indledende diskussion af indholdet ofte kan laves til videoklip og onlinediskussion, hvorved tid til dialog frigives. Datagrundlaget antyder også, at det er i dialogen med underviseren, at mange studerende oplever, at de lærer 'noget'. Disse betragtning danner grundlaget for artiklernes pædagogiske designs (kapitel 7) og for rammen for udvikling (kapitel 8).

Afhandlingens konklusioner fører til antagelsen, at tid til dialog med fordel kan prioriteres i lektionerne. Dette synspunkt kontrasteres af nedgangen i antallet af lektioner på Læreruddannelserne (fra 2700 lektioner i 1986 til 1300 lektioner i 2007) og idéen om at lektionerne kan fagligt 'fortættes'. Det fører til afhandlingens sigte om at gentænke forståelsen af 'fortætning' fra en indholdsmæssig, faglig 'fortætning' til en dialogisk 'fortætning', der sætter fokus på brug af digitale teknologier til øget tid og rum til dialog i og omkring lektionen bl.a. ved at flytte præsentationen af fagligt indhold og de indledende diskussioner til de studerendes forberedelsestid.

Afhandlingens artikelsamling forsøger at udnytte Web 2.0 teknologier til at forskyde undervisningens opbygning fra en hierarkisk og lineær progression til et netværk af muligheder, med den studerende som aktiv beslutningstager.

Artikelsamlingen forsøger ligeledes at arbejde med fællesformulering af et 'delt tredje', som opstår i undervisningen og som bliver undervisningens omdrejningspunkt. Det vil sige, at omdrejningspunktet er ikke underviserens præsentation af fagligt indhold, det er heller ikke den studerendes svar på underviserens spørgsmål, men i stedet en kombination af fagligt indhold og diskussioner fra forberedelsen, der tages op i lektionen og danner udgangspunkt for samtalen i det fysiske undervisningsrum.

RÉSUMÉ IN ENGLISH

This thesis investigates the use of Digital Technologies in University College teaching, with a particular focus the use of Digital Technologies in lessons at Teacher Education at University College North, Denmark.

The initial investigations in the thesis serve as the foundation for a series of articles, four of which have been selected to support the thesis' research questions. Lastly, the findings in the investigation and in the articles are synthesised in an attempt to create a framework for discussing the development of the use of Digital Technologies in lessons at UCN.

The aim of the thesis is to elaborate on the following research questions:

How can lecturers design 'densified' lessons that focus on dialogue facilitated by the use of digital technologies?

This research question leads to two supporting areas of interest:

- How is Digital Technology used in a lesson in University College?
- How can the use of Digital Technology facilitate dialogue?

The thesis is presented in three parts.

The first part (Part 1) introduces the research field and seeks to position the thesis in the field of tension between relevant policy documents, strategy documents from UCN and the research field's existing knowledge about the area of interest. Part 1 also presents the thesis' methodological foundation and the applied methods.

The use of digital technologies in a lesson at UCN, Teacher Education, in particular, is investigated through a Critical Realist approach and the analytical categories introduced in Critical Realism are used to analyse how and why Digital Technologies are used the way they appear to be in lessons.

Part 1 also investigates how the notion of 'academic densification' (a political term that refers to the potential achievement of more learning goals in the same number of lessons) may influence the use of Digital Technology in lessons.

The second part (Part 2) presents the philosophical foundation for the articles, furthermore Part 2 reflects on the four selected articles and the possibilities of discussing further development of the use of Digital Technology in lessons, based on the findings in the articles. The articles present Action Research experiments with a reimagined understanding of what a lesson can be and also, how well-known digital technologies may contribute to the dialogue in the in preparation for the lesson and during the lesson.

The third part of the thesis (Part 3) introduces a philosophical framework for discussing the development of the use of Digital Technology in lessons focusing on the notion of 'academic densification'. The philosophical framework for discussing development focuses on how more

face-to-face time between lecturers and students is made possible with the use of the well-known digital technologies within the practical (curriculum) and formal (Acts) framework that Teacher Education (and other programmes) must follow.

The thesis' second and third parts attempt to create hybrids between e-learning and traditional teaching methods that utilise well-known digital technologies affordances to facilitate increased interaction between lecturer and students, with a focus on the student's learning processes in and around the lessons.

The thesis considers the introduction of the 'study activity model' (model for planning study activities beyond the students' preparation and participation in the lessons) and the concept of 'academic densification' (both 2013) and the decreased number of lessons in Teacher Education (from 1986-2007) as a formal step towards a hybrid of teaching and learning that settles between e-learning and traditional teaching. The urgent challenge seems to be the development of pedagogical designs that meet the formal step in practice.

It is not the aim of this thesis to problematize the formalities such as, policy documents, Teacher Education's legal Acts, or the Lecturers' 'digital competence', but instead to propose hybrid combinations of known pedagogies and known digital technologies, which might contain both, political and procedural requirements and teachers 'and students' personal preferences.

The thesis uses two philosophical approaches, one that is 'retroductively' looking back to seek explanations to why something appears to be as we experience it, and one that inspires the creation of new hybrids of known phenomena. The retroductive philosophy, used in Part 1, is Roy Bhaskar's formulation of Critical Realism that in the beginning (1975) was known as 'transcendental realism', which means that feasible causes for a phenomenon are sought in an investigation of the mechanisms and structures that may cause the phenomenon to emerge. The process of investigation may resemble the way a lawyer makes arguments in a case. It is overt that a 'crime' has been committed, now the circumstances that made someone commit the 'crime' may be investigated. The 'crime', in this case, is the use of Digital Technology in lessons, the investigation is to lay bare the mechanisms and structures that may have caused this practice to emerge.

The second philosophical approach is constituted by a selection of concepts from the philosophy of Gilles Deleuze, used in Parts 2 and 3. Deleuze also bases his philosophy on reality, but not to examine how the observed phenomenon emerged, rather to investigate and experiment with potential development possibilities based on the experienced reality. Deleuze's philosophy can be described as 'transcendental empiricism', indicating that the inspiration for development is sought in the interaction of thinking and doing.

Deleuze may be described as a 'post-structuralist', indicating that his thoughts could be in conflict to Bhaskar's structural understanding of ontology. Hence, the purposes of the applied philosophies in this thesis act as 'unifying oppositions'. One (critical realism) is applied to support Part 1's investigation and the other (Deleuze) is applied to support the development of the investigations and experiments in Parts 2 and 3.

The thesis finds that Microsoft PowerPoint is the most widely used educational technology at UCN and that the PowerPoint presentations contain mostly ‘headlines’ in the bulleted list. PowerPoints linearity seems to become a determining factor for the pedagogy in the lesson to a degree that makes some of the lecturers in the data doubt whether PowerPoint supports their pedagogical ideal. PowerPoint has a multimodal potential to exploit many modalities, as is also the case in some of the PowerPoint presentations analysed in this thesis, however, the extent of text in bulleted lists makes it the prevailing modality.

Although both the literature on PowerPoint and the data for this thesis express a critique of the use of PowerPoint in higher education, it seems as if PowerPoint has such momentum in UCN that the individual lecturer may not be able to change this practice. It turns out that many students use the lecturer's PowerPoint presentations during the lesson (for note taking in the PowerPoint file) and for later for exam preparation, which means that PowerPoint is not only a presentation software, it may also be seen as a ‘learning material’ in itself that breaks the theories into ‘headlines’ that the students use throughout the course and all the way to exams, which may make the use of PowerPoint an expression of what students need to achieve the learning goals of the courses. This finding fostered an idea for future research. I believe that investigating if the ‘headlines’ represent the depth of learning would be interesting in future research. Such an investigation could lay bare a potential overestimation of the depth of learning that may lay in knowing the ‘headlines’ of more complex subjects.

The thesis contrasts the use of PowerPoint by addressing another finding in the data that indicates that dialogue in the lesson is deemed as the most important element in a lesson, according to both students and lecturers. So, while PowerPoint takes up half the time in most lessons (according to the data), dialogue appears to be what the students (also) seek. Conversely, the students also seem to need the content of the PowerPoint presentations, which suggests that the time spend in the lessons may be re-prioritised. The data suggests that it may be in the dialogue between the lecturer and students (and between students) that learning is experienced. This consideration forms the basis of the pedagogical designs in the articles (Chapter 7) and the framework for development (Chapter 8).

The findings lead to the assumption that both students and lecturers would like to prioritise time for dialogue in the lesson. This view is contrasted by the decline in the number of lessons at Teacher Education (from 2700 lessons in 1986-1300 lessons in 2007) and the idea of ‘academic densification’, which may make it difficult to prioritise dialogue in practice because formal demands of presenting academic content are increased. This notion leads to this thesis’ research question and the aim to rethink the understanding of 'academic densification' from a ‘transmission’ oriented 'densification' to a dialogic 'densification'. That is, a dialogic ‘densification’ that focuses on the use of digital technologies to increase the time for dialogue in and around the lesson, amongst other, by moving the presentation of content and the initial discussion of the topics to the students’ preparation phase of the course.

The collection of articles seek to utilise Web 2.0 technologies to displace the teaching structure from a hierarchical and linear progression to a network of opportunities with the students as active decision-maker.

The article collection is addressing a wish to create a joint formulation of a 'shared third' that become the vehicle for dialogue in the lesson that would enable all or most students to engage and, furthermore to enable all or most students to take part in the deliberation of how the course content could be understood . That is, the focal point is not the teacher's presentation of course content, nor is it the student's answer to the teacher's question, but rather a combination of academic content and discussions had during preparation for the lesson that becomes the starting point for the conversation in the physical classrooms.

ACKNOWLEDGEMENTS

The research, thoughts and reflections in this thesis is the culmination of many years of working with great and insightful colleagues and inspiring students. Without whom, none of this would have been possible.

Thanks to all, who responded to my many surveys, and to those who participated in interviews and to those who opened their classrooms to me.

The support from University College North has been tremendous and I want to thank Jesper Vinther, Susanne Dau, Line Helverskov Horn, Annegrethe Nielsen, Annette Pedersen, Niels Bech Lukassen and Christian Wahl for taking an active part in the process – thank you.

I also want to thank my great colleagues at Teacher Education for being patient with me and for answering all my many, many questions in the hallway, or in the canteen or wherever I would meet you – thank you.

I am very thankful for being a part of the research group D4Learning at Aalborg University, and for meeting fantastic people in the D4Learning research group. Thank you to Prof. Emeritus Alan Tait for your hospitality and willingness to share experiences and knowledge.

And thank you to my supervisor Professor Elsebeth Korsgaard Sorensen for your openness, help and support. Thank you for allowing me to follow my interests, for creating possibilities for me to develop as an ‘apprentice researcher’ and for letting me into your inspiring and philosophical mind.

TABLE OF CONTENT

PART 1

1	Introduction	1
1.1	Formulation of the scientific scope and research question	2
1.1.1	Research questions	7
1.2	Readers guide	8
1.2.1	Description of UCN	9
1.2.2	Practical circumstance and bad timing - a redefined research strategy.....	10
1.2.3	Using the appendix.....	11
1.3	Definition of terminologies	12
1.3.1	‘Knowledge’ or ‘information’	15
1.3.2	Digital technology	19
2	Discourses in the field of digital technology in education	23
2.1.1	Digital technology seen as a problem	25
2.1.2	Digital technology seen as the solution.....	27
2.2	Five categories of digital technology application.....	33
2.3	Summing up the discourses in field of digital technology in higher education	37
3	Philosophy of science – critical realism	39
3.1	Philosophy informing science	40
3.2	Key terms and structures applied in this thesis.....	43
3.2.1	The transitive and the intransitive	44
3.2.2	The three domains; the empirical, the actual and the real	45
3.2.3	Conditions for agents and structures	47
3.2.4	Structural development	52
3.3	Summing up the key terms	53
3.4	Critical realism in education research	53
4	Methods to place an ‘Immanent Critique’ and to reimagine ‘Densification’	55
4.1	A Critical realist model for discovery and scientific investigation	55
4.1.1	Retroduction/abduction- reasoning in critical realism	57
4.1.2	Abstractions.....	59
4.2	Action Research.....	61
4.2.1	The process of Action Research.....	62

4.3	Summing up methods	63
5	Investigating the use of digital technology in a lesson.....	65
5.1.1	Ethical considerations	66
5.2	Research design	67
5.2.1	Empiric data for formulating the investigation	68
5.2.2	Designing the surveys	69
5.2.3	Designing the interviews	71
5.2.4	Description of procedure	72
5.3	Data analysis.....	73
5.3.1	Progression of data production.....	73
5.3.2	Dominating technology in teaching and learning at UCN	75
5.3.3	Sharing of PowerPoint	76
5.3.4	Content analysis of PowerPoint	77
5.3.5	Lecturers' reasons for using PowerPoint	82
5.3.6	Students' use of lecturers' PowerPoints.....	85
5.4	Research findings: The full circle of PowerPoint.....	89
5.4.1	Supporting digital technologies and web 2.0 services	91
5.4.2	Typology of lecturers' use of digital technology	92
5.4.3	Typology of students	93
5.4.4	Summing up students and lecturers use of PowerPoint	94
5.4.5	Plateaus in a lesson.....	95
5.4.6	Discussion of findings – the 'Immanent Critique'	96
5.4.7	Conflict between LMS and PLE	99
5.5	Summing up conclusions on the 'Immanent Critique'	100

PART 2

6	Past research –theoretical perspectives	103
6.1	Introduction to philosophical inspiration.....	106
6.1.1	A different view on learning - the problematic field.....	110
6.1.2	Freeing potential - vitalism and education	114
6.1.3	Syllabus as a map – ‘the rhizome’	117
6.1.4	Collaboration and dialogue as a ‘plateau of intensity’	121
6.1.5	Multiple roles and possibilities – ‘body without organs’	123
6.1.6	Let the theme organise the activities - The self-organising chaosmos.....	125
6.2	Getting new ideas and changing practice	127
6.3	Summing up philosophical inspiration	128
7	Past research – reflections	130
7.1	Article 1 ‘Utilising Digital Technology for dialogue and evaluation – new scholastic methods in action’	132
7.1.1	Description context	132
7.1.2	Critique of the quasi-scholastic pedagogy	135
7.1.3	Benefits of using ODF and SRS in relation to ‘The Immanent Critique’	136
7.2	Article 2 ‘Rhizomatic, digital habitat - A study of connected learning and technology application’	137
7.2.1	Description of context	137
7.2.2	The practice of the pedagogical design	137
7.2.3	Co-creation in Web 2.0 as catalyst for the CoP	139
7.2.4	Critique of the pedagogical design.....	141
7.2.5	Reflecting on the double purpose of the pedagogical design.....	141
7.3	Article 3 ‘Opens Source Learning Streams in Online Discussions in e-learning’ ..	143
7.3.1	Mind over body	143
7.3.2	Body over mind.....	143
7.3.3	Description of context	143
7.3.4	Reflecting on findings	145
7.3.5	Approximated synchronicity	146
7.3.6	Critique of the pedagogical design.....	146
7.4	Article 4 ‘When Innovative Instructional Designs are too Innovative – Lack of Schema’	148

7.4.1	Description of context	148
7.4.2	Developing categories to bring virtual ideas to actual practice	149
7.5	Summing up the reflection on the articles	150
7.6	Concluding comments to the reflections on the articles.....	150

PART 3

8	Framework for developing learning designs at UCN.....	152
8.1	The students' assessment of the value of dialogue in a lesson.....	153
8.2	The lecturers' assessment of the value of dialogue in a lesson	154
8.3	Defining dialogue	154
8.3.1	The deontological turn – learning for life	156
8.4	Class size – conditions for dialogue	158
8.5	Towards a framework for developing learning designs at UCN.....	160
9	Conclusion.....	162
10	References	168

LIST OF FIGURES

Figure 1 Study Activity Model UC Denmark	6
Figure 2 Example of learning path from a course for in-service teachers	32
Figure 3 Slide from conference on the implementation of Canvas	32
Figure 4 Understanding of causality in Critical realism	45
Figure 5 Model for discovery in CR research	57
Figure 6 Kemmis and McTaggart (1981).....	62
Figure 7 Paradigms for Digital Technology.....	66
Figure 8 Example of a Likert scale question from one of the surveys.....	70
Figure 9 Example of question assessing degrees of use.....	70
Figure 10 PPT example, contraction or theory subject Danish, Teacher Education.....	79
Figure 11 PPT example, model, and contraction or theory subject Stress, Nurse Education ..	79
Figure 12 PPT example, subject Math Teacher Education	79
Figure 13 PPT example, subject Danish Teacher Education	79
Figure 14 Example of structure in LMS.....	80
Figure 15 Distribution of respondents according to programme	82
Figure 16 Does the lecturers' PPT help you while preparing for lessons	85
Figure 17 Does the lecturers' PPT help you during lessons	85
Figure 18 Does the lecturers' PPT help you preparing for exam.....	86
Figure 19 Example of how students may take notes in the lecturer's PPT	87
Figure 20 The Full Circle of PPT.....	90
Figure 21 Image from teaching – presentation in focus.....	97
Figure 22 Image from teaching - dialogue in focus	97
Figure 23 Example of a syllabus that presents a map of possibilities.....	119
Figure 24 Barbapapa and Barbarmama (CC licence).....	124
Figure 25 Example of utterances in Socratic	134
Figure 26 Schematic view of the collaboration in the CoP.....	139
Figure 27 Excerpt from the Prezi on poetry	140
Figure 28 Excerpt from Prezi after Prezi-editors made their contributions	141
Figure 29 Card sorting: What to keep - dialogue	144
Figure 30 Card sorting: What to let go of - PPT	144
Figure 31 Glass and Smith relation between achievement and class size.....	158
Figure 32 Survey 6, which is more important in a lesson?	160
Figure 33 Framework for development 'stitched' together by DT	161

LIST OF TABLES

Table 1 Excerpt from Education Act for Teacher Education 2013	2
Table 2 description of the three parts in the thesis	9
Table 3 Key terms from CR and their application in this thesis	53
Table 4 Schematic view of analytical process	68
Table 5 Account for empiric data.....	68
Table 6 Timeline of data production	72
Table 7 Teacher demography, control sample	75
Table 8 Frequency of PPT uses in lessons	76
Table 9 Time spent presenting via PPT	76
Table 10 Statics of content I PPT	78
Table 11 Survey statics on PPT content.....	78
Table 12 Typology of lecturers	93
Table 13 Typology of students.....	94
Table 14 Typology of conversation	155

LIST OF ABBREVIATIONS

Term	Abbreviation
Body without Organs	BwO
Critical Realism	CR
Community of Practice	CoP
Digital Technology	DT
Learning Management System	LMS
Online Discussion Forum	ODF
Personal Learning Environment	PLE
PowerPoint (Microsoft)	PPT
Self-Organising Chaosmos	SOC
Student Response System	SRS
University College North	UCN

PART 1

1 INTRODUCTION

This thesis investigates the use of digital technology (DT) in lessons at University College North (UCN) and it seeks to suggest a direction for developing the use of DT in lessons and in preparation for lessons that create hybrids between e-learning and traditional teaching.

The thesis takes the point of departure in four statements/concepts from recent documents from the Ministry of Education and Science, UCN and University Colleges Denmark that could potentially have an effect on the use of DT in University College teaching as it is today and also on the way, the use of DT could be developed.

The four statements/concepts are: ‘Academic Densification’, ‘The Study Activity Model’ (figure 1, page 6), the notion that the use of ICT can free the lecturer’s time to be together with the students described in Ad. 5 to Act on Teacher Education 2013 and, finally elements from UCNs ‘learning design’ called ‘Reflective Practice-based Learning’.

‘Academic densification’ represents the wish to condense the content of the lesson to reach more learning objectives in the same amount of lessons (Ministry of Higher Education and Science, 2013b).

The ‘Study Activity Model’ is a model for planning courses that addresses the activities that the students could/should engage in outside of the lesson (figure 1, page 6) (University Colleges Denmark, 2013). The model suggests that the students should take the initiative to do academic activities in relation to the courses on their own.

Apart from the latter concepts the thesis also seeks motivation in the Education Act on Teacher Education (Reform 2013) (Ministry of Higher Education and Science, 2015b), in which the following is stated:

Danish	Excerpts translated to English
<i>Ad. 5 It i læreruddannelsen</i> Der ligger et stort pædagogisk potentiale i øget anvendelse af it i undervisningen. Formålet med nye digitale læringsformer og -ressourcer er at styrke elevernes faglighed og ruste dem bedre til fremtiden. Digitale læremidler vil kunne højne kvaliteten af undervisningen, fordi de motiverer eleverne og inddrager dem mere aktivt. Og fordi de gør det muligt at lære på den måde, i det tempo og på det niveau, der passer bedst til den enkelte elev. It har også et stort potentiale til at frigøre ressourcer til mere og bedre undervisning og give lærerne mere tid til de enkelte elever. Derfor foregår der også et stort udviklingsarbejde på området i regi af Ministeriet for Børn og Undervisning.	<i>Ad. 5 IT in Teacher Education</i> There is a huge potential in increased use of ICT in teaching. Digital learning materials will improve the quality of teaching because it motivates students and because it involves the students more actively. DT also holds a huge potential for freeing resources to more and better teaching and to allow the teacher to spend more time on the individual student.

<p>Aftalepartierne finder det vigtigt at styrke lærernes kompetencer i forhold til at bruge it som pædagogisk redskab. Derfor indgår dette i temaet 'Undervisningskendskab' i lærernes grundfaglighed. Partierne har endvidere aftalt, at it som pædagogisk redskab også skal indarbejdes i kompetencemålene for de enkelte undervisningsfag, sådan at lærerne bliver velfunderede i fagspecifik anvendelse af it i undervisningen.</p>	<p>The theme of DT is, therefore, a part of 'Knowledge of Teaching' in the course 'Core themes for Teachers'.</p> <p>Because of this, the theme of IT is a part of the curriculum in all subjects.</p>
---	--

Table 1 Excerpt from Education Act for Teacher Education 2013

DT for the subject, or as a catalyst for communication and activities

Even though the formal part of the Teacher Education Act (2013) (ad. 5) mainly addresses the potential for developing the content of the subjects to fit the demands for future workforces, it also introduces a very important claim:

'DT also holds a huge potential for freeing resources to more and better teaching and to allow the lecturer to spend more time on the individual student' (Ministry of Higher Education and Science, 2015b).

I interpret the quote to represent a wish for more interaction between lecturers and students, which allegedly could be made possible by the means of DT. It is not explicated in the Act, in which way DT holds this potential, therefore this thesis seeks to experiment with pedagogical designs that might free the potential.

The notion of changing relations between students and lecturer by developing new relations to DT may imply that DT holds the potential to substitute or change some of the elements of a lecturer's practices that the practice contains today. It is the aim of this thesis to identify the mechanisms and structures that will free this alleged potential.

1.1 FORMULATION OF THE SCIENTIFIC SCOPE AND RESEARCH QUESTION

The scientific scope of the investigations in Chapter 5 is, how the DT that the UCN provides for the lecturer and the DT that the students bring to lessons effect the pedagogical practice of a lesson in UCN teaching with a focus on Teacher Education. The scientific scope of the 'Past Research' (Chapter 7) and 'Framework for suggestions for development' (Chapter 8) is the development of hybrid pedagogies that seek to utilise the DTs of e-learning to free time for dialogue in a lesson.

It is the aim of the investigation in chapter 5 to identify mechanisms and structures that condition the use of DT in a lesson at University College with a particular focus on Teacher Education. The knowledge from chapter 5 informs the articles in chapter 7 and the framework for development in chapter 8.

Reimagining ‘densification’

A central and overt mechanism, that seems to condition the use of DT, is brought on by the Teacher Education Act 2013 (Ministry of Higher Education and Science, 2013b p: 2). The mechanism is called ‘academic densification’, and it describes a situation where the number and depth of learning objectives met in lessons at Teacher Education (in Denmark) must increase in order to meet a specific understanding of ‘quality teaching’.

’...kompetencemål indeholder en faglig skærpelse set i forhold til det nuværende niveau. Hensigten er, at der sker en faglig fortætning i uddannelsen. Professionshøjskolerne vil via udviklingskontrakterne blive holdt op på, at de lærerstuderende får mere kvalitet i undervisningen.’ (Ministry of Higher Education and Science, 2013b p: 2)

’...learning objectives [new curriculum for Teacher Education] include an academic sharpening compared to current levels. The intention is, that there is an academic densification in the programme. University Colleges will via the development contracts [signed with the Ministry of Higher Education and Science] be held accountable for an increase in the quality of teaching.’ (Own translation into English)

The demand, to meet more learning objectives in the same number of lessons, appears simultaneously as a reformulation of the curriculum for several bachelor programmes in Denmark (Ba. Programme in Education (Teacher 2013), Bachelor’s Degree Programme in Social Education (Pedagogue 2014) and all nine Bachelor’s Degree Programmes in Health (2016)), however the political concept of ‘densification’ only applies directly to Teacher Education.

The reformulated curriculum for Teacher Education (2013) appears to lead to an experienced decrease in the number of lessons from Teacher Education Act 2007 to Teacher Education Act 2013 according to the interviews done in relation to the investigations in Chapter 5. Conversely, it is difficult to pinpoint an actual decrease in the number of lessons from 2007 to 2013. The experienced decrease (from 2007 to 2013) in lessons presumably emerge because the well-known course content from the prior curriculum (2007) has been changed and rearranged.

However, historically, there is an actual decrease in the number of lessons that the Teacher Education offers to/demands of the students:

’I 1986 var der et krav om 2.500 undervisningstimer på læreruddannelsen. I 1998 krævede det 1.700 undervisningstimer at blive lærer. I 2010 var tallet nede på 1.300 timer.’ (Grunert & Aisinger, 2011)

’In 1986 the demanded number of lessons at Teacher Education was 2500 lessons. In 1998 it demanded 1700 lesson to become a school teacher. In 2010 the number was decreased to 1300 lessons.’ (Translated into English)

The estimated ‘value’ of a lesson may increase when the number of lessons decreases, hence it is deemed important to investigate the qualitative role of DT in the lessons at UCN.

The new curriculum for Teacher Education (2013) stresses the importance of cross-disciplinary activities and defines more cross-disciplinary learning objectives (the word ‘cross-disciplinary’ appears 84 times in the 2013 Curriculum as opposed to 41 in the latest version of the 2007 (2012) curriculum (Ministry of Higher Education and Science, 2015b; UCN Teacher Education, 2012)). The cross-disciplinary courses reimagine the subjects in new constellations of subjects and themes, presumably leading to a sensation of loss of lessons for the dedicated content of the prior subject.

Quality, ‘densification’ and ‘study activity’

Along with the notion of ‘densification’ of the lesson, content comes a wish for an increase in the students’ overall study time that applies to all programmes.

The mechanism of ‘densification’ basically means that as the quantity of lessons remains the same or decreases, but the ‘quality’ of the lessons must increase (more for less). As a consequence of this, it seems useful to define and maybe redefine the notion of ‘quality’ of education to the new circumstances.

‘Quality’ of a lesson may be a difficult term to discuss, it seems to be either subjective (liking the lecturer, enjoying the academic content etc.) or objectified through statistics (student satisfaction evaluations, grades, dropout rates etc.).

In the ‘Development Contract 2015-2017’ between UCN and the Ministry of Education (UCN Rektorat, 2015 p: 5) the strategic areas that are believed to improve ‘quality’ are defined as:

- Increased student satisfaction
- Increased use of DT in relation to teaching and learning
- Increased utilisation of teachers from other programmes in UCN
- Increased study intensity

It may seem problematic to define efforts for improving quality by quantitative measures. For instance, the ‘Development Contract’ states that the ‘student satisfaction rate’ must increase 1% each year. That, in itself, is presumably not a measure for quality. Such a measure could be interpreted to imply that if the students are satisfied then they learn. This notion is contested, since the notion of ‘satisfaction’ is relative to expectation and thus subjective. Conversely, ‘satisfied’ students might be less prone to skip class and drop out?

At a glance the research in the field of student satisfaction suggests that a shift in pedagogical design to a more e-learning oriented, self-directed pedagogical design could decrease student satisfaction (Allen, Bourhis, Burrell, & Mabry, 2002 p: 93; S. D. Johnson, Aragon, Shaik, & Palma-Rivas, 2000; Kjærgaard, 2015a).

This thesis is especially interested in the quality parameters of ‘increased use of DT’ and ‘increased study activity’ from the ‘Development Contract’. Conversely, the pedagogical designs presented in the articles Chapter 7 carry the risk of potentially decreasing student satisfaction by focusing on the utilisation of DT and study intensity.

The 'Development Contract' defines what is expected of UCN and, by that, of teachers and students at UCN. The strategic and political issues are not discussed as such in this thesis, instead, they are utilised as a necessary foundation for understanding how UCN understands the notion of 'quality' in a lesson since the aim thesis of this thesis is practical/philosophical and not political.

In a recent (2010) review of the understanding of the notion of 'quality' in higher education reviewer/researcher Henard Fabrice found that:

'The vast majority of initiatives supporting teaching quality are empirical and address the institutions' needs at a given point in time. (Initiatives inspired by academic literature are rare.)' (Fabrice, 2010 p: 10)

Fabrice's finding that academic literature rarely inform the development of higher education makes it even more imperative to nest the investigations and experiments in this thesis in the actual political and practical reality of Teacher Education and to some extent University College teaching in Denmark in general.

So, 'quality of teaching' is understood as fulfilling the needs of the institution (students, lecturers and administration), according to Fabrice's review. In relation to the use of DT, the students in this thesis express that they need a system (LMS) that tells them where to be, at what time and what to prepare/be prepared for. They do not really need experiments with DT that might be confluent with newer theories on learning (connectivism, social constructivism etc.), but not directly connected to meeting learning objectives or passing exams.

'Quality' in education in a broader perspective is reviewed by Barrett, Chawla-Duggan, Lowe, Nickel, and Ukpo, they identify five 'components' of 'educational quality' (Barrett, Chawla-Duggan, Lowe, Nickel, & Ukpo, 2006 p: 13):

- Effectiveness
 - What is taught is directly applicable
- Efficiency
 - The lessons are well planned and carried out.
 - No waiting, no technological hassles
- Equality
 - Equal access and benefit for all
- Relevance
 - Content and activities are relevant to exam and future use
- Sustainability
 - The relevance of the content is considered in terms of future needs of professions.

I interpret the strategic areas of quality improvement from the 'Development Contract' and the five 'components' above to mean that lecturers, ideally, could strive for lessons that satisfy the students' academic needs through intense, inclusive pedagogies that utilise relevant digital technologies. If that is 'the answer' then it becomes relevant to formulate questions

and suggest possible processes of answering these questions that give ‘the answer’ meaning in the practices of teaching and designing lessons and courses.

Increased ‘Study Activity’

As a means to help university college lecturers organise the activities outside of the lessons, the Danish University College Association offers a model for planning courses and lessons from the point of view of the student. This model is called ‘The Study Activity Model’ (University College North, 2015; University Colleges Denmark, 2013).

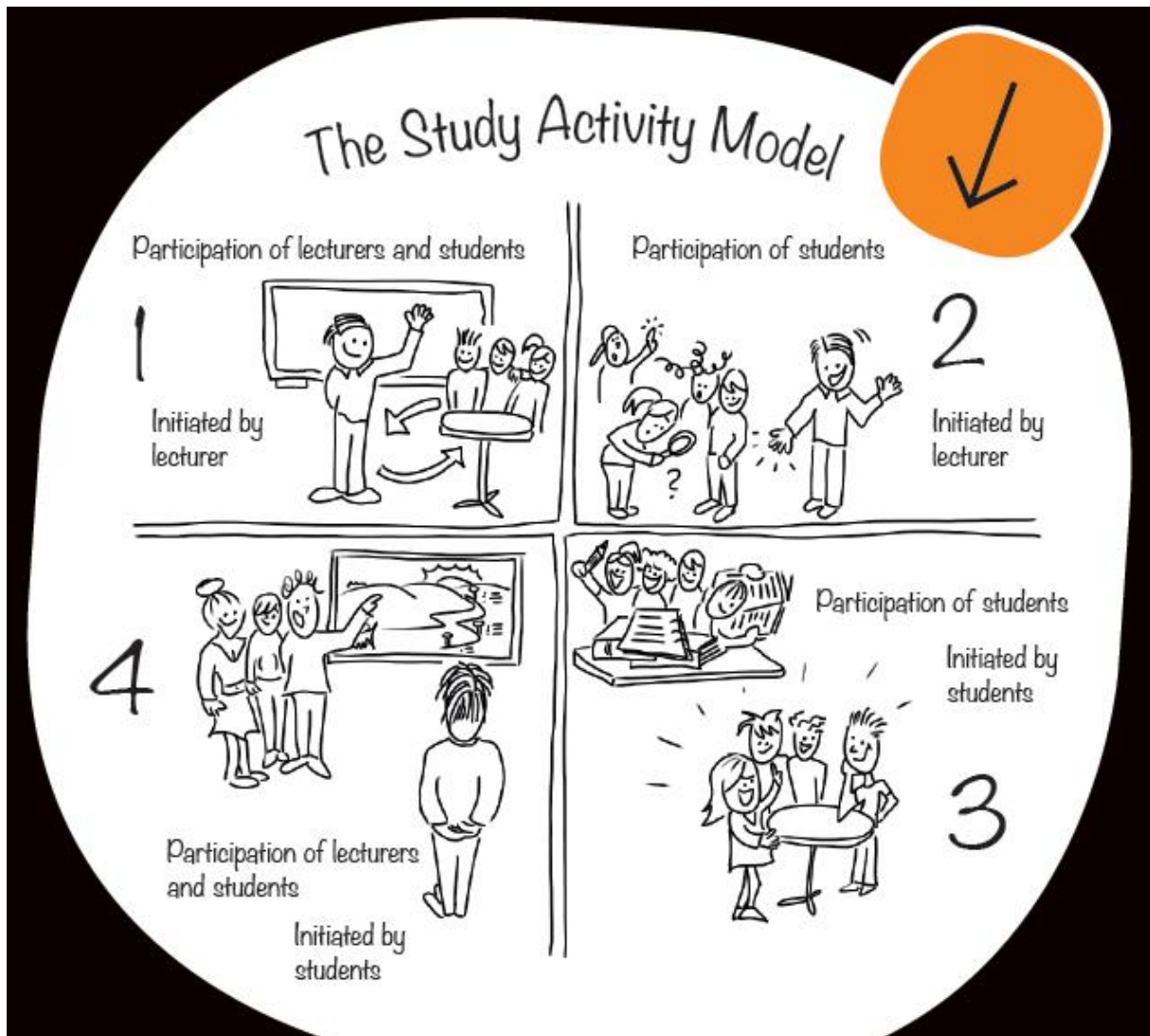


Figure 1 Study Activity Model UC Denmark

The division into four categories, where only two category involves the lecturer directly, indicates that the students have to engage in other academic activities than participating in lessons (category 3, in particular). It also indicates that the lesson has to be a unique, intense ‘contraction’ that the student couldn’t substitute with online resources, a network of peers and a strong strategy for learning. The other three categories are either supported by teaching assistants, study groups or individual work. This, presumably, means that if the lecturers at

University College do not utilise the Study Activity Model to engage students outside of the timescale of the lesson then the lessons might become too compressed and condensed.

I interpret the simultaneous emergence of ‘Study Activity Model’ and ‘Academic Densification’ (both 2013) as The Ministry of Education and Science’s acknowledgement of the negative impact of the decrease in lesson numbers (from 1986-2007). The negative impact being the assessment that a decrease in lessons also entails a decrease in ‘learning outcome’. I also interpret the combination of the ‘Study Activity Model’ and ‘Academic Densification’ as an indication of an emergent paradigm of learning in higher education that requires an increasingly heutagogic approach to learning from the students (strategic, self-determined learning (Hase & Kenyon, 2000; Hase & Kenyon, 2003). This interpretation emphasises the importance of reimagining the lesson and of the students’ and lecturers’ roles in the lesson.

1.1.1 RESEARCH QUESTIONS

The two ‘quality parameters’ defined in the ‘Development Contract’ as ‘increased use of DT’ and ‘increased study activity’ seen in relation to the concept of ‘densification’ from the Ministry of Education and Science makes up the research field in this thesis. The research field of this thesis does not include a critical political debate on the rightfulness of these three notions. However, the research field seeks to investigate ways of combining the three notions in pedagogical designs nested in a shared understanding of ‘quality’ (amongst students and lecturer at Teacher Education and UCN more generally).

The initial assumption, based on open-ended answers from students and lecturers in the empiric data (Appendix 4, surveys 5 and 6, QS6 and QS6), is that the time for ‘dialogue’ in the lessons may be a valid parameter for ‘quality’, in the sense that time for dialogue between lecturers and students, and peer dialogue between students are deemed as very important for learning (see chapter 8 for elaborate analysis).

These four elements; DT, study activity, ‘densification’ and dialogue becomes the anchorage for the research question, the research strategy, and for the Action Research design processes behind the articles.

This leads to the formulation of the main research question:

How can lecturers design ‘densified’ lessons that focus on dialogue facilitated by the use of digital technologies?

This research question leads to two supporting areas of interest that lead:

- How is DT utilised in a lesson in University College?
- How can the use of DT facilitate dialogue?

The supporting questions are addressed in the investigation in Chapter 5.

Contribution to the field

This section describes the way in which this thesis seeks to contribute to the field of research in higher education with a focus on utilisation of DT for dialogue and reimagining the notion of the lesson.

The contribution mainly lies in experimentation with novel ways of utilising digital technologies to change the relations between students, lecturers and DT in a University College lesson. These experiments are presented in Chapter 8 ‘Framework for suggestions for development’ and in Chapter 7 ‘Past Research’.

However, the contribution to the field also lies in an elaboration on the existing research on how the use of Microsoft PowerPoint (PPT) affects teaching in University College lessons. Finally, the thesis seeks to develop the use of methods for investigating and developing higher education through the philosophical concepts of Deleuze.

The thesis rests on three fundamental speculations and claims:

One; speculations about whether the students are benefitting from the way DT is utilised in lessons at University College today.

Two; the most fruitful way of making a developing connection between peers or between students and lecturer is through dialogue.

Three; DT is an ‘orphan’ to traditional education adopted from e-learning.

The three claims will be supported by the review of the field and by the research in both the ‘Immanent Critique’ (Chapter 5), the ‘Framework suggestions for development’ (Chapter 8) and in the ‘Past research’ (Chapter 7).

These three claims delineate the discussion of the discourses in the field in Chapter 2.

1.2 READERS GUIDE

This section describes the structure of the thesis and explains why the thesis came to be the way it is presented here.

This thesis is written as an ‘article assisted monograph’. The article assisted monograph is described as follows in the Curriculum for PhD students at the Faculty of Humanities:

‘A combination of a monograph and two or more articles. It is recommended that the monograph does not exceed 150 pages’ (Halkier (Dean), 2016 p: 12).

This dissertation style was chosen, because it was considered necessary to investigate the present use of DT in lessons at UCN in greater detail than first assumed. This led to an investigation that is presented in chapter 5 of part 1. The style and content of investigations in Chapter 5 do not lend itself to journal articles since it is too extensive and the results are founded locally.

However, the results of the investigations in Chapter 5 creates a platform and delineation of what the articles should investigate.

	Part 1	Part 2	Part 3
Form	Investigation of the use of PPT (pages 1-101)	Past research (Pages 102-151)	Framework for development (Pages 152-161)
Content	Introduction Review of the field Methodology Methods Investigation of the use of DT at UCN, Teacher Education in particular	Philosophical notions Description and analysis of the selected articles. The analytical categories are based on the Deleuzean notions deployed in the pedagogical designs	Suggestions of how to utilise the knowledge gained in part 1 and 2 to suggest directions for development in the future.

Table 2 description of the three parts in the thesis

Part 1 is a stepping stone for part 2, and Part 3 combines parts 1 and 2 with new perspectives on the use of DT in a lesson at UCN, Teacher Education in particular.

1.2.1 DESCRIPTION OF UCN

UCN is a University College in the northern part of Denmark. UCN has campuses in Hjørring, Thisted and Aalborg. UCN offers a series of bachelor's degrees in the fields of health, education and business and technology. Furthermore, UCN offers and a wide selection of shorter programmes and continued education for in-service practitioners (see the full list of programmes here: www.ucnoth.dk (English), www.ucn.dk (Danish)).

UCN in short:

- Total students 10.005
- Bachelor programmes 22
- Total staff 780
- Academic staff 600

Teacher Education in Denmark is under normal circumstance a four-year bachelor's programmer including 18 weeks of internship. Teacher Education at University College offers the main official qualification to teach at state schools (folkeskole). This means that most new teachers in state schools are educated from Teacher Education at University Colleges.

Education is generally funded by taxes in Denmark. This means that University Colleges are founded by the state of Denmark (the taxpayers). The funding is partly based on the number of students that graduate (Danish Ministry of Education, 2001). UCN is accredited to continue its business in relation to UCNs adherence to the 'Development Contract' and other criteria, which means that the Act on Education for the different programmes and the policy and strategy documents are increasingly important.

The students are entitled to receive subsidies from the state (Statens Uddannelsesstøtte SU (The State's Education support) while they study. So, the students do not, directly, pay for education and there is no/little corporate funding of UCN.

1.2.2 PRACTICAL CIRCUMSTANCE AND BAD TIMING - A REDEFINED RESEARCH STRATEGY

Several obstacles and barriers emerged along the way that has influenced the way this thesis turned out. The initial research design was a Design-Based Research (DBR) study aiming to do 4-6 interventions at UCN. The initial research design was inspired by 'Demonstrationssskole-projektet', which is large-scale national DBR project that I took part in from 2012-2015 (Sørensen, 2016). In that project, I took part in six interventions in a 'year 11 school' (10. Klasescenter).

I was inspired by the notion of quantifying qualitative data that the aforementioned project aimed for. I was also inspired by the way the interventions were designed and planned based on a pitch from the researchers followed by more detailed designing and planning by the teachers with me as a consultant. So, I thought I could make a similar research design using the principals from Design-Based Research.

When it turned out to be impossible for me to do the interventions that the articles should report from, the entire research strategy had to be re-considered and my initial research design had to be revised. The reasons why I deemed the interventions both practically and ethically unfeasible are:

- New curricula for Teacher Education, Nurse Education, Ba. Social Education
 - The process of understanding and actualizing the new curricula in practice meant that the lecturers were already under considerable stress making it even more difficult to make time for experiments.
 - What used to be two-year courses was reorganised into a series of shorter 1-semester courses, making the individual course more time constrained.
- Moving of programmes to new Campus
 - Ba. Social Education, Teacher Education and Continued Education for lecturers move to new Campus meaning that the lecturers had to spend time and energy on reorganising everyday routines also making it difficult to make time for experiments.
- New 'Collective Agreement' on terms for working hours and conditions
 - A new paradigm for assessing workload and for distributing tasks.

The reasons listed above are important, however, the most important reason why the interventions were not executable was, presumably, that the interventions were to do with DT. My assumption is that DT may be regarded by many colleagues as an extra, unnecessary, layer that is too difficult or fragile to make use of. So, apart from PPT and the DT that the subject/discipline uses, they might not really need more DT.

So, I decided to change dissertation form from an article based dissertation to an article assisted monograph. In hindsight, I should have anticipated the problems that I faced. The physical and pedagogical changes at UCN were announced before I started formulating my research strategy, however, I took the point of departure in my knowledge of the way the programmes were organised in the summer of 2013.

Another research design, October 2014

When I realised that I needed a new research strategy, I started looking for other ways of investigating the use of DT in lessons at UCN. I found interesting indications of overt practices in relation to the use of DT in the baseline survey (Appendix 4, survey 1).

Therefore, I started collecting data that would open an understanding of how the state of things may be and I also searched for mechanisms and structures that could produce this current state of things. I was reluctant to let go of the wish to investigate possible directions of development, so I continued to make smaller scale action research projects with colleagues (amongst other Lecturer 1 and ICT 1) that could experiment with other ways of conducting a lesson at UCN. These action research projects are all published as conference papers, articles, and book chapters and a selection of them are presented in Chapter 7, 'Past research', of the thesis (see Appendix 1 for a full list of publications).

The change in research design led to a new research strategy that separates the thesis in three parts. One part that uses Critical Realism as a philosophy of science and, partially, as a method for investigation as well and a second part that uses the philosophy of Gilles Deleuze as inspiration for designing other ways of creating relations between students, lecturers, and DT. And a third part that seeks to formulate a framework for the development of the use of DT at Teacher Education and also UCN in general, to some extent.

So, the research strategy is to use Critical Realism to describe, understand and explain the state of utilisation of DT in lessons at Teacher Education (UCN) (Part1) and to use the findings in Part 1 to make pedagogic designs that use Deleuzean concepts in Part 2, while finally to use Parts 1 and 2 to make a framework for discussing development in Part 3.

1.2.3 USING THE APPENDIX

The Appendix is found on the website www.vinkelvej12.dk/Phdappendix.

The purpose of the Appendix is to provide the reader with access to the data supporting the conclusions in this thesis. The Appendix consists of statistics from the relevant surveys and qualitative responses from the open-ended questions in the surveys. Furthermore, the Appendix contains:

- A list of publications
- A list of informants
- The interview guide
- Short introduction to the applied concepts from the philosophy of Deleuze
- The Nexus of Practice analysis preceding the analysis in the thesis.

The thesis refers to the Appendix, when appropriate.

It is suggested that the reader either glances at the abridged introduction to the Deleuzean philosophy in Appendix 6 or reads the introduction in Chapter 6 before reading the thesis or the articles.

1.3 DEFINITION OF TERMINOLOGIES

This section introduces and discusses the key terms used in the thesis. The various terms refer to similar things in the methods and theories applied.

- **Agent:** An agent is an individual who causes something to happen (Used by Deleuze and Bhaskar).
 - An agent has agency
- **Actant:** An actant is a joint term for human and non-human actors (used by Latour)
 - The juxtaposition of human and non-human actors requires a joint term, actant.
 - The actant is a term from narratology (Greimas) that refers to both an actor and the part that he/she plays and to the structural role that that part plays in the narrative.
- **Actor:** An Actor is a person. He or she is a social actor that participates (act a role) in action (Used by Scollon, see Appendix 7).
 - An actor acts in an action. He/she plays a part in the unfolding of the action.

Apart from that the terms describing the ‘situation’ of interest in the theories and methods are called; action, event, situation

- **Action:** An action is where practice takes place (Used by Scollon).
 - The synchronous activity of more elements of an action. It is ‘where the rubber meets the road’ (Scollon), complements the Deleuzean notion of the ‘Problematic Field’ used in Chapter 7
- **Event:** An event is something that is happening in the ‘now’, that can mostly be understood in hindsight. So, it creates a ‘fold’ between past and present. (Used by Deleuze, Scollon, and Bhaskar). Used in Chapter 5 and 7.
 - Even though the notion of ‘event’ is used by Scollon and it resembles his notion of ‘nexus of practice’. Scollon uses Goffman’s notion of event. It is constituted by, participants, venue (place) and dialogue (Riggins, 1990 p: 47).
 - Deleuze contrasts ‘event’ with ‘essence’. Where ‘event’ is the whole experience and essence is merely the observable or communicable ‘contraction’ of the event.
- **Situation:** A situation is the observable entirety of the here and now. (Used by Bhaskar and Scollon)
- **Learning:** Learning is viewed from a Deleuzean perspective, which is slightly different from the psychological or sociocultural ‘isms’. Learning is seen as neither behavioural, cognitive or constructivist, it is the formation of relations between the virtual idea and the actual action. It is the deontological ethics of thinking and doing with the purpose of developing what a human being is (see Chapter 6.1.1 for elaborate discussion). Hence, learning is seen as an individual process in a social context.
- **Traditional teaching:** Is defined as ‘lecturer driven’ lessons consisting of presentation and discussion of academic content and arranging pedagogical activities in a lesson in a physical classroom at a specific time with a specific academic purpose to a fixed and

predefined group of students at University College. The definition of traditional teaching is based on the observation, interviews and survey data.

- E-learning: Is defined as a course without, or with very few, face-to-face lessons, which utilises digital channels for communication and in which the pedagogical activities are manifested and shared digitally. The activities often have an actual physical practice (teaching in this case) that is mediated digitally through multimodal means of communication (images, graphs, video, audio text etc.).
- Dialogue: ‘Thinking together through language’. A mediated exchange of thoughts, or processed information, amongst actants (humans and non-human) that lead to a higher level of understanding or a constructive change in algorithm. Defined in detail in Chapter 8.3.
- Lesson: A planned educational event taking place in a specific timeslot in a timetable at University College North, where a lecturer and a group of students are present in the room at University College (see Appendix 11 for a more elaborate definition).
 - Theory lesson: A lesson that takes the point of departure in a theory and not in exercising crafts, music, gymnastics etc.
- Pedagogical design: the concrete description of the lessons in a course and the ideas behind the way the lessons are described. The notion of a lesson as a design for learning. The conviction that pedagogies can be designed bears with it the idea that teaching is an event that can be done in many ways. It is the idea that a philosophical notion, a principal and a practical method can be explicitly communicated and carried out in the practice of teaching in a lesson or an entire course or even programme. A pedagogical design considers the academic content and pedagogical activities in relation to the ‘target group’. Conole refers to it as a ‘learning design’, however, in the context of this thesis, it is referred to a pedagogical design to emphasise the part of the lecturer. Conole defines a learning design as follows: ‘...the design of a course is driven by ‘pedagogical models’ that capture the teacher’s beliefs and is a set of rules that prescribe how learning can be achieved in a particular context...’(Conole, 2012 p: 120)
 - Pedagogical design or Learning design? The phrase ‘learning design’ is only used in Chapters 7 and 8 , where the design is thought of as a way of sharing and discussing designs more generally for learning amongst lecturers. The reason being the direct linguistic constellation of the words ‘learning’ and ‘design’ may suggest that an external strategy for teaching can determine and internal process of learning. However, in ‘The Larnaca Declaration on Learning Design’ (Dalziel et al., 2016) the purpose of ‘learning designs’ is defined as: ‘The ultimate goal of Learning Design is to convey great teaching ideas among educators in order to improve student learning.’(Dalziel et al., 2016 p: 1)
 - The notion of ‘learning designs’ also entails the possibility of sharing designs: ‘If educators can easily re-use and adapt the good ideas of their colleagues, then the preparation time for teaching may decrease’(Dalziel et al., 2016 p: 4)
- Positive difference: in math, the ‘positive difference’ between 12 and 8 is 4, it represents a difference that, in most cases, is different from the numbers that produce it. In Deleuzian thought it is a metaphor for a difference that is different from all its

parts (Baugh, 1997 p: 140; Deleuze, 1990 p: 140). 'Positive difference' is not the same as 'synergy'. It is not the intention to achieve more, it is the intention to achieve something different, a creative hybrid constellation that becomes a 'shared third' made from the parts.

- Deontology: 'Ethics of duty', to do what is morally and ethically within our knowledge. Sees our knowledge of something as a cause of ethical action. For instance, if a teacher-student knows that a certain activity (reading for class, taking part in a discussion etc.) will make him/her a better teacher, then he/she should take part (if he/she can). Kant's famous phrase: 'ought implies can' (Kant & Guyer, 1998 p: 473) indicates that we are only obligated as far as our knowledge, thoughts and abilities allow us. This also implies that a deontological view on education is individual and subjective. And lastly, it implies that education is understood as a moral obligation. In a Danish context, the moral obligation to become educated is supported by free and equal access to schools and universities and state-founded subsidies while studying. It is the Danish government's aim that 60% of a youth generation graduate from higher education by 2020 (the number is 54% in 2016) (Danish Government, 2012 p: 7). By the historical free and equal access to education in Denmark, the hindrance for becoming educated is not predominantly financial, which may make the phrase 'ought implies can' ambiguous, because other reasons why a young man or woman does not attend to education may be difficult to generalise and regulate.
- Web 2.0: Term coined in 2005 by Tim O'Reilly meaning: Web services that allow users to interact and to share and create content (O'reilly, 2007).
- Lecturer: A lecturer at University College in Denmark (Ministry of Higher Education and Science, 2015a). Often, but not always, a practitioner with academic qualifications that equals a master's degree and practical experience within the field the lecturer teaches. E.g. a school teacher (Ba. of education) with a master's degree in education or a nurse (Ba. of nursing) with a relevant master's degree.

The terms come from different theories on the similar phenomena, which is why they have similar meanings but differ in important areas anyway. The way the terms are used in this thesis can be exemplified with the following example. The situation is English teaching, the event is giving feedback on written assignments, and the action is the conversation between student and lecturer. The lecturer is interpreted as an agent, the student is an actor and the technology used for giving feedback (video clip, computer, pen etc.) is an actant. The position/practice system of the event determines who is an agent and who is an actor. So, the Deleuzean suggestions for development aim to change the position/practice system in the lesson. Either by introducing new positions and practices as presented in the articles 'Open Source Learning Streams in Social Media and in year 11 math - All the right Technology for all the wrong reasons', 'Rhizomatic learning in a digital habitat Qualifying the quantified self - A study of conscious learning' (best article award ICEL 2014), 'Deep learning in the Open Source Learning Streams'. Or by changing the existing practices slightly as presented in the article 'Utilising DT for dialogue and evaluation – new scholastic methods in action'.

1.3.1 'KNOWLEDGE' OR 'INFORMATION'

This section seeks to pinpoint the difference between 'knowledge' and 'information'. It is deemed important to make this distinction because the two terms seem to get used synonymously in the context of DT. This section discusses the difference between the two terms and argues that the synonymous use of the word lead to an inflation of the understanding of what can be shared digitally and what can't be shared directly.

The meaning of the two layman's terms 'Information' and 'Knowledge' may seem obvious, however, they may be used somewhat synonymously, even though they bear a different meaning in this context. We talk of 'knowledge sharing' in the workplace (college), when we may, strictly speaking, be sharing information. At UCN, there seems to be an underlying sense that PPT represents knowledge and that they are 'academic currency', that is, they are worth something, also seen in isolation from the context they were used. Hence, sharing PPT is seen as sharing knowledge, when a more precise term might be sharing information.

This thesis problematizes that notion and sees information as an external category to the mind, whereas knowledge is seen as an internal category to the mind. Hence, the terms may need a further definition. So, what is knowledge? And what is information?

Deleuze addresses this issue in his 'ontology'. Deleuze's 'ontology' is put into a paradoxical equation: pluralism=monism. This equation means that concepts are both absolute and relative at the same time. The absoluteness is determined by the consistency of the concept, whereas the relativity is determined by the communicability of the concept, which is what Deleuze calls the pedagogy of the concept. (Deleuze & Guattari, 1987 p: 20; Deleuze, 1994 p: 22).

The notion of 'consistency' refers to the level of shared understanding of a concept in a community (class, country, city, family, team etc.). In this understanding of 'consistency', it is interpreted as shared 'knowledge'. However, the concept's communicability refers to the community's ability to produce information that communicates the concepts in a way that conveys the ideas of the concept into the practical execution of the concept.

This can be exemplified by a syllabus as being both an expression of an idea and an instruction for how to actualize the idea. If the idea is 'lost' in the actualisation, then the syllabus may just be information instructing students how to act. However, if an idea is translated and brought along with the practice of teaching, then the actualisation of the syllabus may bring with it the knowledge of the 'sender'. That is if it is possible for the students to understand why the syllabus is designed the way it is.

First up, the notion in this thesis is that; Information is a mediated expression that can be objective and knowledge is an individual processing of information, amongst other, that can be subjective.

In order to determine a point of departure for a definition of 'Information' and 'Knowledge', a dictionary lookup is chosen as a starting point.

The word ‘Information’ as defined in the Oxford Dictionary:

‘Facts provided or learned about something or someone’ (Oxford Dictionaries, 2015b)

The word ‘Knowledge’ as defined in the Oxford Dictionary:

‘Facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject’ (Oxford Dictionaries, 2015c)

The two definitions are intertwining in the sense that they could be interpreted to mean approximately the same thing. ‘Facts learned’ as opposed to ‘facts acquired’ does not seem to set ‘Information’ and ‘Knowledge’ apart. However, the dictionary definition of ‘Knowledge’ has the words ‘skill’, ‘experience’ and ‘education’ as part of the definition. So, it seems like the first part of the definition of ‘information’ and the last part of the definition of ‘knowledge’ is what sets the two definitions apart.

Information is understood as; ‘facts provided’

Knowledge is understood as; ‘theoretical or practical understanding of a subject’

If anything, the dictionary definitions may indicate why the two words would be mixed up in everyday language. However, in professional contexts, it may be a problem to have a synonymous understanding of ‘Information’ and ‘Knowledge’. Because ‘Information’ is interpreted as shareable, while ‘Knowledge’ is not. Thus, ‘knowledge sharing’ may be interpreting as a false representation or a misleading illusion.

In the Latin version of the term ‘Information’, it means ‘to give form to the mind’ (Capurro & Hjørland, 2003 p: 343-411). In the Greek version, it means to ‘convey the meaning of something fully’.

Information is mediated from someone to someone, through something or it is mediated from something to something, through something or any combination of human/non-human actant combination.

So for the operational sake of this theses ‘Information’ is defined as:

‘Knowledge communicated.’

Knowledge, on the other hand, can be defined as the cognitive processing of information (P. G. Hansen & Hendricks, 2011 p: 11). However, the word ‘knowledge’ also represents the philosophical challenge of capturing what we can know about the world. Knowledge translates to ‘scientia’ in Latin leading to ‘Science’ (the creation of knowledge) and knowledge translates to ‘episteme’ in Greek which leads to ‘epistemology’ – the theory of knowledge. Epistemology is the line of philosophy where philosophers discuss the relations between ‘being’ (ontology) and ‘knowledge of being’ (epistemology). Most often in relation to pinpointing what ‘the truth’ is and how it is possible to speak of objective truth in research.

The two philosophers used in this thesis, Bhaskar and Deleuze, are more interested in the ontology of things/entities than in the philosophical discussion of how we can know

something truthfully. Bhaskar takes the point of departure in the notion that ‘all knowledge is fallible’ and that the task for the researcher is to investigate into the less fallible answer.

‘Ontology has been vindicated not as providing a set of necessary truths about a mysterious underlying physical realm, but as providing a set of conditionally necessary truths about our ordinary world as investigated by science. It is important to be clear about what philosophical argument can achieve. Thus, as a piece of philosophy we can say (given that science occurs) that some real things and generative mechanisms must exist (and act). But philosophical argument cannot establish which ones actually do; or, to put it the other way round, what the real mechanisms are. That is up to science to discover.’ (Bhaskar, 2008 p: 42)

Philosophy can only take our understanding of something part of the way, scientific investigations are needed to find and identify causal mechanisms that underpin the emergence of reality, according to Bhaskar. This leads the way for what I interpret as quasi-positivistic methods such as Grounded Theory and Design-Based Research.

Deleuze uses Nietzsche to address this issue of knowledge and truth. His belief is that you can have truthful knowledge, without having the truth.

‘As Nietzsche succeeded in making us understand, thought is creation, not will to truth.’ (Deleuze & Guattari, 1994 p: 54)

The notion that ‘thought is creation’ leads the way for experimentation and it relates to Bhaskar’s notion of producing ‘reasonable’ explanations, that are ‘truthful’ but does not claim to be ‘the truth’ (Scott, 2013 p: 62).

Deleuze says the issue of falsity is an issue of invisible or covert distinctions between real and unreal:

‘Then there's another pair of terms, true and false. The real and the unreal are always distinct, but the distinction isn't always discernible: you get falsity when the distinction between real and unreal becomes indiscernible. But then, where there's falsity, truth itself becomes undecidable. Falsity isn't a mistake or confusion, but a power that makes truth undecidable.’ (Deleuze, 1997 p: 65-66)

What makes something appear false may be that truth is difficult to define in a specific case. If you can not make a shared definition of truth in a given situation then falsification may always possible according to Deleuze. The truth, according to Deleuze, is given by context and discourse, so truthful knowledge is only truthful if we acknowledge the context and discourse.

Research communities such as, for instance, the online research group ‘Rhizomatic Learning’ founded by David Cormier (Cormier, 2015; Cormier, September 2014) share articles and develop the notion of Rhizomatic Learning and they discuss the relation between education and the importance of accommodating to the way knowledge is transformative and almost

organism-like on the internet. They pinpoint and contest the existing view on traditional teaching:

'The existing educational model with its expert-centered pedagogical planning and publishing cycle is too static and prescribed to accommodate the kind of fluid, transitory conception of knowledge that is necessary to understand the simplest of Web-based concepts. The ephemeral nature of the Web and the rate at which cutting-edge knowledge about it and on it becomes obsolete disrupts the painstaking process by which knowledge has traditionally been codified.' (Cormier, 2008 p: 3)

The general concept of what knowledge is changing when the gatekeepers of knowledge are redefined (not done away with) and when the mechanisms of knowledge production are altered. These mechanisms used to be (10-15 years ago) a slowly evolving body of commonly approved learning materials and methods for teaching. That changed so slowly that generations would recognise the phenomena 'School' and 'Teaching' when their children started school (Sørensen, Audon, & Levinsen, 2010). The curriculum in school was and is still basically concentrating on; reading, writing, and mathematics. However, the ways of achieving these core competencies have changed a lot. So, today parents might not recognise 'School' and 'Teaching' when they visit their kids in school. The average Danish classroom in primary, secondary and high school contains many artefacts that adhere to other discourses than the traditional discourse of school. There are artefacts from the discourse of business (Interactive whiteboard, PPT), from the discourse of entertainment (smartphone, tablets etc.) and from a plethora of personal discourses such as social networks and hobbies (game consoles etc.). Furthermore, the activities in school are building on these 'other' discourses which means that learning activities and learning materials have changed with the introduction of DT in schools in the late 90ies. So, the 'truthful knowledge' that parents had about school does not necessarily apply fully to the context of a school of today.

The shift in the context of the 'truthful knowledge' also means that the organisation and presentation of relevant information are no longer solely confined to the lecturer's instruction and textbooks. This leads to a rethinking of how information is processed to knowledge. This rethinking contests the idea that relevant information in itself leads to knowledge. The connection between information and knowledge has changed a lot over a short period of time. In the time before the public access to the internet (ca. 1993 in Denmark) getting information was a daunting task; you had to go to the library, look up your topic, find the right books, read the relevant content etc. And you properly had to leaf through a number of books before you found the information you needed, then you had to write down (in handwriting) what was important in the passage etc. All in all, it demanded both physical and cognitive processes to get the information you needed. A recent study shows that students who rely on internet information have a tendency to overestimate their knowledge compared to students with more varied study strategies (Fisher, Goddu, & Keil, 2015). This indicates the paradoxical condition that easy access to information has made the gap between getting information and understanding information bigger.

In 'Knowing Knowledge' George Siemens quotes his colleague Stephen Downes when he defines knowledge in a network based on connections:

'A property of one entity must lead to or become a property of another entity in order for them to be considered connected; the knowledge that results from such connections is connective knowledge.' (Siemens, 2006 p: 16)

The use of the word 'entity' may entail that Siemens and Downes count in both human and non-human actants.

So, the important notion in this regard is that information is understood as shareable enunciation and that knowledge is a property of the mind. Knowledge can't be shared directly, however, it can be mediated through language and other signs. The mediation of knowledge can be shared as information. The information can then be processed in the mind of the learner and possibly become new knowledge (Hendricks & Hansen, 2014; Hendricks, 2010).

So, it is an aim for the articles in this thesis, Chapter 7, to address the conflation of the two terms because, if the terms 'information' and 'knowledge' are conflated to both mean 'information', then that understanding becomes determining to how we teach.

I suspect that the strategies and policy documents that condition and, to some extent, determine the development of education in Denmark thinks of knowledge and information as similar phenomena and, thus, overestimate the value of sharing learning materials and PPTs in LMS

1.3.2 DIGITAL TECHNOLOGY

This section defines the scope of DT discussed in the investigation in Chapter 5 and in the articles.

DT is a board term encompassing most technologies based on processing binary code in transistors, so the term needs to be more precisely defined. The distinction between DT and 'technology' may be formulated in terms of; the mechanisms that make DT perform tasks are virtual, whereas the mechanisms that make 'technology' perform tasks are actual, physical mechanics. DT is often a combination of actual and virtual mechanisms that collaborate to perform tasks. For instance, a printer receives its instructions in binary code (postscript, PDL etc.) the binary instructions make actual mechanics (gears and levers etc.) add ink to specific areas of a piece of paper. However, DT can also be entirely virtual. For instance, the operation of a smartphone is mostly virtual, only very few actions are done through actual mechanisms. Most smartphones have only very few buttons, all other operations are virtual mechanisms within the operative system. This also makes the smartphone an example of a Deleuzean 'multiplicity' or even a Body without Organs (see Chapter 6 for definition). The actual mechanics of technology limits its field of operation. For instance, a typewriter may be interpreted as a singularity, it does only one thing, typewriting. Another example of the difference between singularities and multiplicities is the difference between a piano and a keyboard. A piano makes an actual, mechanically produced sound (hammer on strings),

whereas a key on a keyboard activates a digital sample of a sound that is played through an amplifier and a speaker. The sample of sound can be any digital sound, most obvious sounds would be the sounds of other instruments, but it may as well be, for instance, animal calls.

Analogue singularities vs. digital multiplicities

This distinction is of importance when it comes to introducing DT as a teaching tool. Because, even though analogue and digital projection technologies are similar (OHP vs. projector, the use of light and lens to enlarge and project an image on a screen), the ‘input’ for the projection is different. The folio for OHP only supported text and crude reproduction of graphics and images, whereas the laptop enables a variety of modalities. So, an online laptop connected to a projector and speakers substitutes the OHP, the VCR/DVD, the tape recorder/CD-player and in some cases, it potentially also substitutes the blackboard if the room has Interactive Whiteboards (IWB). So, in the ‘analogue classroom’ the lecturer needed proprietary technologies to support each modality (text/graphics, film, audio) and in the ‘digital classroom,’ the lecturer may only need his/her laptop (connected to a projector and speakers). This also marks a shift in paradigm from ‘actual technologies’ to ‘virtual technologies’. In the ‘analogue classroom,’ the lecturer needed to, physically, operate the technologies, whereas, the ‘digital classroom’ demands virtual operation of a user interface on the laptop and maybe a physical connection to projector and audio. The virtual and actual are equally real, as Deleuze puts it (see Chapter 6), meaning that the ‘emergent’ practice is real and observable in both cases. This means that a collection of proprietary technologies are substituted by a simple system of digital technologies, centring on the lecturer's laptop.

So, the digitalisation of the classrooms at UCN may be extensive, however, as the analysis in Chapter 5 will show, the digital opportunities are not commonly used as multiplicities, they are often used as singularities doing mostly what the OHP did in the past. This indicates that the shift in paradigm from actual singularities (OHP, ‘pigeonholes’ etc.) to multiplicities (Computer/projector, LMS) are contested by the momentum of the old practices (see Chapter 5.5).

The most important distinction between DT and ‘technology’, apart from the distinction between actual and virtual mechanics, is interpreted to be that DT has the potential to catalyse the emergence of multiplicities in a lesson, while ‘technology’ has not. This potential of DT in education has been investigated by scholars for at least the past three decades (Selwyn, 2011 p: 53-54), however, the impact on higher education is interpreted to be less than imagined (Conole, 2012 p: 101; Player-Koro, 2013). This thesis addresses the slight ‘disappointment’ expressed in the literature and the sensation of unfreed potential by introducing a Deleuzian understanding of multiplicity and ‘positive difference’ to analyse and reimagine the concept of using DT in a lesson.

Digital technology for communication and process facilitating or as a part of a subject

Furthermore, DT is practically delineated as what the UCN provides lecturers with and what the students bring to lessons. The thesis does not investigate DT adhering to a specific discipline or subject like for example; blood pressure monitors, oxygen monitors, digital

music recording, video editing software, supporting software for dyslectics etc. The choice to leave proprietary DT out of the investigation may be an issue of concern because the proprietary digital technologies may influence the way these subjects are constituted and, thus taught. For instance, digital recording seems to change music teaching at UCN. The music lecturers express that process of recording music with students has become less of a practical challenge and more of a creative development. The digital recording process is a combination of multiplicities and singularities. It combines iPads (the app Garage Band) and digital audio interfaces. The example of iPads in music teaching contributes to the discourse of using DT for efficiency and ease, however, the result is increased focus on the creative process of writing music and not on getting by easier, according to the music lecturers. In another interview, the interviewee (lecturer 12) expressed that dealing with statistics in MS Excel live on the screen in the lesson was a determining factor for the pedagogical approach to the lesson. His claim was that in the case of teaching statistics in Excel, DT for communication and organisation was inseparable from the DT of the subject. In this case, the computer is a multiplicity containing the academic content (texts in LMS) and techniques (instructions from the lecturer) of the subject as well as the content of the subject and finally Excel is the learning material that serves as 'plateau' for the 'event'. Another example is the programme for Computer Science where the lecturer (lecturer 18) explains how the process of learning to code web pages is often a 'shared coding-session', where the lecturer projects his laptop screen to the big screen and he and the class will make 'code' together. The process of teaching becomes an all-encompassing situation, where the computers (students and lecturers) serve as multiplicities.

So, in some cases, the choice in this thesis of separating the DT of the subject from the rest of the context of the lesson may be problematic. The conclusion is that if the academic subject itself is stratified virtually (through DT) to the 'plane of organisation', then it may be difficult to separate the DT from the subject matter. These situations are not that common in Teacher Education, but they occur occasionally in the on-campus training facilities in Nursing (lectures 6 and 7) and Occupational Therapy (lecturer 8).

So, when the words DT are used in this thesis they refer to the DT expressed in survey 1, Appendix 4;

- Laptop computers (provided by UCN to lecturers and the students own laptops)
 - lecturers: MS Office and LMS
 - Students: MS Office, Facebook and LMS
- Projectors (of which some are interactive) and Audio and WiFi
- Tablets
- Smartphones

The main focus is on how the lecturers use the laptops, that the University College have provided them with, in a lesson and what the students use their private laptops, smartphones and tablets for in a lesson.

Software and applications used with the DT

The software and applications used are derived from the answers in the baseline surveys (see Appendix 4, survey 1), which delineated the software and applications as follows:

- PPT
 - lecturers, for presentations and for structuring lessons
 - Students, for taking notes and for structuring headlines from the topics
- Google
 - Information search
 - Students, collaboration, organising and sharing resources and documents
- LMS
 - Information and communication between students and lecturers
- Social Media
 - Class has a facebook group for sharing information about the course

In Chapter 7 the scope is broadened to also include the time between lessons.

2 DISCOURSES IN THE FIELD OF DIGITAL TECHNOLOGY IN EDUCATION

This chapter describes a selection of discourses within the research field of DT in education that are deemed relevant to understanding and developing the use of DT in a lesson at UCN. The purpose is also to gather relevant information for seeking an understanding of why the policy documents within UCN, the Act on Teacher Education, and the ‘Development Contract’ express certain expectation to what DT may contribute within University College teaching at UCN.

The procedure of gathering relevant information about existing research was:

- 1) To make a ‘crowd created’ review. This review was done by asking relevant people in the sector of University College teaching in Denmark what they knew about projects, research and literature dealing with ICT in UC teaching. They contributed in a shared Google folder. This review was published in 2014 (Gynther, Kjærgaard, Slot, & Sørensen, 2014)
 - a. It gathered information from IT related projects from all University Colleges
 - b. It gathered information about relevant publications that was used by colleagues
 - c. It gathered information about research within the field of IT in Teacher Education
- 2) Following related projects, in particular, the ‘Technucation’ projects from Århus University (Hasse et al., 2015).
- 3) Reading literature by established scholars such as James Paul Gee, Howard Rheingold, Nicholas Carr, Chris Dede, Robin Goodfellow, Marc Prensky, Neil Selwyn, David Buckingham, Grainne Conole, George Siemens, Terry Anderson, Vincent Hendricks etc.
- 4) Honing in on the use of PPT in teaching
- 5) Reviewing the field of Deleuzean education studies (presented in Chapter 6)
- 6) Reviewing the field of ‘educational dialogue’ (used in the in Chapter 8)

The research field of DT in Teacher Education and in University College education, in general, seems to become increasingly documented. There are several research reports from OECD (OECD, 2015) and from the Danish Governments and the individual Ministries (Danish Government, 2011; Ministry of Higher Education and Science, 2013a). Reviews from fellow researchers (Ananiadou & Rizza, 2010; Arstorp, 2015b; Enochsson & Rizza, 2009; Røkenes & Krumsvik, 2014) and the review that I co-wrote (Gynther et al., 2014) show that it is a field of interest from both policymakers and researchers.

Conversely, the interest in the use of DT in Teacher Education does not seem to come directly from the wishes of Teacher Education, it appears more likely to be an effect of a general interest in the use of DT in schools. Thus, making it an indirect interest, occasioned by the notion the training digital skills in school will lead to increased employability. :

'[Milestone] Digital learning resources are a natural and integrated part of everyday teaching. This means that pupils benefit from even better teaching and are better equipped to face a digital future.' (Danish Government, 2011 p: 22)

So, the interest in the use of DT in Teacher Education may be brought on by the government's conviction of what skills are needed in the future and through a chain of causation, which ends in the formulations in Ad.5 in the Act on Teacher Education (see Chapter 1.1). Judged by the seeming lack of connection between Ad. 5 and the curriculum for Teacher Education (see Appendix 8) it appears as if the interest in the use of DT Teacher Education is primarily an interest in the teacher students' future use of DT in schools.

However, the interest in DT might not be as big amongst teacher students and lecturers at Teacher College. This discrepancy between what policymakers envision and what lecturers do is elaborated in Arstorp's recent PhD thesis on 'Technology in Teacher Education - an imagined or realised practice' (Arstorp, 2015a), however, it will also be touched upon in the investigation in this thesis. Arstorp's investigation researches the insecurity that the lecturers experience when utilising technology in teaching and the support mechanisms that the particular University College has implemented. Arstorp's research is diagnosing a problem of unstable technology and low technological literacy amongst lecturers, whilst this thesis also acknowledges the problems that Arstorp addresses, this thesis approaches the problem from a different angle and tries to suggest possible solutions. So, in that sense, the two theses complement each other.

The notion of using DT in education seems to be stratified. It moves on several levels and in several directions and it forms individual discourses (Goodfellow & Lea, 2013; Selwyn, 2011; Selwyn, 2014). These discourses appear either positive or sceptical, fewer seem to work with DT in a practical manner that departs from the actual affordance of the technology in relation to the needs of a learner or a lecturer in a concrete context.

In the book 'Whackademia' Richard Hill investigates the state of university teaching in Sydney. He interviews a group of academics about their assessment of the state of university teaching, the quotes in the book are generally critical towards the state of university teaching and defines what Hill calls 'Production Line Teaching' (Hill, 2012 p: 101). In one of Hill's interviews a senior academic expresses the state of teaching as follows:

'Students are taught but they do not learn. The teaching is all very mechanical and linked to particular aims and objectives. You put up the slides, put your lecture notes on-line, make sure you cover everything in the unit guide so that your arse is covered. Senior academic in legal studies. Quot.' (Hill, 2012 p: 101)

In this understanding of the management mechanics of the programmes in higher education teaching, they lead to a practice revolving around producing and presenting PPT slides. Hill's investigation addresses the policies and the organisation of the programmes as the main reason why DT is narrowed down to PPT.

Grainne Conole also hones in the reason why DT has not revolutionised education yet:

'Conole (2004) has argued that there is a gap between the promise and reality of the use of technology in education and that there is little evidence that education has changed fundamentally as a result of the use of technologies. Much use of technology appears to simply replicate bad classroom practice resulting in simple Web page turning (Oliver 2000). Similarly, Masterman (2008a , p. 210) argues that the lack of uptake of technologies is due to a number of factors: lack of awareness of the possibilities, technophobia, lack of time to explore the use of technologies, aversion to the risks inherent in experimentation and fear of being supplanted by the computer.' (Conole, 2012 p: 101-102)

This may be interpreted to indicate at least two problems; one being that the policies and organisation of the programmes support a very simple utilisation of DT. Another reason being that lecturers and students may need increased digital literacy to exploit the alleged potential of DT. However, if the two problems are synthesised into one answer, it may be that a traditional organisation of presence lessons does not require the elaborate use of DT, hence neither students nor lecturers develop competencies to utilise digital technologies in teaching and learning. Conole also argues that the size of the uptake of may be due to a little focus on the possibility of actually designing lesson/courses differently:

'A key issue is that teachers do not know how to design, mainly adopting an implicit approach based around prior experiences and practices.' (Conole, 2012 p: 102)

The quote from Conole epitomises the findings in Chapter 5. Only 'lecturer 1' expressed her approach to planning lessons as an open, creative process focussing on how the students possibly could learn from participating in her lessons (see Chapter 7, Article 1).

In the context of this thesis both these problems are interpreted as important, however, the relation between the organisation, DT and lecturers and students are regarded as the key to understanding the state of DT application. Conversely, there are presumably other reasons for the 'gap' (*'between the promise and reality'*, Conole), the lecturers might not need more DT than a laptop, projector, and PPT to fulfil the demands of the curriculum and the students might not need other technologies than the digital technologies that the lecturers use in the lessons, to pass their exams?

2.1.1 DIGITAL TECHNOLOGY SEEN AS A PROBLEM

This section describes a selection of critical discourses. The attempt to understand the critical discourses is deemed relevant because the interviews and the open-ended answers in the surveys (Appendix 4) expressed a subtle doubt that DT should have a positive influence on teaching and learning. There are several different critiques of DT in relation to the use of DT for teaching and learning purposes. These discourses seem to problematize the situations where DT assists or takes over the students' cognitive processes, with the purpose of making thinking, knowledge production, memory etc. easier and more efficient. In the list below these discourses are presented with, what I regard as key researchers and works:

- There is a critical movement claiming that DT and education is a dangerous match due to digital technologies aim to make things easier, faster and more convenient leading

to superficial learning and over-inflation of assessment of own knowledge (Fisher et al., 2015; Hendricks & Hansen, 2014; Hendricks, 2010).

- There is a critical movement that claims that the convenience of DT subdues human competencies like memory resulting in ‘digital dementia’ (Spitzer, 2012).
- There is a critical movement that claims that access to many sources on the internet makes us conflate the difference between information and knowledge resulting in ‘pluralistic ignorance’ (Carr, 2008; P. G. Hansen & Hendricks, 2011; Hendricks, 2010).
- There is a critical movement that claims that the internet is driven by hidden commercial interests that thrives through the internet users willingness to suspend privacy for access to services like search engines, SNS, news, online collaboration tool etc. (Carr, 2011; Morozov, 2012).
- There is a critical movement that claims that students with solely web-based study strategies have a tendency to overestimate their own knowledge (Fisher et al., 2015)
- There is a critical movement that claims that the lines between subjective and objective privacy have been blurred (Bay, 2014).

The distinction between ‘subjective’ and ‘objective’ privacy addresses the cases where people decide to make information about themselves publicly accessible in Web2.0 or Social Media and to indicate that privacy has become increasingly complex by the introduction of Web 2.0 and Social Media. The ‘subjective’ privacy in Social Media and Web 2.0 seems to short-circuit the privacy laws that should protect privacy, in the sense that if people’s own actions on the internet compromise their own privacy then it becomes an ethical matter of knowing the consequences of one’s actions or the service provider’s ethical consideration of not to exploit user data. This critical movement may be particularly interesting in the context of (higher) education because many of the Web 2.0/Social media tools that researchers and lecturers experiment with are prone to compromise ‘objective’ privacy, and, thus, lead students into a ‘grey zone’ of privacy of which they might not know the full extent, which may leave lecturers with an ethical responsibility.

Another reason for this concern is that there is a legal difference in using LMS functionality and finding similar functionality in open web resources. The LMS is considered a private network with specific privileges, e.g. sharing of copyrighted material (within the limits of the copyright agreement), hand-in scan be handled securely and communication is not monitored (at UCN). If lecturers use open resources like e.g. the free LMS ‘Edmodo’ or facebook those privileges ceases and students’ data might be compromised and used for commercial interest (facebook, google etc.) or shared with other students without the knowledge of the students (Edmodo, Prezi etc.).

Studies show (Huffman & Huffman, 2012) that students have a tendency to use the DT that the lecturers use in the lessons, this indicates that lecturers have a responsibility when it comes to the ethical issues of choosing non-legislated web services that might compromise privacy.

2.1.2 DIGITAL TECHNOLOGY SEEN AS THE SOLUTION

The critical movement seems, in some respects, to be a response to the ‘optimistic movement’ in the sense that the optimistic wishes for the potentials of using DT as contested by the practical experience of using technology in practice. In Neil Selwyn’s account for the ‘optimistic movement’, the prospect of using technology in teaching has its roots in the emergence of motion pictures in the beginning of the 20th century. Before that ‘teaching technology’ was, for instance, photographs as ‘visual instruction’ (Selwyn, 2011 p: 45). In the beginning of the 20th-century educational films were thought of as a revolution in education. In the period from 1910 to 1950 thousands of educational videos were produced and in that period research showed a great learning advantage in using educational films, according to Selwyn. In the mid-fifties and early sixties, research began to doubt the actual effect of educational videos in learning and the use of educational videos started declining.

‘By the 1950s it was becoming increasingly apparent that films were not having the major impact on how schools, colleges and universities went about educating students – despite their booming popularity as an entertainment medium’ (Selwyn, 2011 p: 47).

It is an interesting notion, that even though contemporary research showed that education videos could have an impact on learning it didn’t change the organisation of the programmes and pedagogical designs in schools and in higher education. It is also interesting that educational videos were phased out at the same time that motion pictures became popular in entertainment.

The current situation may be interpreted differently, because there is little evidence that DT enhances learning, conversely, it is implemented (also) because it is entertaining and that it allegedly has a motivational effect on some students (Gee, 2003).

Today, the presence of DT in education is a given fact (in Denmark). It is not like in the 20th century where (digital) technology was brought into education by pioneers that believed strongly in their idea (Thomas Edison, B. F. Skinner etc.).

It seems as if Edison and Skinner understood the role and potential of new technology in the light of industrialisation and automation and therefore the understanding that technology brought new ideas for teaching that would make the teacher/teaching more efficient and in turn also make the individual teacher less important. Skinner said in an interview in 1958, that in the future we would need fewer teachers but the teachers who were great at programming the ‘teaching machine’ would be more valuable and higher paid (Selwyn, 2011 p: 121).

The general notion in that line of thinking was that technology may make both teaching and learning more efficient. Skinner wanted to solve two big pedagogical problems that he identified in classroom teaching; the lapse between teaching and feedback and the uniform progression in a school class.

On the basis of the results of his animal experiments, he was certain that reinforcement and ‘behavioural chaining’ would make students learn more in a shorter period of time. The idea was to give quick and unambiguous feedback and to provide student-paced learning. The

means to do so was the ‘teaching machine’, it was a device that looked a lot like an advanced typewriter. The students would work on their tasks at their own pace and they would get immediate feedback on their assignments.

The rudimentary functionality of the ‘teaching machine’ seems to be further developed in the basic functionality in most LMS. This means that an LMS (Canvas, Its Learning, Moodle etc.) holds the possibility to create ‘programmed courses’ that give instant feedback, adapt to the learner's behaviour and suggest further actions to the learner based on other learners path and results. It may be interpreted to raise the hypothetical question of how and when a lecturer is necessary for higher education.

Optimistic movement in the Acts, curricula and policies

The optimistic movement is also explicit in the curriculum for Teacher Education in Denmark. In the most recent Act for Teacher Education, the 2013 reform of Teacher Education in Denmark (Ministry of Higher Education and Science, 2013a ad 5), the potential for teaching and learning with DT is expressed as a panacea for better teaching and more efficient learning. The referendum text, add 5, claims (excerpts translated from Danish):

‘-Digital learning materials will improve the quality of teaching because it motivates students and because it involves the students more actively.’

‘-DT also has a huge potential for freeing resources to more and better teaching and to allow the teacher to spend more time on the individual student.’

The last excerpt seems to have implicit connotations such as, if DT can free lecturer resources then DT/digital learning material must be an autonomous resource that in itself guides the students’ activities. This idea could be interpreted to be similar to the notions in Skinner’s ‘teaching machines’ (Skinner, 1960; Skinner, 2011).

The first excerpt Ad. 5 (...*digital learning materials will improve the quality...*) seems to claim a ‘cause and effect’ nexus between DT and teaching. It explicates the notion that using digital learning material has a motivational and activating effect on students and that motivation and activity will improve the quality of teaching. This might be true under the right circumstances but it appears as if DT also accentuates the traits of past analogue practices in an enhanced digital version (Reedy, 2008 p: 154) (from overhead to PPT, from pen and notepad to word processing etc.).

The excerpts from the Act for Teachers Education 2013 correspond well with the national strategy for digitalisation ‘The Digital Path to Future Welfare’ (Danish Government, 2011). In the strategy extra funding for increased focus on DT in education is described as follows:

‘The government will invest DKK 500 million, with municipalities adding up to DKK 1 billion, to tailor teaching in schools to the needs of the future. The pupils must be able to use modern digital learning resources in the classroom so that photocopies and dog-eared notebooks may be relegated to the past.’ (Danish Government, 2011 p: 22)

However, the quote also insinuates a qualitative difference between paper-based materials (photocopies and notebooks) and that modern digital learning resources, in the sense that, paper-based materials connote descriptors such as ‘dog eared’ and ‘relegated to the past while digital materials are connoted ‘modern’ and ‘of the future’, according to the Danish Government in 2011.

Paper vs. screen reading and writing

This notion is contrasted by Mangen and Velay’s discussion of the state of embodied vs disembodied processes. They discuss different studies of the haptic of writing and argue that students reading from paper are engaged in deeper cognitive and bodily process than students reading from a screen. Furthermore, they speculate that paper-based reading is more likely to remember what they read and to get a deeper understanding of the content (Christensen, 2013; Mangen, 2010). Furthermore, Mangen and Velay argue that writing with a pen on paper is a more demanding process (tactile contact + muscle memory + thinking) than writing on a keyboard (Mangen & Velay, 2010 p: 381-382).

Analogue or digital classroom

Teacher Education (and Nurse Education, and Occupational Therapist Education) are predominantly organised as ‘traditional’ teaching in combination with supervision on assignments at UCN. Meaning that teaching is materialised as lessons with a class of students and a lecturer in combination with periods of internship. In the empiric data, it seems as if DT is either an active learning material defined by the subject (statics in Excel, coding in VisualStudio) or it is a kind of visualisation device for instruction (Projector, PPT etc.).

Reedy puts it this way:

‘Classrooms are, by and large, visually stimulating places’ (Reedy, 2008 p: 143)

Judging from the observations in this thesis Reedy’s assumptions also apply here. The investigations in Chapter 5 seek to explore reasons why classrooms are ‘visually stimulating places’.

The notion in this thesis is that if we do not reorganise the educational context in which DT should contribute, then we are likely to repeat the same mistakes that Edison and Skinner did last century (Cuban, Kirkpatrick, & Peck, 2001; Winner, 2009), which is to miss the opportunity to free the potential of DT in higher education.

The right amount of DT

At Teacher Education, we used to write ‘Bring Laptop’ in the welcoming letters to new students, however, that is not necessary anymore because it is implicit in the context of university college education that students bring their laptop to lessons.

In the Danish newspaper ‘Politiken’ the, then head for research (2006), now deputy director for Confederation of Danish Industry (2016), Charlotte Rønhof says that she is shocked to experience how little Danish schools have changed. She states that (translated from Danish):

'The teaching is conducted like in the last century – it is grotesque when so many tools are invented to make teaching more exciting and to heighten the academic level. However, one can't ask teachers to teach something they haven't been taught themselves' (Translated from Danish) (Politiken, 2006)

Rønhof claims that the teachers are not keeping up with the surrounding society and that Rønhof sees a lot of potential in 'tools', which she does not define in detail. Conversely, she continues that you can't expect the teacher to teach in ways they haven't been taught themselves. The last comment is interpreted to address Teacher Education and it may be understood to mean that teaching in schools is traditional because Teacher Education is traditional. The fact that the quote is from 2006 is an issue of concern in this context, however, I assess that it is still a common opinion.

In contrast to Rønhof's quote the 2015 OECD report on digital technologies and education; Students Computers and Learning – Making the Connection (OECD, 2015) states that:

'Despite considerable investments in computers, Internet connections and software for educational use, there is little solid evidence that greater computer use among students leads to better scores in mathematics and reading.' (OECD, 2015 p: 145)

The report also shows higher scores amongst students that read on print compared to students that read on screen. This finding supports Mangen and Velay's indications that we remember more from reading from paper.

The report also states that the right amount, used the right way is better than restricting use or setting use free:

'But while PISA results suggest that limited use of computers at school may be better than not using computers at all, using them more intensively than the current OECD average tends to be associated with significantly poorer student performance. ICT is linked to better student performance only in certain contexts, such as when computer software and Internet connections help to increase study time and practice.' (OECD, 2015 p: 16)

This quote seems to connect to the notion that digital technologies could hold the potential for freeing the lecturers' time to spend more time with the individual student from the Teacher Education Act 2013 Ad 5. The two quotes and the connection between them are somewhat volatile. However, there seems to be an idea of a more self-governed heutagogic learning strategy nested in the 'right' digital technologies and applications.

Another interesting finding in the OECD report is that the use of DT in schools differs a lot even between neighbouring countries. In Denmark, 86,7% (2012) of all students use computers in school, which is a decrease of 6,3% since 2009, in Germany that number is only 68,7% (2012) and Belgium the number is 65,3% (2012). There is a tendency towards a correlation between a country's economy and the quantitative use of ICT in schools; however rich countries do not necessary support computers in schools if it goes against the pedagogical tradition of the country (e.g. Germany).

When it comes to the home-use of DT Denmark tops the chart 99,9% of all students have DT at their disposal at home and 84,7% have more than 3 computers at home, according to the OECD report (2012). Danish students also top the charts when it comes to internet use both at home and at school. Danish students spend an average of 46 minutes on the internet at school every day and 136 minutes outside of school on weekdays. This adds up to 182 minutes of internet time a day on weekdays, that number is 177 minutes a day during weekends. Only Australian students spend more time on the internet at school, 58 minutes.

However, the quantitative measures only give partial knowledge of the outcome of internet use, because 58 minutes of internet time might be really beneficial to the students learning depending on the educational quality of the internet activity. The OECD report suggests that we need to approach teaching differently to take advantage of DT in teaching. The report also concludes that basic literacies and numeric skills are important before venturing into digital texts. The general notion is that access to DT in schools and at home do not lead to increased learning, according to the test measures of the PISA test:

'In 2012, 96% of 15-year-old students in OECD countries reported that they have a computer at home, but only 72% reported that they use a desktop, laptop or tablet computer at school. Only 42% of students in Korea and 38% of students in Shanghai-China reported that they use computers at school – and Korea and Shanghai-China were among the top performers in the digital reading and computer-based mathematics tests in the OECD Programme for International Student Assessment (PISA) in 2012. By contrast, in countries where it is more common for students to use the Internet at school for schoolwork, students' performance in reading declined between 2000 and 2012, on average.' (OECD, 2015 p: 15)

The OECD report concludes that a new approach is needed to free the potential of DT in schools, which I take to also include higher education.

Programmed instruction to free time to be together

The optimistic movement may be driven by the idea that courses can be programmed into a digital system and deployed by a learner without the intermediation of a lecturer freeing time for the lecturer to supervise smaller groups of students.

A similar notion was conceived by Skinner in the fifties a few years before the digital age. Skinner's idea was to make 'programmed instruction' where the learner's answers to a question would mechanically determine the next activity (Selwyn, 2011 p: 68). 'Programmed instruction' has been made easy for lecturers with the emergence of Learning Management Systems (LMS). The various LMS support different types of mechanisms for deploying programmed 'learning paths' (a pedagogical design that consists of a predetermined sequence of content, tasks and a limited number of choices (Blaschke, 2012 p: 64)).

The notion of 'learning paths' has been tried in several courses for in-service teachers at UCN. The learning paths seem to change the needs for DT and to utilise many functions in the LMS; test-tool, survey-tool, video embedding, online forum and hand-in function.

Figure 2 Example of learning path from a course for in-service teachers

The learning path above (figure 2) was accompanied by video conference to make sure that the students could get quick supervision on the tasks if they needed to. The first ‘learning path’ was an experiment, where the lecturer was present while the students worked on the tasks in the learning path. The second utilisation of the ‘learning path’ was a formal part of the syllabus.

Another example of the use of LMS functionality is in the book chapter ‘Deep learning in the Open Source Learning Streams’ (Kjærgaard, 2015a). The discussion forum and the possibility for embedding video clips are key functions conditioning and determining the appearance of the course. Conversely, the extended use of LMS functionality at UCN is not that common. The LMS implementation group at UCN report that, even though, the lecturers agree that the new LMS (Canvas by Instructure) appears to be great they only need and use it for communication and file sharing.

Figure 3 Slide from conference on the implementation of Canvas

That does not necessarily represent a problem it could also represent the actual needs of the lecturers. The aim to increase the use of LMS functionality does not seem to relate directly to the demands of the curriculums (see Appendix 8). The question is if there is a request or need amongst lecturers and students for the functionality of the new LMS? A practical demand for re-organisation of the programmes in the direction of e-learning may create a need for LMS functionality. This could be if the programme was reorganised to include blended learning methods as exemplified in the article ‘Utilising DT for dialogue and evaluation – new scholastic methods in action’ (Kjærgaard, 2016c).

2.2 FIVE CATEGORIES OF DIGITAL TECHNOLOGY APPLICATION

This section describes an analytical tool that introduces 5 ways of looking at the role of DT in lessons.

These categories have emerged through the initial preliminary studies (Baseline S1QS1 Appendix 3) and through the review of the field. The 5 categories represent protruding uses of DT, however, they are not found in ‘pure’ states, the categories indicate contractions of use in specific contexts DT, which can be isolated for analytical purposes.

In the article ‘*Motivation and learning strategies in the use of ICTs among university students*’, the researchers identify four categories of ICT utilisation among University students; social, technical, academic and educational platforms (Valentín et al., 2013). ‘Social use’ refers to communication, ‘technical use’ refers to technological literacy (techniques to operate ICT), academic use refers to the students use of digital presentations and word processing and educational platforms refer to LMS and university e-mail (Valentín et al., 2013 p: 55). These four categories in relation to the empiric data inspired the five categories in this thesis.

The need for the categories became evident because it was difficult to communicate what type of situation the DT was affecting a learning process or a pedagogical design.

The 5 main categories identified in the review and in the baseline survey:

1. DT in the Educational Programme
 - a. How the organisation of the programme catalyses a specific way of using DT
 - b. How the organisation of the programme limits the use of DT
 - c. How the organisation supports use of DT
2. DT in the academic subject/discipline
 - a. A specific academic subject and its DT
 - b. A specific practice and its DT
 - c. A specific culture and history of the subject and DT
3. DT in the lesson (lesson)
 - a. The communication channels in the classroom
 - b. The types of assignments
 - c. The organisation of the relations between lecturer and students
4. DT in the learning process

- a. The student's utilisation of DT in learning
 - b. The student's interaction in digital learning communities
 - c. The students personal learning environment
5. DT in everyday learning
- a. Developing skills with DT
 - b. Potentially working towards a heutagogic learning strategy

The main focus of this thesis and in the articles is on category no 3; the lecturer's and students' utilisation of DT in a lesson and in the relations between lecturers, students, and DT.

The nexus of DT and education

The prior research on the field of DT utilisation in higher education is pinpointing several problems in the relations between DT, students, and lecturers. The most dominating discourses appear to be the discourse of students' use of social media in lessons (Aydin, 2012 p: 1097) and the lecturers' use of presentations software. In this thesis the use of social media does not appear to be the biggest concern (see Chapter 5), however, the empiric data suggested that the lecturers use of presentation software is a de-facto standard for how to use DT in lessons and furthermore, this de-facto standard also determines and conditions the relations between the students and the lecturer and the DT in the classroom (see Chapter 5). Therefore, the process of discussing different discourses continues into the discourse of presentation software.

2.2.1.1 Review of the research on PowerPoint as a pedagogical tool

This section discusses PPT as a pedagogical tool in higher education. The research within the field of using presentation software in lessons in further education is reviewed because the de-facto standardisation of PPT as the main pedagogical technology in a lesson entails a series of issues for further investigation.

Edward Tufte's PPT studies address a series of problematic issues in the practice of using PPT in teaching (Tufte, 2003) that also appear in the analysis in Chapter 5. Tufte's argument is that PPT is, genealogically, a marketing tool for promoting simple 'slogan-like' ideas:

'That essay (Tufte, 2003) suggests PP, because of its cognitive style, is a moral or an ethical issue because PP so strongly enforces a certain type of cognitive style, which is not truth oriented but rather marketing oriented.' (Zachry & Thralls, 2004)

Zachry and Thralls suggest that the use of PPT in education entails an ethical problem, because PPT, in their view, imposes a certain perspective of something that comes across like unquestioned surface. This notion appears to be relevant for the analysis in Chapter 5, because the students seem to consider the content of the lecturers PPT the very important, both during lessons and while preparing for exams.

A brief history of PPT

PPT was developed for Apple Macintosh by Robert Gaskins and his company Forethought I 1987. Forethought, inc. was bought by Microsoft in 1990 and the software changed the name

to PPT. Forethought also changed the name to Microsoft Graphics Business Unit. It was designed to present linear, clear messages in a persuasive and easily comprehensible form – to make powerful points.

'[PPT] is software you impose on other people.' (I. Parker, 2001p: 1)

In the cognitive style of the PPT that Parker has in mind, the lecturer may be transmitting simplified information and not directly facilitate knowledge production. In that understanding of PPT usage, the aim seems to be persuasion, not understanding or reflection.

Tufte claims that PPT catalyses a specific way, a cognitive style, of presenting academic content (Tufte, 2003). PPT contains a set of possible ways of portraying information that might appear powerful and even intrusive, however, the real issue with PPT, according to Parker, is rather its immanent mode of simplification.

'In the glow of the PPT show, the world is condensed, simplified and smoothed over.' (I. Parker, 2001p: 5)

Even though Parker might be right in some cases, the reality seems more ambiguous and complex, as the investigations in Chapter 5 elaborates. PPT might be the vehicle for planning, lecturing and for the students' note taking, but it is also a strong standardisation or alignment of students' and lecturers' perception of what teaching is. Reedy put it this way:

'At Aylmer, the dominance of PPT (and in many cases, by extension, the data projector and IWB) meant that many students and teachers began to think about teaching and learning in terms dictated by the technologies. The world of teaching and learning has, in some measure, become reduced to a 1024 x 768 pixel presentational display – it has been shaped around the 'form factor' of the technologies. There are several examples of this that I saw over my time at Aylmer.' (Reedy, 2008p: 154)

This alleged simplified standardisation brought on, partly, by DT also brings a clear understanding of the protocol in a given teaching situation. What constitutes a 'lesson' is recognisable for the student and the student knows his/her role in position/practice system (see Chapter 3) in the situation which presumably makes it easier for the student to focus on content. The analysis in Chapter 5 will imply a more diverse understanding of the use of PPT and suggest reasons why the use of PPT is the way it appears to be.

2.2.1.2 Review of the role of digital technology in a University College lesson

This section looks at the discourses of how DT is used in a lesson in higher education.

The supporting research question 1a in this thesis raises the question: *How is DT utilised in a lesson in University College?* Answering this question led to an investigation of the role of DT in a University College lesson. The role of DT is constituted by the relations between DT, students, and lecturer in a position/practice system. So, it is an investigation of what constitutes and determines the conditions for the development of these relations. This makes it an investigation of 'habits' (practices enunciated by both students and lecturers) and 'organisational traditions' (curricula, timetables, and syllabuses).

In David Johnson's study of University professors' utilisation of ICT (D. R. Johnson, 2012) he found that the professors were focused on the practical advantages of digital technologies as more convenient substitutes for prior, analogue alternatives.

'Academics perceive new technologies as of limited or no functional relevance to instruction, which suggests that initiatives for professors to adopt instructional technologies contradict professional values. When technology is employed in instruction, the objectives are typically enhanced visualization or attracting student attention.' (D. R. Johnson, 2012 p: 137)

Johnson's experience corresponds well with the analysis in Chapter 5. Neil Selwyn also elaborates on Johnson's work:

'...professors were more commonly motivated by the gains derived from enhanced visualization of content in forms that could then be readily stored and later distributed to students.' (Selwyn, 2014p: 69)

The vast majority of the professors in Johnson's study were not focusing on using technologies for pedagogical purposes. They didn't utilise network communication possibilities, collaboration opportunities neither did they focus on digital study skills. They focused on digital technologies that would reinforce their presentation habits in more efficient ways.

In the empiric data behind this thesis, it shows that the most commonly applied DT is either PPT or the technology of the profession or trade in question and the specific academic subject. Only rarely is the focus on DT as an active part of the students study skills or learning process.

Huffman and Huffman address this issue in the article 'Beyond basic study skills: The use of technology for success in college' (Huffman & Huffman, 2012). They divide the study of digital study skills into three stages; stage one is addressing whether the study tool/method is it convenient and whether it fulfils an acknowledged need or not. Stage two is investigating how the study tool/method performs in reality and finally, stage three investigates the implications of blurred ecotones between; academic and private lives. Huffman and Huffman found that the students' ability to understand and utilise the lecturer's intentions with the utilisation of technology in the class affected their grade positively. Hence, the lecturer's level of technological literacy is important for the student to benefit from utilising his/her own technology in class (Goodfellow & Lea, 2013; Tyner, 2014). The term literacy is used in its post 'sociocultural turn' meaning (Gee, 2005) which indicates that literacy is divided into subcategories of competencies to express oneself in sociocultural contexts through complex media, take part in network development and to understand complex media expressions. 'Usefulness' is a key term according to Huffman and Huffman however 'usefulness' is more than one thing. They divide 'usefulness' into the; usefulness of technology in general and usefulness of technology as a prediction of the needed technological literacies of the future profession. Both almost equally important:

'We assessed "usefulness of technology" as "usefulness of technology in future occupation," a factor very important to college students.' (Huffman & Huffman, 2012)

It is not evident which technologies the students in Huffman and Huffman's study utilised apart from the four technologies they investigated; word processing, web search, LMS, and email. However, the four technologies seem to cover the most predominant technologies at play. As it turns out the chosen selection of technologies resembles the technologies that the students in this study most commonly utilise.

So, even though the variety of technologies may be sparse it does not urge students or lecturers in the programmes to promote a more diverse utilisation of technology as a part of the student's study skills. All of the four technologies could be utilised in more advanced ways. Word processing could include reference systems and formatting and reference handling, web search could include social bookmarking, LMS could include systematic use of statistics and testing and relation building on the basis of learning analytics and email could be used as a topical relation database if emails were labelled in certain ways. Even with a narrowly scoped selection of technologies, the possibilities are many, however, the needs of the students may be expressed in their use of DT, thus, indicating that they do not need a more advanced utilisation of DT.

The multimodal aspect of digital presentations

One of the strong affordances of presentation software is that it provides different types of multimodal semiotics (Zhao, Djonov, & van Leeuwen, 2014).

Even though the linearity of a PPT is implicit in the functionality of PPT, the linearity may be accompanied by nonlinear hypertext navigation within the presentation. However, none of the PPT samples (see Chapter 5.3.5) contained hypertexts neither did any of the interviewees refer to the usage of hypertext within the perimeters of the presentation.

PPT has, in itself, many semiotic modalities, and many possibilities for organising nonlinear excursions (Zhao et al., 2014) of which a few are utilised in the sample presentations analysed in this study. Apart from the inbuilt possibilities in PPT some lecturers add supporting technologies. These technologies are rare but important since they bear witness of a 'third wave' in the wake of the 'second wave' in the aforementioned metaphor of Celsi and Wolfinbarger (Celsi & Wolfinbarger, 2002).

2.3 SUMMING UP THE DISCOURSES IN FIELD OF DIGITAL TECHNOLOGY IN HIGHER EDUCATION

The field of DT in higher education appears to be both intricate, commercial and political. It is intricate because it changes the structure of education in the sense that the student in higher education, potentially, could learn most of the curriculum by him/herself given the right resources, strategy and desire to learn. However, only very few succeed in completing MOOC courses. In their review of MOOC completion rates, Khalil and Ebner suggest between 0,67% and 19,2%, in Coursera, with an average completion rate of 7,6%. Other reviews suggest and

average around 15-16%. Katy Jordan's research on MOOCs indicates that as enrolment rates decrease, completion rates increase (Jordan, 2015 p: 345). If the completion rate is an indicator of how many learners are able to learn in a self-regulated learning environment, then the potential of being empowered by DT to learn by one's self is not applicable to higher education in general, yet.

The relation between DT and higher education is also intricate because DT seems to require a set of skills and competencies to operate fruitfully (Arstorp, 2015b; Celsi & Wolfinbarger, 2002; Martin & Madigan, 2006; Trilling & Fadel, 2009a).

It seems as if the positive discourses rely on the potential that only a few students can free in reality when the digital technologies are put to use in traditional teaching.

The negative discourses are addressing elements of DT that are deemed important for this project, however, they are not determining the investigations and the experiments presented in the articles. The issues of privacy, and of suspending inherent human qualities such as; a sense of place (GPS), memory, handwriting and ability imaging (3D) will be considered in the experiments. This means that the experiments attempt to focus on what humans can do with DT to enhance human abilities such as collaboration and dialogue instead of 'offloading' skills to DT.

So, the discourses inform the investigation in Chapter 5 and the experiments in the articles in the sense that negative discourses indicate what to avoid and the positive indicate a direction for freeing the potential.

This leads to a locally grounded discourse on the use of DT at UCN that focuses on using DT that catalyses dialogue and collaboration.

3 PHILOSOPHY OF SCIENCE – CRITICAL REALISM

This chapter introduces and discusses the philosophy of science that the investigation of the use of DT in lessons as presented in Chapter 5 rests upon. Critical realism (CR) is chosen for this investigation because it may offer a hybrid methodology between positivistic, interpretive and critical social science. CR offers a critical view on the experienceable phenomena in a social context. The critical view leads to assumptions that are investigated scientifically often in a mixed methods investigation that utilises both positivistic, quantitative methods and qualitative interpretative methods. The aim is to identify causal mechanisms that may produce the experienceable phenomena. In the case of this investigation, the experienceable phenomenon is that PPT seems to be the dominating DT used in a lesson at UCN. The investigations move ‘backwards’ from the experienced phenomena to find the mechanisms, structures and agents that produce it. CR seeks to place a critique, and offer ‘reasonable’ explanations why things appear as they do, and finally, CR suggests what and how to develop other approaches to what is interpreted as false representation.

Critical Realism and the philosophy of Gilles Deleuze

CR is in contrast to the philosophy of Deleuze used later in this thesis in a very particular way. They both take the point of departure in the experience, however, CR moves backwards from the experience and investigates the reason why something appears the way it does. Deleuze moves forwards from the experience and uses the experience to create ‘positive difference’ (see chapter 6 for elaboration). CR was called ‘transcendental realism’ in the early writings, meaning that knowledge of the real transcends into the ontology of the phenomena looking for reasonable explanations. Deleuze’s philosophy is called ‘transcendental empiricism’ meaning that knowledge transcends from experience to the plane of ideas and that it feeds conceptualisation of development. So, CR structures the investigations and the philosophical concepts of Deleuze inform and develop the pedagogical designs presented in the articles and in chapter 8.

The origin of Critical Realism

CR is British philosopher Roy Bhaskar’s philosophy of science formulated in the books ‘A realist philosophy of science’ (1975) and ‘The Possibility of Naturalism’ (1979) (Bhaskar, 1979; Bhaskar, 2008). However, CR has evolved through the hands of other researchers, Margaret Archer, Andrew Sayer, Berth Danermark, Andrew Collier, David Corson and David Scott to name a few (M. Archer, Bhaskar, Collier, Lawson, & Norrie, 2013; Collier, 1994; Corson, 1991; Danermark, 2002; Sayer, 1992; Scott, 2005; Scott, 2013). In connection with the development and propagation of the philosophy, Bhaskar formulated a ‘model for discovery’ (the DIREC model presented in Chapter 5.1). This model for discovery has been used throughout the studies in this thesis.

CR is the philosophy of science that lays the foundation for the first part of this thesis, the investigations in Chapter 5. It serves as philosophical background for the choices in approach, method, data analysis and as a basis for formulating an ‘Immanent Critique’ of the state of

application and use of DT in university college teaching. So, the balance between what we can ‘think’ and what we can ‘prove’ can be understood as a balance between philosophy and science, according to Bhaskar (Bhaskar, 2008 p: 5). The methodology of CR is interested in laying bare the ‘real’ mechanisms that produce the experienced event assuming that the event is something else than it appears to be. So, Bhaskar is interested in what is behind the presumably false representation of the real (a critical approach). CR is described as ‘Transcendental Realism’ in the early writing of Bhaskar.

‘It [transcendental realism] regards the objects of knowledge as the structures and mechanisms that generate phenomena; and the knowledge as produced in the social activity of science.’ (Bhaskar, 2008 p: 15).

In a ‘Transcendental Realist’, later CR, approach the investigation is focusing on what makes phenomena appear as they seem to do. I interpret this to only be possible if the researcher has a well-defined understanding of the phenomena because the CR approach only ‘describes’ the phenomenon, it does not directly investigate and analyse the phenomena. So, even though the focus is on investigation the structures, mechanisms and agents that produce phenomena the investigations in Chapter 5 also seek to gain a greater understanding of the phenomenon itself. In that sense, the concepts of CR becomes analytical categories.

3.1 PHILOSOPHY INFORMING SCIENCE

This section describes the layered ontology in CR and discusses the layered ontology in relation to Deleuze’s notion of ontology.

Bhaskar seeks to maintain the balance between science and philosophy by introducing a layered ontology consisting of both a subjective, interpretive, epistemological layer (transitive layer) and an objective, ontological layer (intransitive layer) to knowledge. These two layers contain, respectively, transitive and intransitive objects of knowledge. Transitive objects of knowledge come into existence when they are articulated or experienced in a combination of language and practice (a nexus of practice) (i.e. teaching, organisation etc.). Intransitive objects of knowledge exist prior to our knowledge of them, the gravity of the planet Mercury, for instance, existed before scientists could measure it as Bhaskar puts it (Bhaskar, 2008 p: 11). Partial knowledge of phenomena in the intransitive layer can be achieved through scientific investigation and retroductivist reasoning. Bhaskar uses ‘Darwinian evolution’ to exemplify a theory that connects plausible mechanisms in the intransitive layer with transitive objects of knowledge. Darwin found structures, mechanisms, positions and practices that are all intransitive objects of knowledge, upon which he created a series of transitive objects of knowledge, that speculate in the evolution of species leading to his theory of evolution (Bhaskar, 2008 p: 11-12).

However, it is very important to note that while Bhaskar thinks that knowledge transcends from ‘the real’. In other words; you can experience more than you can know and you can think more than you can experience.

The idea of ‘ontology’ bears with it a certain claim to ‘truth’ or as Michael Hardt put it in ‘Deleuze: An Apprenticeship in Philosophy’:

‘...ontology itself is presumed to carry with it a transcendental determination of the good.’
(Hardt, 1995 p: 120)

The fundamental idea in the ‘layered ontology’, that you can identify and define layers of ontology and claim that identifying mechanisms and structures should bring you closer to the ontology of the phenomenon is used as an analytical framework. However, it is also contested in this thesis that CR should open a ‘secret’ segue way to an analysis deeper than other analysis. CR is mainly used because it offers an applicable set of analytical categories and because it offers a balanced view on what it is reasonable to claim knowledge of.

The application of Bhaskar’s CR revolve around three main notions; the ‘layered ontology’, the ‘Immanent Critique’ and the ‘transcendental argument’. These will be elaborated in more detail in this chapter.

Critiques call Bhaskar’s philosophy of science ‘neo-positivism’ (Nygaard, 2005 p: 52), which is not entirely wrong. Others contest the suggestion that CR is ‘neo-positivistic’ or ‘quasi-critical rationalism’ (Buch-Hansen, 2005 p: 103). Both statements have an element of truth to them because CR can appear in many contexts as long as the layered ontology, the ‘Immanent Critique’, and the transcendental argument is the cornerstones of the research. CR becomes closely related to positivism if the methods focus on getting large quantities of qualitative data. This could happen in a Grounded Theory study, where statistics on qualitative data coding was the prime analysis. Or in a Design-Based Research study with more focus on doing many interventions than on the depth and increasing the complexity of the iterations. On the other hand, CR differs from positivism because those same methods could be used in ways that would emphasise the qualitative data and the depth and complexity of the data. So, in practice, CR might appear as both positivistic and interpretive according to the method and intentions of the research.

The way CR is creating a foundation for reasoning in this thesis is also in-between the positivist (quantitative) and interpretive (qualitative) doctrine. The empiric data (surveys, interviews observations, and analysis of PPT) all contain both qualitative and quantitative aspects of the research object. This means that the explanations of the apparent state of the use of DT at UCN are not as ‘scientific’, as a purely quantitative study could appear to be. On the other hand, the interpretative treatment of the data, leading to suggestions for development (articles and chapter 8) are not as emancipatory as they would have been if they were purely speculative and interpretive. So, the investigations end up with methodological flaws in a scientific paradigm, and at the same time, they end up with philosophical suggestions for development that are ‘tamed’ by science.

The data analysis condition the framework for how the philosophical concepts can inform and develop the pedagogical designs presented in the articles (Chapter 7). The balance between science and philosophy is very important because critical realists believe that science can lay bare the ‘causal mechanisms’ and philosophy can emancipate ‘false representations’ from

their falseness (M. Archer et al., 2013 p: 403). That is also the assumption in this thesis. The ‘Immanent Critique’ (Chapter 5) is leaning towards science, whereas the articles and the ‘Framework for Suggestions for Development’ (Chapter 8) lean towards philosophy.

Realism, criticism and emancipation

CR is both a ‘realist’ theory and a ‘critical’ theory, which entails that CR is generally used as a methodology for promoting emancipatory change, thus, encouraging the use of emancipatory methods.

‘The aim in Critical Theory is emancipation, so it is critical in the sense that it does not simply seek to generate knowledge of the world as it is but to detect and unmask beliefs and practices that limit human freedom, justice and democracy and engage in action to bring these about.’ (Scott & Usher, 2011 p: 35)

In that sense CR is not intended as a methodology for descriptive research; however, CRs aim for emancipatory investigations holds the potential for both exploratory and explanatory studies.

CR is critical, but it also a kind of realism, which means that the research is built on ‘common sense’. David Scott put it this way:

‘We believe that the world is ‘real’, that it exists around us ‘out there’ indifferent of our hopes, beliefs, and desires at any particular moment. This independent, ‘objective’ world is the yardstick against which we must measure our hopes, beliefs, etc. to establish and assess their truth and reality.’ (Scott & Usher, 2011 p 15)

The metaphor of a ‘yardstick’ is also describing the point of departure for the researcher. The yardstick indicates what we know already and the research, in turn, becomes the investigation into how the phenomenon came to be represented in such a way. Bhaskar explains the difference between ‘normal’ realism and the ‘transcendental realism’ (later critical realism) that he is developing:

‘‘Realism’ is normally associated by philosophers with positions in the theory of perception or the theory of universals. In the former case the real entity concerned is some particular object of perception; in the latter case some general feature or property of the world. The ‘real entities’ the transcendental realist is concerned with are the objects of scientific discovery and investigation, such as causal laws. Realism about such entities will be seen to entail particular realist positions in the theory of perception and universals, but not to be reducible to them.’ (Bhaskar, 2008 p: 16)

This means that CR is primarily interested in causal laws that we, through scientific discovery and investigation, can know of. Furthermore, the quote also says that the discoveries cannot be reduced to the realist theories of them. The scientific findings might transcend the notions in the theories, but the findings will presumably be richer than the theories. The realist approach also entails a strong focus on causation. Causation is understood as a rhizomatic,

geographical and viral relation between cause and effect and not as a genealogical, successive and arborescent teleological relation between means and ends. Sayer put it this way:

'One of the most distinctive features of realism is its analysis of causation, which rejects the standard Humean 'successionist' view that it involves regularities among sequences of events.' (Harré and Madden, 1975; Bhaskar, 1975) (Sayer, 2000 p:13)

The notion of causation is important because it contrasts the teleological doctrine. Bhaskar claims that in reality 'successionist' law of order is a construction of arborescent hierarchies that adheres to the transitive layer. They are made by the actants in the 'event' they were not present before and they will dissolve after the 'event'. The 'event' holds the structures and mechanisms for producing the 'event' and without the structures and mechanisms the successionist order return to a rhizomatic order. For instance, a lesson at Teacher Education may be an example of a successionist order that is brought on by a specific structure (syllabus/curriculum/time table) and mechanisms (room, furniture, blackboard, projector etc.). That is not how people normally meet (outside of education) and that is presumably not how they will meet after the lesson.

CR is a methodology that is open to many methods, so in that sense, it is a meta-theory. In relation to that, David Scott raises two propositions that CR researchers should consider:

'The first is that the deployment of empirical research methods requires, or indeed needs to be underpinned by, a meta-theory, such as empiricism, critical realism or pragmatism. The second is that holding a belief that an independent reality exists does not commit one to the view that absolute knowledge of the way it works is possible.' (Scott, 2005 p: 634)

The proposition is that empirical research needs a meta-theory is a way of securing consistency in the empiric data. CR as a meta-theory creates a theoretical framework and sets the outer perimeter for the studies, so to speak. However, it also filters out other approaches to the object of research that might have opened for other insights. Therefore, by applying CR as a meta-theory you also accept that you find the things that CR hones in on, which is the structured mechanics of reality. You claim to find mechanisms, agents, practices, potions, that produce the ontology of the real. Moreover, these are found through a combination of epistemological explanation (retroduction) and developmental experiment (abduction).

Therefore, CR seems to apply if the belief is that there is something real to be critical about, something you believe should change. This interpretation of CR is the reason why CR is used in the investigations in Chapter 5.

3.2 KEY TERMS AND STRUCTURES APPLIED IN THIS THESIS

This section introduces the key terms from CR put to use in Chapter 5. The terms are utilised as analytical categories for the analysis of the use of DT in lessons, which makes the key terms part of the method as well.

The key terms include terms for stratifying the world into layers and domains such as potions and practices, structures and mechanisms and transitive and intransitive domains.

The fundamental stratification in CR is that of the 'transitive' and the 'intransitive' layers. To put it simply; there is more to the world than we see, and we see more than there is. In CR the belief is that we can never fully understand the being of real phenomena, however, on the other hand, we construct more knowledge of the phenomenon than the phenomenon itself. For instance, a weather forecast on television can be interpreted as a social construction that generates an emergence of its own, which is separate from the ontology of weather. What we actually know about tomorrow's weather is very little compared to the social construction of a weather forecast. The same goes for e.g. a football match. The commentators construct a new phenomenon that is bigger than the actual football match is, however, we may not really understand the complexity of the football match (or the weather, or learning for that matter). So, we have real events like gravity, learning, weather, football etc. that we can experience to a certain extent but never fully explain or understand, according to CR. In order for researchers to get closer to explaining and understanding these real phenomena, CR addresses the mechanisms and structures that produce the phenomena instead of just getting knowledge of the representation of the phenomena.

3.2.1 THE TRANSITIVE AND THE INTRANSITIVE

The Intransitive layer refers to ontology, the being of things in the domain of the real. The intransitive exists contrary to our ignorance or knowledge of it.

The Transitive layer refers to epistemology, the knowledge of things in the actual. The transitive layer represents the construction of knowledge of what exists and occurs in the intransitive layer.

The intransitive layer consists of objects of knowledge that exist independent of our knowledge of them. Bhaskar explains it like this:

'In short, the intransitive objects of knowledge are in general invariant to our knowledge of them: they are the real things and structures, mechanisms and processes, events and possibilities of the world; and for the most part they are quite independent of us. They are not unknowable, because as a matter of fact quite a bit is known about them.' (Bhaskar, 2008 p: 12)

It is important to distinguish between the notion of not being able to know or say anything about something because it has a certain state of being, and the interpretive notion that all you can know is the socially constructed knowledge of something. In CR the belief is that you can achieve knowledge of both. Examples:

- Smoking affects your health no matter if you believe it or not.
- Your stocks decrease in value if the market drops, no matter if you know of it or not.
- It does produce sound if a tree falls and no one hears it

It makes no difference to objects in the intransitive layer that we know of it or not, however, knowledge of objects in the intransitive layer is likely to change practices in the transitive layer. For instance, smoking, car safety, nutrition, and exercise. They all represent

phenomena, where knowledge of objects in the intransitive layer affects observable practices and thus making knowledge a matter of ethics. We know more about the effects that smoking causes, which has led to anti-smoking campaigns and a decrease in the number of smokers. We know more about how to lead ‘impact energy’ away from the cabin of the car, leading to safer cars. We know more about human metabolism and the body’s need for exercise, which changes nutrition advice and leads to healthier people (or more guilty-feeling people).

On a critical note, I doubt that the stratification of ontology and the quest for structures and mechanisms are more ‘truthful’ or insightful than other philosophies of science. CR designs a set of structures that are mediations of Bhaskar’s meta-theory of science, which applies to the research object in this investigation, mainly because it offers a set of analytical categories and not so much because it claims to hone in on a phenomenon’s ontology. Nonetheless, the analytical categories seem to address important elements of what goes on in a lesson in regards to the use of DT.

3.2.2 THE THREE DOMAINS; THE EMPIRICAL, THE ACTUAL AND THE REAL

This section introduces the notions of domains in CR. It presents the three domains and suggests how these inform the investigation in chapter 6.

In CR ontology is divided into 3 domains (Bhaskar, 2008 p: 39; Nygaard, 2012 p: 53):

- The Empirical; observations and experiences
- The Actual; Events and phenomena
- The Real; Structures, mechanisms, potentials and tendencies

The visualisation of the domains below is inspired by Sayer (Mingers, 2004 p: 94; Sayer, 2000 p: 15):

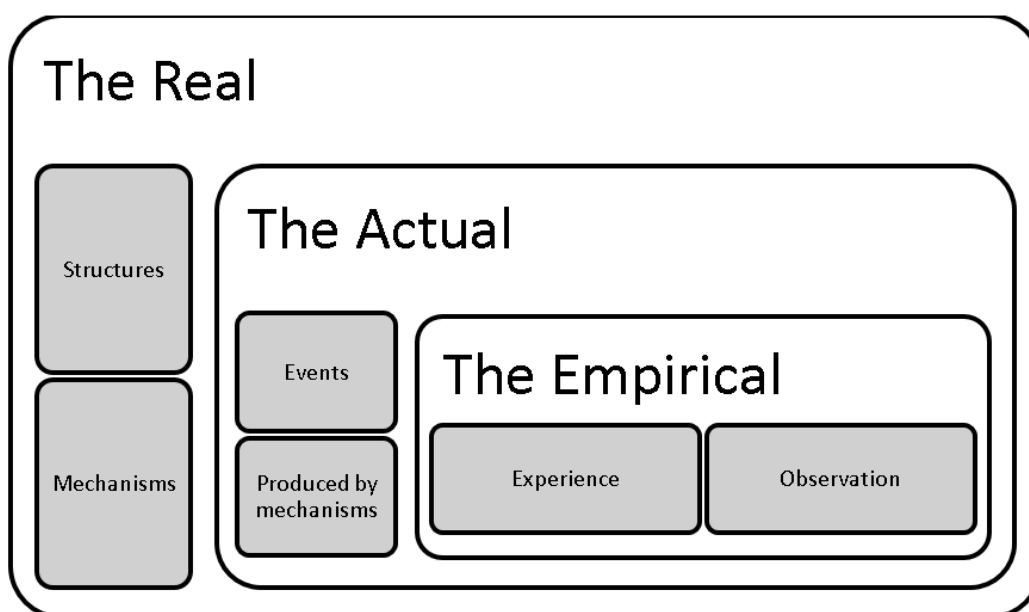


Figure 4 Understanding of causality in Critical realism

The figure (figure 10) shows that every experience is mediated and that there is no direct connection between the empirical and the actual domain other than representations of it. The observations and experiences of the event are never full nor pure, they will always be mediated through the mind of the researcher making objective positivistic research impossible.

3.2.2.1 The Empirical Domain

This domain is at the transitive level it is referring to what we individually experience. It is based on our intuitive understanding of the world and on the conscious knowledge of the world; terminology, concepts, hypothesis, models and theories. The empirical domain can be value-laden and represents the individual understanding of the world and the empirical world develops through a synthesis of preconception and new experience into ‘new knowledge’, which is what Bhaskar calls transitive objects (Bhaskar, 2008 p: 13). The transitive objects are opposed to the intransitive objects. The intransitive objects are mechanisms and structures that operate independently of us. For instance, it still generates pulsating sound waves when a tree falls, even though no one is around to hear it. It could be argued that learning is an intransitive object of human nature in the sense that learning is still possible even though we are not in an educational context. This conception of learning indicates that we properly can’t change the nature of learning. Learning is the same mechanism as it was in the times before DT but the ways we try to catalyse learning has changed by the introduction of DT in education.

The key word is: Experience

3.2.2.2 The Actual Domain

This domain is both at the transitive and the intransitive level it is constituted by all phenomenon both known and unknown to the individual. This is where the ‘event’ that is experienced in the empirical domain happens. The actual domain is more complex than the individual can conceive, hence, more than one story can be told for an ‘event’. Knowledge is created about something. That ‘something’ is not our conception of it but it is an ontological being in itself, which will always be more than we see or think of it or experience. In Deleuzian terms, the Actual Domain is where the virtual is stratified onto the plane of organisation. That means that this domain is where the virtual idea of a concept and the actualization of the concept meets in an experienceable ‘event’.

The key word is: Event

3.2.2.3 The Real Domain

This domain is at the intransitive level and it is constituted by all the structures, forces, and mechanisms that constitute emergence of the phenomenon.

‘...the view that the world at the level of the real is comprised of ‘enduring and transfactually active mechanisms’ (p. 20), entraining the dynamisation of the traditional principles of substance and causality (the principle of indifference).’ (Bhaskar, 2008 p: xvii)

The real is constituted by a set of mechanisms. These mechanisms are organised objects in structures that are; enduring, continuing to operate, and active. The notion in CR is that knowledge of the mechanisms will change the unpredictability of the real, thus challenging the principle of indifference. This leads to an understanding of the real as a complex multiplicity of many relations between causal mechanisms of which all are influencing the emergences of observable events in the empirical.

The domain of the real host phenomena that exist prior to our knowledge of it but if we engage in the interaction between the empirical and the actual domain we might change the real and that is what the studies in this thesis is about – changing the real.

For instance, gravity pulls an object towards the centre of the earth, but if a mechanism of causality is deployed to obstruct the causal mechanism of gravity then the object might not fall to the ground. In layman's terms that could be a book on a table, the book being the object being pulled to the ground and the table being the mechanism changing the causality. Transferred to education this could mean that even though all the information necessary to reach a learning objective is achievable outside the lesson the students still rely on the structure of the syllabus and the pedagogical mechanisms deployed in the lesson to learn.

The keyword is: Mechanisms

3.2.3 CONDITIONS FOR AGENTS AND STRUCTURES

It is fundamental to CR research to locate causal mechanisms, agency and structures. These three elements function as analytical categories for the research. However, they might only give us insight to the specific context in the domain of the empirical. Bhaskar writes that what a scientific intervention or an experiment in the domain of the empirical entails is causal effect on events in the domain of the actual and that these experiences might open for understanding of causal laws that operate in the domain of the real:

'It is a condition of the intelligibility of experimental activity that in an experiment the experimenter is a causal agent of a sequence of events but not of the causal law which the sequence of events enables him to identify.' (Bhaskar, 2008 p: 1)

This quote addresses the balance between conditioning and determining the outcome of an experiment. To reach a state of general assumption a researcher might choose to deploy methodologies such as; Design Based Research, Grounded Theory or Nexus of Practice (Markauskaite, Freebody, & Irwin, 2010 p: 55). The general assumption is that when experience in the empirical domain seems systematic it leans towards a more generalizable conclusion.

This notion redefines the relation between quantitative and qualitative data from being dichotomized to being dialectical (M. Archer et al., 2013 p: 409). It also suggests a dialectical relation between philosophy and science in the sense that philosophy and science inform and cross-fertilise each other. The philosophical concepts are made more precise and practice relevant by scientific discovery. For instance, a 'Design Based' study will to some extent seek to generalise on the basis of cases bringing the level of the actual closer to the level of the

empirical. A Grounded Theory-based study will seek to get qualitative knowledge of the actual in a systematic sequence of studies at the level of the empirical and maybe generalise on the basis of systematic coding of the new knowledge. Both methods combine quantitative and qualitative data and they couldn't generate the same results without both approaches to data production. The qualitative observation of communication in a series of events becomes generalizable because the coding reaches a level of saturation that makes it plausible to express general traits of the research object (Anselm Strauss & Juliet M. Corbin, 1997). The same goes for Design Based research the individual intervention resembles a case-study or an action research cycle until it becomes part of an iterative process of continuation with a baseline and an end-line evaluation to pinpoint what has actually been achieved from the interventions (Bell, Hoadley, & Linn, 2004).

3.2.3.1 Structural Conditions

The structural conditions are believed to precede the social interaction in CR. The structures represent articulated and practised arbitrates that constitute culture, society, education, protocol, conduct (Buch-Hansen, 2005 p: 50). A syllabus is an example of a structural condition it is articulated before the lesson, it is designed on the basis of a shared tradition and understanding of what a syllabus is. It goes beyond what the individual agent (student) knows of the situation and it exists even though the agent (student) is not aware of it. For instance; the assignment described in the syllabus and the hand-in date still counts even though the student has not seen it.

The intersection between an agent, mechanisms and the structure is very important because it is in the intersection between agent and structure the structure becomes real it is what Bhaskar refers to as the 'Point of Contact' (Bhaskar, 1979 p: 44). Examples of 'Points of Contact' are students in a classroom with a lecturer and a syllabus. The students and the lecturer are agents but with different roles and positions, the syllabus is a practice system, and the structure is the room and the things in the room acting as mechanisms for actions. The things in the room condition and determine the practice in the room. For instance, if the projector is out of order, then the lecturer has to use other mediational means to present his/her agenda and content.

The 'Point of Contact' it is where the 'rubber meets the road' as Scollon would put it in Nexus Analysis (see chapter 5 for a more elaborate description). Furthermore, the notions of 'Point of Contact' is elaborated by Deleuze in the concept of the 'Problematic Field'. That is the field where knowledge transcends to practice and where experience transcends to knowledge (see chapter 6).

In order for the structure to become real, it has to be reified through a position. A position is defined as a body of, rules, obligations, functions, assignments, places and rights that an agent is assigned to a specific practice. A lecturer, for instance, is a position in the position/practice system of education. Bhaskar argues that social structures exist only in the virtue of human agency (Bhaskar, 1998 p: 44). This argument is going to be challenged by the emergence of complex, deep learning algorithms in it systems and the notions of 'Actor Network theory' (Latour, 2005) and 'Object-Oriented Ontology' (Harman, 2009; Morton, 2011). Furthermore, the mere presence of DT in an 'event' of teaching/learning puts the practice of utilising

objects and the human process of thinking closer together in the direction of ‘distributed cognition’ (Salomon, 1997). ‘Distributed Cognition’ is the notion that cognition can be distributed into, for instance, systems of navigation in aviation or autocorrect in word-processing etc. In both cases, non-human actants act as causal mechanisms in a structure. CR researcher, Sayer defines a structure a constellation of elements whose combined causal powers potentially create an emergence. He elaborates:

‘Objects are, or are part of, structures. ‘Structure’ suggests a set of internally related elements whose causal powers, when combined, are emergent from those of their constituents.’ Thus, hierarchical structures might enable delegation, division of tasks, surveillance, and efficient throughput of work. Whether these powers are ever exercised depends on other conditions – in the case of unemployed workers, whether they need to provide for themselves, whether there are any jobs, etc. When causal powers are activated (as when the worker works), the results depend again on other conditions (the kind of context, tools, etc). Social processes are also typically dependent on actors’ interpretations of one another, though much can happen which is unacknowledged or unintended too.’ (Sayer, 2000 p: 14)

A structure is not understood as an organisational regime. It is both an intransitive entity that can potentially organise events in the transitive layer if the mechanisms utilise the structure. For instance, in a lesson, the syllabus is an explicit enunciation of structure in the transitive layer. The syllabus can only be actualized if the structures that the syllabus express are supported by the implicit structures in the intransitive layer. If the syllabus presents other ways of organising a lesson than the students are used to, then there will be a discrepancy between the expected event in the syllabus and the actual event that the mechanisms in the intransitive structures produce (the students’ habits etc.).

3.2.3.2 Human and non-human agents

An update of Bhaskar’s statement that social structure exists only by the virtue of human agency might be due. The claim in this thesis is that social structures exist in the virtue of both human and nonhuman agency. An example of a nonhuman actant could be a computer system. The computer system brings about its own terminology and practices and establishes new structural conditions and henceforth new positions. The computer system operates mostly according to man-made instructions and algorithms and it does so contrary to what a human operator (user of DT) might know or think. It may act, it does not just react.

If we presume that social structures exist by the virtue of human and nonhuman agents the nonhuman agents must take on human-like properties. These human-like properties could arguably be the manifestation of computing power and large amounts of shared and combined data in combination with many layers of algorithms that end up producing fuzzy logic human-like user-experiences. Google, iOS (iPads) and facebook are examples of digital technologies that almost understand user needs before they explicitly emerge. So even though digital technologies are still ‘just’ performing digital instructions in ‘machine code’ the many, many layers of ‘assembler code’ and other higher levels of programming makes the user identify with the metaphoric user interface as human-like. The more developed ideas in relation to the

causal powers of the non-human is to be found in the research field of artificial intelligence and critical discourses of digitality where the argument is not whether nonhuman agents are human-like but rather when human intelligence becomes a redundant operator of artificial intelligence (Carr, 2008; Selwyn, 2011 p: 83). In relation to this and as a development to Bhaskar's initial concept of the necessity of human agency, Kaidesoja writes:

'Furthermore, rather than being produced by causal powers of relationally interpreted social structures, it seems to me that many of the currently observable causal effects of the undesirable relations between the historical actions of human beings and nature (e.g. global warming of climate) are based on changes in the processes within "non-human nature" which have been influenced by the historical actions of human agents and concrete social systems (e.g. intensification of the greenhouse effect as a consequence of mass consumption of fossil fuels since the nineteenth century). This is not to deny the fact that currently existing concrete social systems and their structures may also either accelerate or slow down natural processes which are undesirable from the point of view of human beings. From this perspective, it can be also argued that some changes in the processes and structures of (non-human) nature, which have been initiated by historical actions of human beings and their concrete social systems, do not necessarily require their recurrent maintenance by current human agents.' (Kaidesoja, 2009a p: 8; Kaidesoja, 2009b).

The non-human causal effect is becoming a part of the domain of the real in the sense that it has causal powers that are effectively independent of the individual's knowledge of it. Following Kaidesoja's argument the example of algorithms developed and shared over time, an increase in computing power and data mining from many sources (GPS, Social Networks, Search history etc.) leave us with a non-human agent in the social structure. However, the non-human agent is developed by humans, so it does exist by the virtue of human agency, however, the point is that the level of complexity in the human agency is so complex that it becomes non-human.

So, the addition of non-human agency in the shape of computer systems in networks does not change the notion of a social structure and agency as a mediating system of concepts. These concepts might be concepts of the domain of the real, for instance, teaching. A lecturer needs a social structure in the domain of the empirical to make his/her teaching experienceable for the students in a lesson. The lecturer's social structure must be evident both when he/she is active in 'point of contact' between structure and agency and in the time between 'points of contact'. The empirical structure of teaching lets the students anticipate how future lessons will be and thus prepare them for the events in the domain of the actual. A shared concept of social structure is morphing into culture and tradition. Bhaskar defines the position-practice system as follows:

'...it is evident that we need a system of mediating concepts, encompassing both aspects of the duality of praxis, designating the 'slots', as it were, in the social structure into which active subjects must slip in order to reproduce it; that is, a system of concepts designating the 'point of contact' between human agency and social structures. Such a point, linking action to structure, must both endure and be immediately occupied by individuals. It is clear that the

mediating system we need is that of the positions (places, functions, rules, tasks, duties, rights, etc.) occupied (filled, assumed, enacted, etc.) by individuals, and of the practices (activities, etc.) in which, in virtue of their occupancy of these positions (and vice versa), they engage. I shall call this mediating system the position-practice system. Now such positions and practices, if they are to be individuated at all, can only be done so relationally.' (Bhaskar, 1998 p: 44)

Bhaskar stresses the importance of identifying the relations between the position, the structure, and the agent. The point being that the way to tell position and practice apart from one another is by analysing the relations between them. That is also an indication of an understanding of positions as social constructions. If the relation between position, agent and structure are individuated by the relations one could argue that it is constructed by the relations. The relational aspect of teaching connects to both the structure and the agents in the context. The structure being the local and regional educational culture, the concrete teaching/learning arena, the curriculum, the syllabus, the organisation of the furniture in the classroom etc. The lecturer takes on different sub-positions by changing the relation to the students; he makes a shift from the presenter to the facilitator, to a supervisor, (maybe) to adult friend all while still maintain the position and agency of being the 'teacher' in the same structure. The sub-positions might be defined in the structure; however, they only come into existence if the relations are made. An emergent position-practice system in schools in Denmark is a system of lecturer and non-human agent. The non-human agent is 'student-data'. That is, data on learning and progression generated by the students either automatically or through evaluations and then later used for substantiating the school teacher's pedagogical decisions (Qvortrup, Egelund, & Nordahl, 2016 p: 9).

So, the position-practice system mediates the relations between agents in a structure and constructs or deconstructs the social structure.

3.2.3.3 Social interaction

Teaching is understood as a social interaction and social interaction is conditioned by underlying structures but they are not determined by the structures, according to CR, that means that the structures that organise a lesson create the conditions for the possible interaction, activities, and relation in the lesson. Archer describes the social interaction in and 'open system'. The system is open when occupied by people meaning that the structural conditions may result in several different emergences of the 'event'. In practice, that means that before the lecturer invokes impersonal forces (rules and regulations) on the lesson then the social structure allows for many relation and activities between students. However, as soon as the lecturer commences to teach the mediation of the syllabus sets a protocol for relations and behaviour. It is expected that the students follow the directions of the lecturer in a University College lesson, however, it is not a law of nature, and it is a socially constructed behaviour that can easily be changed. This happens if the students do not participate in the activities in the lesson and engage in personal discourses instead (facebook web shopping etc). So, the question is if a lesson becomes a more open system, which allows creativity and prevents personal discourses to take focus at the same time.

'Mediation through human agency in open systems, emergent properties (SEPs and CEPs) can exist unexercised due to a variety of intervening contingencies. The one factor which guarantees that social systems remain open (and even precludes thought experiments about closure), is that they are necessarily peopled. People, in turn, are capable of resisting, repudiating, suspending or circumventing structural and cultural tendencies, in ways which are unpredictable because of their creative powers as human beings. In other words, the exercise of socio-cultural powers is dependent inter alia upon their reception and realization by people: their effect is not direct but mediated, for there are no other ways in which it could be exercised without invoking impersonal social forces.' (M. S. Archer, 1995 p: 196-197)

What actually goes on in a lesson is not entirely determined by the syllabus it is determined by the way in which the students receive, understand and realise the emergent mechanisms of the syllabus. Furthermore, the socio-cultural powers are not direct, they are mediated through the actions of the lecturer and students. The direct power of the structure would, according to CR, imply an impersonal force. The impersonal force could, for instance, be a set of demands that the students must meet to complete course etc. It could be demands for a specific number of posts and replies in an online discussion or an obligatory number of tweets in a social media course etc. Demands for engagements that negates the nature of engagement in the sense that if you demand engagement it becomes enforced participation. The enforced participation might lead to engagement, but it is up to the individual participant to make the change. This is what Deleuze addresses as the matter of 'desire' or 'interest'. The enforced participation represents the interest of the lecturer, however, it does not necessarily correspond with the desire of the student. The matter of desire or interest is a matter of whether the structures compliment or contradict each other. Joseph and Kennedy put it this way:

'Society is composed of a multitude of stratified and emergent structures that interrelate and codetermine one another in complimentary and contradictory ways.' (Joseph & Kennedy, 2000 p: 520)

If enforced participation turns to engagement, then the social structure has changed the social interaction, however, if the enforced participation does not turn to engagement on a broader scale, then the structures that the syllabus rests on was a false representation of what actually happened and the syllabus is presumably up for evaluation.

The analytical approach of CR utilises the notion of The 'Immanent Critique' and The Transcendental Argument, these two central notions are presented in chapter 4.

3.2.4 STRUCTURAL DEVELOPMENT

This section describes and discusses the structures upon which social interaction can happen.

CR views the social structures as preceding social interaction. The syllabus describing the forced participation existed before the course started, however, the evaluation of the course might change the syllabus so that the next course might be different.

3.3 SUMMING UP THE KEY TERMS

This section presents a schematic overview of key terms.

CR terminology	Meaning	Function in thesis
Intransitive layer	Ontology	Identifies the immanent nature of learning
Transitive layer	Epistemology	Pinpoints the reasonable possibility of achieving knowledge
Empirical domain	Experience	The process of collecting mediated expressions of the actual event through empirical methods such as; surveys, interviews and content analysis
Actual domain	That which is experienced	The process of collecting first-hand data from the event through observation of lessons
Real domain	The ontology of the phenomenon	Analysis and interpretation leading to the concluding statement in Chapter 6, that the use of DT leads to a 'Full Circle of PPT' in a lesson at UCN (Teacher Education in particular).
Structural conditions	The overt and covert contingencies in a situation	Analysis of what produces the emergent use of DT leading to the conclusion the lecturer's use what they 'need' to use to meet demands in the curriculum and students use what they 'need' to use in order to pass exams.
Position/practice system	Roles and actions in a systematised habits	Analysis of who does what in a lesson also used to suggest other ways of distributing roles and practices
Point of Contact	Where roles are acted out in a practice	The practice of teaching a lesson. The situation where the students, the lecturer and the DT meets
Immanent Critique	Definition of a false representation based on arguments that transcends from the empirical to the real domain	Used to understand the immanent state of the use of DT and to place a critique that seeks to suggest new and hybrid practices.
Transcendental argument	Arguments that transcend from the empirical to the real domain	Used to find reasons why the phenomenon of the 'Full Circle of PPT' emerges. Reasons that transcend the layers of the ontology

Table 3 Key terms from CR and their application in this thesis

3.4 CRITICAL REALISM IN EDUCATION RESEARCH

According to CR education-researcher Brad Shipway, CR was introduced to educational research as a reaction to a positivist, quantitative research agenda and oddly enough also as a reaction to postmodernist, relativist research. In the book 'A Critical Realist Perspective on Education' Shipway explain, through Elliot Eisner, why a CR approach is needed:

'The destructive legacy of positivism in education is seen by Eisner (1997) as having widespread and endemic effects on the classroom. For example, the modernist insistence upon foundations for knowledge has provided the basis for such mistaken and damaging quests as the search for the 'teacher-proof curriculum'. The effects of positivism in education are long-lasting and resistant to change, evidenced by such notions as the measurement of teacher movements by stop-watch over ninety years ago being recycled at the end of the same century in the guise of 'time on task' for the student.' (Shipway, 2011 p: 133-134)

The quest for generalisable knowledge on education and measurable units of 'learning' are interpreted as residues from the scientific paradigm of natural sciences, but the promise of affirming results could allure policy makers and lecturers to demand that type of education research hoping for affirming results that improve education.

'As a result, such positivist conceptions in education ignore the vital information provided by the nuances of what takes place in the classroom. A lack of nuance in the classroom `converts repetition to repetitiousness, assertiveness to boorishness, diffidence to shyness, inquisitiveness to prying, dignity to aloofness' (Eisner 1985: 265). These nuances play a pivotal role in many of the everyday pedagogical decisions made by teachers. By reducing the reality of diverse backgrounds and educational needs to the backgrounds and needs of a dominant group, positivistic a priori conceptions of curriculum commit the epistemic fallacy. The dominant group's definition of education, or what education should be, is then reified and implemented through curriculum, teacher training, and other institutional structures.' (Shipway, 2011 p: 133)

Shipway claims that by reducing a phenomenon to our knowledge of it, we commit what CR calls 'epistemic fallacy'. That is the act of reducing ontology to epistemology, or in layman's terms, to reduce the thing to the knowledge of the thing. CR in educational research is different in the sense that it demands an inductive approach where 'causes' for something is analysed from many angles. On the other hand relativist research that would claim that everything is a social construction and that our knowledge of something is all there is. CR researchers would call that the ontic fallacy. One of the guiding features of CR is to let the research object choose the method. That is why CR does not partner with specific methods but only create an outline of plausible methods.

'...the notion of the epistemic fallacy could be discerned in the insistence of ThCR (Theoretical Critical Realism) to allow the object itself to determine how it will be known.' (Shipway, 2011 p: 72)

However, this notion actually also opens the possibility of letting the key terms in CR act as a method in itself (see Chapter 5.1 for elaboration)

4 METHODS TO PLACE AN ‘IMMANENT CRITIQUE’ AND TO REIMAGINE ‘DENSIFICATION’

This section describes the methods applied to investigate the state of ‘densification’ in lessons and to reimagine the notion of ‘densification’ in UCN. The initial idea, after the change in research strategy (October 2014), was to use the method of Grounded Theory and the procedures described in Grounded Theory (Bartlett & Payne, 1997; Chong & Yeo, 2015), however, the data that I was able to produce did not directly support a Grounded Theory study (see Appendix 10 for a detailed description). It is my assessment that the Grounded Theory study that was intended would have required more ethnographical data and a freer access to observing lessons. Hence, the idea of Grounding a theory on the application of DT in a lesson abandoned, and the data that I was able to produce was produced according to the procedures of both CR and Grounded Theory but analysed according to the procedures described below.

The methods investigate and develop different aspects of ‘densification’ that lead to the understanding of the notion of ‘densification’ and to a reimagining of the notion of ‘densification’.

4.1 A CRITICAL REALIST MODEL FOR DISCOVERY AND SCIENTIFIC INVESTIGATION

CR is not in itself a method, however, CR introduces a series of analytical categories that can be synthesised as a method. CR analysis through the optics of ‘transcendental realism’, which in short means to find reasons for that which is experienced. The transcendental arguments go from the experience to the conditioning mechanisms and structures that make the experience possible. These are investigated through the analytical categories defined by CR. The analytical categories are presented in Table 3.

The ‘Immanent Critique’ – a technique from CR

Placing an ‘Immanent Critique’ is the process of locating contradiction within mechanisms and structures that produce practices. It bears with it the distinction between structures in nature and social structures, the latter being determined by activities (Buch-Hansen, 2005 p: 42). The ‘Immanent Critique’ partially accepts the premises that the object of critique is constituted under and partially critiques the premises of the object as well. The ‘Immanent Critique’ accepts that there are ‘natural structures’, they adhere to the intransitive layer of the ontology. That is structures that can not be changed easily (a curriculum, education acts, financial conditions etc.). In conjunction to that, there are social structures that are determined by social interaction (teaching principal, pedagogy, the organisation of programmes, relations between subjects etc.) and they can be changed but only within the framework of the intransitive structures. The ‘Immanent Critique’ builds on a dialectical relation between ‘natural structures’ and ‘social structures’. The ways of investigating the level of the real are many, however, Bhaskar defines a cyclic process of discovery called the DREIC model (Bhaskar, 2010 p: 3; Gary Hawke, 2014)

The structure of the investigations is as follows the DREIC model:

1. The 'Immanent Critique' is first and foremost the notion of 'The Full Circle of PPT' presented in Chapter 5.4.
 - a. Description: the description of the practice in of the use of DT in a lesson is based on an analysis of the empiric data from surveys, interviews, observation and analysis of learning material.
 - b. Retroduction: interpreting mechanisms, structures, positions/practices and agents in the description of the practice that could potentially produce the emergence of the practice.
 - c. Elimination: evaluation of the 'reasonability' of the analysed 'abstracts' in the investigation.
 - d. Identification: find investigate reasonable mechanisms that could produce the phenomena in the chosen 'abstract'
 - e. Correction: evaluate possible sources of bias.
2. The second part of the thesis discusses a selection of articles are first and foremost designed on the basis of the philosophical notions of Deleuze and Guattari. The method for implementing Deleuze and Guattari's thoughts in pedagogical designs is; Action Research influenced by Design Thinking.
3. The third part of the thesis; 'Framework for suggestions for Development' (Chapter 8) is using informed abstractions to design suggestions for the future of the investigated programmes.

The cyclic approach to the investigation was made possible by the fact that the investigated practice was accessible throughout the whole period of writing the thesis. I revisited the students and the lecturers six times during the project period. The possibility of revisiting the people in the practice allows for a more organic approach to the investigation where one discovery leads to another.

Bhaskar articulates a rationale for developing science that goes from knowledge on one level of reality to the level of reality that explains the prior level.

The cycle of discovery encourages an ongoing process of producing data and discovering new elements of the phenomenon and producing new data again but in a more focused context etc. So the process in this thesis has been one of Why-Explain-Why-Explain-Why-Explain. The last step is then to synthesise the explanations to one coherent explanation of the phenomenon in question:

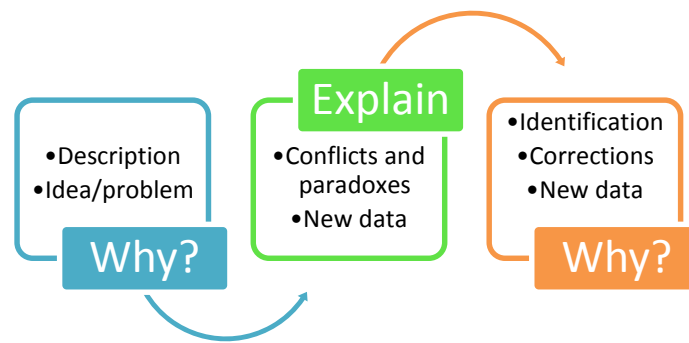


Figure 5 Model for discovery in CR research

The process indicates that the research is an ongoing process that leads to a new cycle of scientific discovery instead of completion. Thus, the research project is more about asking increasingly insightful questions, than coming up with ultimate answers. This way of working with discovery opens for a variety of methods such as; Design Based Research, Action Research, Nexus of Practice, Grounded Theory etc. However, in this thesis, the DREIC model is combined with the analytical categories from CR.

4.1.1 RETRODUCTION/ABDUCTION- REASONING IN CRITICAL REALISM

The four common ways of reasoning; deduction, induction, abduction and retroduction are viewing sense making rather differently, hence, they apply to different types of sciences and research objects.

- The deduction is the reasoning process of taking the example and generalising on the basis of that.
- Induction is the reasoning process of taking a series of examples and generalise on the similarities in the pattern.
- Abduction is the reasoning process of making informed guesses as to how something might improve and on the basis of that to design experiments that will generate experiences with the informed guesses turning them into actual experiences.
- Retroduction is the reasoning process of reconstructing the events and mechanisms the caused something to happen. Retroduction is a realist, ontological approach to investigations that seeks to identify the causal mechanisms, structures and actants (human and non-human agents) that jointly create the event.
 - Doing research through retroductive reasoning entails two convictions;
 - That reality is more than the observable, thus, the conceptualisation of reality is flawed.
 - The Deleuzean notion of actual and virtual being equally real.

The retroductive investigation is used to make the empiric transcendent to the virtual. That is to get inspired by the empiric experience to generate new ideas. Ideas, that are generated from experience in practice connected to things from outside the practice. In one case the idea

is to investigate how an outside technology (PPT, which is designed for selling and not teaching (I. Parker, 2001)) and the practice in a lesson. In the other case, the idea came from a Samsung commercial in which the slogan 'Life Companion' was used. That slogan was referring to the Quantified Self (Kjærgaard & Sorensen, 2014b; Nissen, 2013) possibilities in the smartphone. The idea was to resemiotise the discourse of 'life' to the discourse of 'learning', so the slogan became 'Learning Companion' instead. This idea fostered a connection between teaching and the documenting, tracking and logging features of a smartphone. In turn the Design-Based Research study, that investigates the 'Open Source Learning Stream' (Kjærgaard, 2015a; Kjærgaard, 2015b; Kjærgaard, 2015c; Larsen, 2013). The idea must be based on significant experience and knowledge and it must be explored through experimentation and testing. In the book 'Designing Social Research' Blankie put it this way:

'The Retroductive research strategy also starts with an observed regularity but seeks a different type of explanation. In this strategy, explanation is achieved by locating the real underlying structure or mechanism(s) that is/are responsible for producing the observed regularity, and identifying the context in which this happens. As structures and mechanisms may not be directly observable, it may be necessary to search for evidence of the consequences of their existence; should they exist, certain events can be expected to occur. Retroduction uses creative imagination and analogy to work back from data to an explanation.' (Blaikie, 2009 p: 19)

Retroductive reasoning uses 'creative imagination', which demands a lot from the researcher. The quality of the 'creative imagination' is closely related to the researcher's ability to form virtual relations between elements that are observable in the data and unobservable elements that appear through analysis and analogy. The relation is virtual and it is constituted in the 'plane of consistency' (see Chapter 6). This virtual relation is real but not actual. To make it (or parts of it) actual and later empirical the retroductively reasoned idea must be described, explained and explored. And to some extent also tested if that is possible. If the method is e.g. case-based teaching then the retroductive reasoning process is mostly a learning process, that can't be tested. However, the reasoning process is identical to the reasoning process in a large-scale Design Based Research project. The level of potential generalisation, testing and for finding repeating patterns may be much higher in the large-scale study, but that does not mean that one can not learn from a case. The dissemination and utilisation of the results are, however, very different. The generalised results for the large-scale study apply to many on a superficial level, whereas the results of a case-study may apply to a few, but, on a deeper level.

In short, retroduction leads to the methods that look beneath/above the empiric. It raises the question; which structures, mechanisms, positions, practices and agents are necessary for this event to take place. So it addresses the actual needs and desires in the situation for the event to happen. A crucial question in relation to education could be; 'what does a learner need in order for him/her to learn a specific topic?' or 'How much can you take away from an educational situation and still learn from it?'

This leads to a series of ‘abstractions’ for further investigation.

4.1.2 ABSTRACTIONS

An abstraction is a condensed virtual conceptualisation created on the basis of knowledge, experience, and creative thinking. It is to abstract something from its source.

Sayer explains why abstractions are important:

‘The objects that social scientists study, be they wars, discourses, institutions, economic activities, identities, kinship or whatever, are concrete in the sense that they are the product of multiple components and forces. Social systems are always open and usually complex and messy. Unlike some of the natural sciences, we cannot isolate out these components and examine them under controlled conditions. We therefore have to rely on abstraction and careful conceptualization, on attempting to abstract out the various components or influences in our heads, and only when we have done this and considered how they combine and interact can we expect to return to the concrete, many-sided object and make sense of it.’ (Sayer, 2000 p: 19)

Abstraction then becomes the tool for creating a hypothesis that can be actualised through experimentation. This focus on explanatory and exploratory research that CR and Deleuze implicitly advocate contrasts more quantitative methods and that is why Bhaskar addresses the difference between generalisation and abstraction (Bhaskar, 1979 p: 139). An abstraction may look like a generalisation but it may not be the intention. A generalisation may be interpreted to be the most protruding story to be told from a study, whereas an abstraction is an idea spun from the new knowledge in a study. There can be many abstractions spun from a study but only one or few generalisations. The difference between abstraction and generalisation could be described as the difference between the virtual and the actual. The abstraction is the virtual concept and the generalisation is the actual essence (see Chapter 7).

Sayer describes a strategy for making abstractions. He suggests a series of distinctions between a series of categories, which can help structure the formulation of the abstraction:

‘A simple distinction can be made between ‘substantial’ relations of connection and interaction and ‘formal’ relations of similarity or dissimilarity.’ (Sayer, 1992 p: 88)

‘Another useful distinction can be made between external, or contingent relations and internal or necessary relations.’ (Sayer, 1992 p: 89)

The categories are, Substantial/formal, External/internal, Contingent/necessary, Similarity/dissimilarity. The categories in themselves do not valorize one over the other, they merely address important types of relations. The types of relations also reveal structures, according to Sayer:

‘In any real situation, there is usually a complex combination of these types of relation. The structure of a system of interest can be discovered by asking simple questions about such relations: What does the existence of this object (in this form) presuppose? Can it exist on its own as such? If not what else must be present? What is it about the object that makes it do

such and such? These questions may seem simple to the point of banality, but the answers are often complex and many errors of conceptualization and abstraction stem from evasions of them. (Sayer, 1992 p: 91)

If Sayer's guiding question are asked in relation to an educational situation the questions and answers could be formulated like: What is presupposed in order for teaching to be represented like 'this'? The contingent relations between teaching and the mechanisms that produce the phenomenon of teaching are a series of positions and practices, roles, and actors in connection with a historic trajectory. The positions are those of student and lecturer; however, the 'roles' are more complex. A lecturer can be a friend, a supervisor, an adult, a presenter of information, a restrictor, a controller, an assessor etc. A student can be a learner, a lecturer, a resistor, a helper, a friend, an apprentice, an opponent etc. The physical notions of 'College' and 'classroom' are also presupposed even though much of both teaching and learning might take place in other physical places or in digital spaces such as Learning Management Systems and social media. Furthermore, a specific, recognisable subject, an adjoining syllabus, and relevant learning material are presupposed. Lastly, it is presupposed that there will be an exam that evaluates the students' outcome according to a scale of grading.

Next relevant question; what is the least the situation can consist of and still be considered teaching? A syllabus in solitude does rarely equal teaching. The constellation of lecturer and students does not in itself constitute teaching. The constellation of students in a classroom with learning materials does not constitute teaching and so on. This analysis is used to pinpoint all the elements that contribute to a constellation of actants (objects and people) then constitute a shared understanding of what teaching is. Furthermore, the analysis is used to formulate abstractions. An example of an abstraction in this thesis is the 'Open Source Learning Streams'. The analysis was based on a reduction of elements to the absolute essentials and a focus on what the lecturers assessed as most important in order for the students to learn. That led to a 'resemiotisation' of the discourses from a discourse of lecturing to a discourse of supervising and guiding. It also led to a re-territorialisation of the practice into a new practice. Stripped down to bare essentials the lecturers and the researcher designed a model for teaching that consisted of only: lecturer produced video clips, online discussions, and assignments. The actual act of teaching happened in the online discussions and the focus was on dialogue. The abstraction that led to the pedagogical design was built on the questions that Sayer put forth.

The Abductive research strategy has a very different logic to the other three. The starting point is the social world of the social actors being investigated: their construction of reality, their way of conceptualising and giving meaning to their social world, their tacit knowledge. This can only be discovered from the accounts social actors provide. Their reality, the way they have constructed and interpreted their activities together, is embedded in their language. Hence, the researcher has to enter their world in order to discover the motives and meanings that accompany social activities. The task is then to re-describe these motives and meanings, and the situations in which they occur, in the technical language of social scientific discourse. Individual motives and actions have to be abstracted into typical motives for typical actions in

typical situations. These social scientific typologies provide an understanding of the activities, and may then become ingredients in more systematic explanatory accounts.

4.2 ACTION RESEARCH

The method of Action Research was used in the articles: ‘Opens Source Learning Streams in Online Discussions in Video-Based e-learning’, ‘Utilising DT for dialogue and evaluation – a quasi-scholastic method in action’, ‘Qualifying the quantified self - A study of conscious learning’ and ‘Rhizomatic learning in a digital habitat’ (Kjærgaard & Sorensen, 2014b; Kjærgaard & Sorensen, 2014c; Kjærgaard, 2015a; Kjærgaard, 2016b). These studies were inspired by both the philosophy of Deleuze and by the thoughts of Kurt Lewin.

Deleuze provided the virtual concepts and Lewin provided the method for actualizing the concepts into practice. Deleuze’s philosophy is a philosophy of development through positive entelechy it is not about negating actual possibilities through a discourse of the oppressive ‘them’. However, as philanthropically as that may sound, it requires a substantial amount of groundwork to reach a point, where actors become agents and action becomes entelechy, or where it is reasonable to talk about freeing of potential. Action research is, in many, respects a very Deleuzean approach to development, as will be elaborated in the following

Action Research was developed as an emancipatory research and development technique by Kurt Lewin (Lewin, 1946). The aim was to engage the people in changing their positions and possibilities. His method seeks a higher understanding of the participant’s situation in order to develop other ways of dealing with the situation. Action research builds on what Deleuze would call ‘positive difference’ and a desire to evoke ‘élan vital’ in people. The problem Action Research seeks to solve often involve suppressing power structures:

‘In the late 1930s Kurt Lewin and his students conducted quasi-experimental tests in factory and neighbourhood settings to demonstrate, respectively, the greater gains in productivity and in law and order through democratic participation rather than autocratic coercion.’
(Adelman, 1993 p: 2)

This means that Action Research has been/is connected to a Marxist tradition of research. The relation to Marxism lies in a critical approach to the hegemony, a quest for empowering people, a quest for a democratic dialogic approach and a sense of hope (Coghlan & Brydon-Miller, 2014 p: 529). The latter being very important in a Deleuzean context. Action Research preaches vitalism instead of resentment. Like Deleuze, Lewin wants to redefine the suppressing and volatile notion of ‘them’ (the state, the lecturers, parents, the police etc.) into a vital and concrete ‘us’ (community). The main aim of both Deleuze’s and Lewin’s philosophy is to not accept the role of victim. That is also why Action Research has to deal with the participants’ own problems and solutions and why it in some cases has a slight evocation of therapy. The matter of redefining the ‘them’ is an important part of developing teaching. There is always a ‘them’ it is either the politicians, the programme director, the colleagues or the students. This notion of turning ‘them’ into ‘us’ means to engage in the mechanisms that constitute the ‘them’ and negotiate an ‘us’ instead. Action Research relies on the researcher's respect for the participants ‘intelligence and goals’ (Elvemo et al., 1997 p: 2).

Action Research is also a method for centring the actant in the development process, thus making it a deontological process rather than a teleological ‘means to an end’.

The critique of Action Research often is that it lacks legitimisation and generalisation, that it is case determined and, by that, prone to be subjective. The ‘fold’ of new thoughts and actions are folded onto the prior thoughts and actions of the actant, thus making the research findings relative to the context and ethically tied to the issue that the actant tried to develop a different approach to. In many ways the critique is correct because what the critique critiques is what Action Research tries to be an alternative to:

‘...is that Action Research constitutes a powerful critique of positivism, technical rationality and their associated academic and institutional discourses. What is interesting about this is that this critique has been most effective through being exemplified in the practice of action research rather than in its theoretization. [...] It is, however, to emphasize that action research critically depends on its doing for its being, and it is through the critique immanent in the doing that action research has been able to challenge and mitigate the oppressive features of positivistic and technical-rational research and theory for teachers and others who have been its main beneficiaries.’ (Scott & Usher, 2011 p: 41)

Action Research is more likely to be contributing to the development of practice through the development of practitioners than the other way round.

4.2.1 THE PROCESS OF ACTION RESEARCH

The process of Action Research operates in cycles of action and reflection (Kemmis & McTaggart, 1982). It relies on a timescale where iteration is possible. The full cycle includes; planning, acting and observing, reflection, revised the plan, acting and observing, reflecting and so forth.

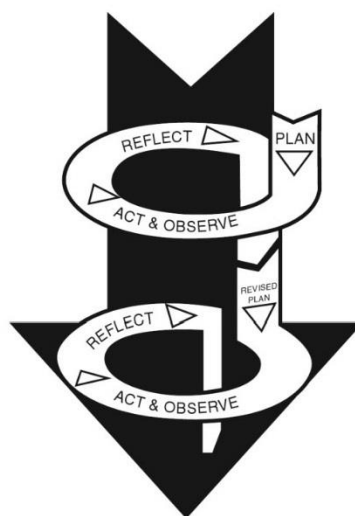


Figure 6 Kemmis and McTaggart (1981)

In the case of the Action Research inspired research in this thesis, there were a series of planning conferences where the lecturers (5-8). In these conferences the researcher/actant and the other actants discussed the ways in which we could change the discourse and practice of a specific course. The task was to transform the face-to-face course into an e-learning course. The structure of the new course was given it had to consist of a 2-day presence seminar followed by 6 weeks of e-learning. So, we identified an individual goal and shared goal amongst the actants (lecturers of the course). The shared goal was articulated through a collection of elements from traditional teaching that the lecturers defined as intricate, essential, and almost indispensable. The most protruding element was dialogue with students. The Action research method helped to address the issues that could free the potential of the new situation. The Deleuzian notion of positive difference helped focus on the potential of the new in the relation to the old without negating the old.

4.3 SUMMING UP METHODS

The quest for emancipation and change has been the main purpose of the chosen methods (including the preliminary studies described in Appendix 7 and 10). However, the access, or lack of access, to data also determined which methods could be applied. The emancipatory drive was nested in a growing discrepancy between what DT potentially could contribute to in a lesson and what it appears to contribute to in UCN in 2016 (elaborated in Chapters 1 and 2). The claim for emancipation from existing structures and practices was also nested in the new curricula, Acts on Teacher Education, 'Development Contract' and strategies at UCN (Ministry of Higher Education and Science, 2015b; The Danish Government, 2011; UCN, 2013; UCN Rektorat, 2015). So, the chosen methods were chosen to investigate the possibilities for 'positive difference' and hybrid connections between what was already present in the lessons. Therefore, the approach to research method in all studies has Action Research as a starting point and from there they developed according to the context. Some studies needed quantitative data to get an understanding of the context (Chapter 5), while other studies needed qualitative studies to develop and observe hybrid practices (Chapters 7 and 8). The development of the methodical approach and philosophical inspiration behind this was created in an interplay between the two. The philosophy of Gilles Deleuze (presented in Chapter 6 and in an abridged version in Appendix 6) presents the idea of learning through expansion, not only reproduction. Deleuze borrows the metaphor of an 'arrow being thrown into the unknown'. Parr explains Deleuze's notion as follows:

'Deleuze prefers what he calls a 'nomadic' or 'clandestine' form of thinking. The only form of 'communication' that is suitable to the contemporary world is the Nietzschean arrow or Adorno's 'message in a bottle'. Thought is fired like an arrow, in the hope that another thinker – a 'friend' – may pick up the arrow and fire it in turn.' (Parr, 2010 p: 285)

This line of thinking seems to epitomise the exchange mechanism of e.g. Twitter, where the desire to share and learn appears to be larger than the desire to know the people in the context. This mode of investigation is also expressed by American street photographer Gerry Winogrand, he says that he does not take photographs to capture what he sees, he takes photographs to see what he captures (Szarkowski & Archer, 1988). The difference between

capturing what the researchers see through ethnographic methods and seeing what the experiment brings characterises the difference between the investigation in Chapter 5 and the experiments in the articles presented in Chapter 7 and in the framework suggestions for development in Chapter 8.

The initial intention was to develop a method based on Deleuze and Guattari's concept of 'Schizoanalysis' (Savat & Thompson, 2015 p: 282-283; Stivale, 1980; Watson, 2008). It is a method for investigating the schizoid contrast between 'desire' and 'interest'. Where 'desire' is the individual person's drive towards something and the 'interest' is the external wish for a person to do something (see Chapter 6). This distinction seemed suitable for analysing the alleged contrast between some discourses on the prospects of using DT in higher education and the reality of the practice of using DT in higher education. Albeit, even though the concept of 'Schizoanalysis' seemed specious, I decided not to deploy 'Schizoanalysis' as a method for education research. The main reason being that the concept in itself is unfamiliar to most and that the preliminary studies showed that a 'Schizoanalysis' of the utilisation of DT at UCN would address practical and political elements of teaching that go beyond this thesis to change. Like, for instance, the difference between the desire of the student and the interest of the institution. I presume it would be an interesting study, however, it might not contribute to answering the research question in this thesis and it may lead in other directions that the use of DT in lessons. It would be like 'throwing an arrow into the unknown', which is exactly the type of research I would like to do, but given the context of this thesis, it was deemed too perilous.

5 INVESTIGATING THE USE OF DIGITAL TECHNOLOGY IN A LESSON

This chapter presents an investigation of the current state of what DT is used and how it is used in a lesson at Teacher Education, and to some extent in UCN in general. The chapter describes the state of the students' and lecturers' use of DT in lessons and seeks to identify causal mechanisms and structures that make a specific practice emerge and the chapter seeks a plausible explanation of why this practice emerges and place an 'Immanent Critique' of the practice.

This chapter seeks to elaborate on the research question in the 'area of interest':

How is Digital Technology used in a lesson in University College?

Leading to the investigation of the main research question:

How can lecturers design 'densified' lessons that focus on dialogue catalysed by digital technologies?

As described in Chapter 1 the investigation mainly focuses on the DT that the students bring to a lesson and the DT that the lecturer is equipped with by UCN in lessons at Teacher Education (supported by data from Nurse Education, and Occupational Therapy). The main focus is on Teacher Education, however, the data show that there appears to be little variation between the three programmes regarding the use of DT.

The reason for including more programmes in the investigation was partly for comparison and partly to explore broader perspectives on the development of the use of DT in teaching at UCN. That is, to see if the programmes could inform and inspire each other.

In this thesis, it is presumed that the use of DT may be connected to the organisation of the courses, in the sense that, programmes organised in classes, lessons and physical classrooms may not necessarily need DT as much as, for instance, an e-learning course would.

So, the analysis will treat the collection of reasons ('transcendental arguments') for the use of DT in teaching at UCN as a 'rhizome' (see Chapter 6.3.1) that 'grows' from several covert and overt needs and reasons, such as:

- The organisation of the programme
- The ontology of a lesson (Appendix 11)
- The students' needs for passing a course
- The lecturers' needs for fulfilling curriculum

The figure below (Figure 8) shows how the four interrelated paradigms of relations to DT and teaching and learning may relate.

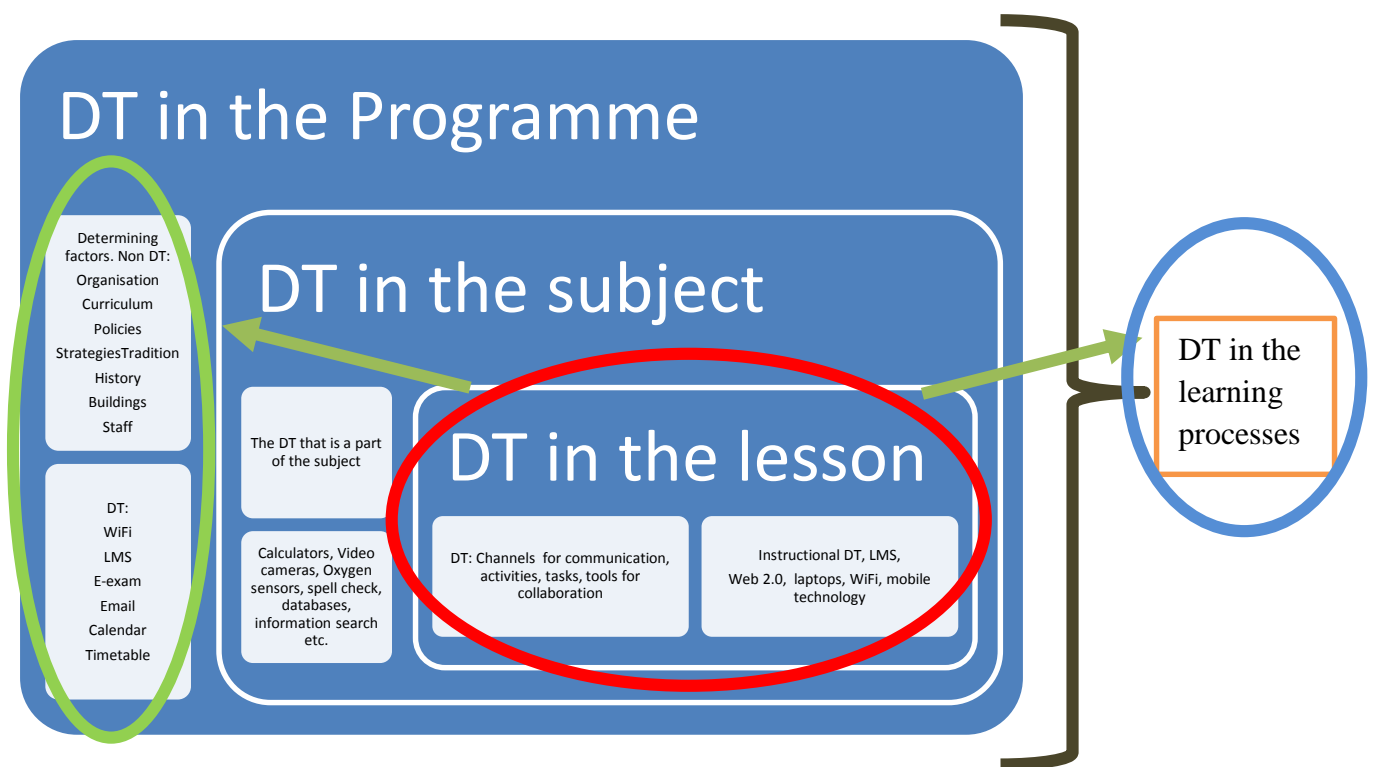


Figure 7 Paradigms for Digital Technology

The red encirclement, ‘DT in the lesson’, indicates the main field of interest in this study. The green encirclement, ‘DT in the programme’, indicates a conditional field of interest to this study. The blue encirclement, ‘DT in the learning processes’, also indicates a determining and conditioning field of interest in this study.

Figure 8 is made for the purpose of delineating the scope in this investigation, and it is inspired by the notions put forth by Selwyn, Goodfellow, Huffman and Huffman and Celsi and Wolfinbager (Celsi & Wolfinbarger, 2002; Goodfellow & Lea, 2013; Huffman & Huffman, 2012; Selwyn, 2011; Selwyn, 2014). The figure also shows that even though these four paradigms interrelate and one might determine the other (WiFi determines the use of LMS etc.), they may operate separately in practice. This conception may be interesting to the findings in this investigation because the assumption in the strategic documents (UCN, 2013) is that DT can transcend from one paradigm to another, indicating a wish for the formal initiatives in the programme (UCN) to develop the practice in the lesson and, additionally, that the use of DT in the lesson develops the informal habits of the students learning processes.

5.1.1 ETHICAL CONSIDERATIONS

This section describes my ethical consideration that emerged while doing this part of the thesis.

I considered the data collection/production for this thesis as a sensitive social activity, where colleagues allowed me into their practice. This means that I did not act as a ‘neutral conduit’ (Scott & Usher, 2011 p: 136). I did not separate knowledge of the research object from ethical considerations in an ‘ends justifies the means’ logic. My intentions were to tell a constructive story of how one practice of using DT to present content could evolve into a practice of using

DT to facilitate learning through dialogue. My ethical aim is inspired by Deleuzian ethics (see Chapter 6) which means that I aim to address relational changes that utilise what the students and the lecturers are already good at, in a new, hybrid position/practice system. The fact that I'm engaged in the same practice, as I investigate entails that I have relations to the practices and the people in the practices (students, administration, and lecturers) that go beyond the PhD project. So, placing an 'Immanent Critique' is a balancing act of making a reasonable critique that is potent enough to create debate and still respectful to the people in the practice. One of the main claims in the analysis is that positions and practices emerge due to structures and contingencies between the physical conditions on campus and the curriculum and not because of lack of competency or will. This is important because it is not the intention to expose a lack of 'digital competences' at the lecturer, students or administration.

Another ethical aspect is the aspect of whether the research portrays a shared practice or a unique practice. If the research portrays a unique practice then it would be possible to identify the practitioners of that specific practice and expose individual colleagues, which would be unethical.

It is the ethical aim of this PhD thesis to change that discourse in the direction of a discourse of actual 'needs' for DT instead of 'constructed needs' that may emerge in political documents (Ministry of Higher Education and Science, 2010; Ministry of Higher Education and Science, 2013a; Ministry of Higher Education and Science, 2015b) and in the direction of developing hybrids between practices that are already in the context (see Chapter 7).

The notion of 'learner needs' is investigated by Parker, Manor and Herrington in the article 'Authentic online learning: Aligning learner needs, pedagogy and technology' (J. Parker, Maor, & Herrington, 2013) and in the article 'A Critical Realist Orientation to Learner Needs' Ayers raises the question of what a learner needs in order to learn and what is constructed as needs for learners (Ayers, 2011). The insinuation that there might be a discrepancy between what a learner actually needs in order to learn something and what, in this case, Teacher Education provides as resources for learning is important to this investigation, because the needs of the students seem to be PPT (see Chapter 5.5). They seem to represent a 'real need' in the data, in the sense that if the PPT are taken away, the students express a sense of lack (see Chapter 5.3.8) (Ayers, 2011 p: 351). It is considered an ethical issue in this thesis whether DT in a lesson presents a 'real need' for the students or if it is an outside interest suggesting other 'needs' for DT than those of the immediate context of the lesson.

5.2 RESEARCH DESIGN

The research design and analytical approach are guided by the DREIC model from CR (see Chapters 3 and 4) and to some extent by the procedures of Grounded Theory (Chong & Yeo, 2015; Glaser & Strauss, 1967; Lee, 2012; Oliver, 2012) and the field guide to 'Nexus Analysis' (R. Scollon, 2002) (see Appendixes 7 and 10). In the practical context of the investigation, that involves identifying an emergent practice of social action and it investigate the mechanisms and structures that could with reasonable certainty be inclined to produce 'the emergence'.

This is formulated into an apparatus of analysis that can be shown in this schematic visualisation:

Transitive layer	Intransitive layer	
emergence: the Lesson	Mechanisms	Structures
Observing the use of DT in lesson at UCN Focus on content Engagement: Focus on reproducing content, listening as participation.	T: Division of lessons and supervision S: Syllabus divided into preparation and lesson activities Texts as preparation, bullets on PPT as content Text and PPT as a mechanism for catalysing the production of knowledge.	Positions and practice system Timetable Room allocation The educational system as the historical trajectory of the students (school, grades, exam aptitude, admission etc.). The educational system as a structure to make the lesson emerge.

Table 4 Schematic view of analytical process

The lesson is understood as an emergence in the transitive level, it comes into existence because the curriculum, the timetable, the syllabus and the allocation of rooms create the circumstance for it to emerge. However, these factors also determine the emergence of the lesson. All agents taking part of the lesson may be seen as determining agents, in the sense that if the lecturer, for instance, does not show up at the right time in the right place, the emergence of the lesson changes and even though the syllabus might describe in detail how the lesson should be conducted, the lesson will presumably not be the same without the lecturer. The same reasoning applies to the students, if the anticipated number of students arrive at the right time, at the right place, prepared accordingly, then the lesson presumably becomes something else, than if only half the students show up unprepared. Displacements from the anticipated situation may lead to other nexuses of practice that lead to other discourses like for instance; irresponsible lecturers, unprepared students, too complex structures in the syllabuses etc.

5.2.1 EMPIRIC DATA FOR FORMULATING THE INVESTIGATION

The empiric methods have been generated from a mix between qualitative and quantitative data production techniques. The body of data consists of mediated expressions such as; interview, surveys and observations. And analytical data from learning material analysis, curriculum analysis and researchers own experiences within the field of investigation. The entire body of empiric data is collected in Appendix 2, 3, 4, and 5. The majority of the informants that contributed to the data production in the “Immanent Critique” are students and lecturers at UCN. The data is collected in the period from September 2012 to May 2016.

Surveys	Interviews	Observation	Analysis of PPT
A baseline survey and 12 supporting surveys of which 6 are used in the analysis. The Surveys contain both closed and open-ended questions	18 formal + 32 registered informal talks that led to ‘memos’	30 formal observations of lessons. Numerous informal leading to ‘memos’	51 PPT from lessons

Table 5 Account for empiric data

Some informants have been revisited several times both under formal and informal circumstances. Since my workplace is also my field of investigation I have had numerous encounters with colleagues and students during which we have discussed the relation between DT, students, and lecturers in University College lessons. The dialogue with colleagues and students have qualified the points that I tried to make and they have often made me see the field from other angles by pointing out aspects of a lesson that did not come out in the surveys (e.g. that the PPT are seen as a hybrid between instruction and lesson notes). The collection of data has been a constructive and long process of engaging in practice from other angles than I would normally do.

The formal data (online surveys, interviews, observations and material analysis) have served as the foundation for the analysis, however, all the informal encounters have helped hone in on the mechanisms that are at play in the structures beneath the events of practice.

5.2.2 DESIGNING THE SURVEYS

The baseline survey (Appendix 4, survey 1) was designed to; identify plausible discourses, to identify mechanisms and to lay bare structures within the field of technology application in University College lessons.

The surveys (Appendix 4, survey 1-6) all use both open and close ended questions. The close-ended questions are included to get a quantitative overview of the field, while the open-ended questions are included to achieve a qualitative elaboration of the themes in the surveys.

Furthermore, the open-ended questions serve as a feedback channel to ensure that I get all relevant answers.

The close-ended questions use a Likert scale (measuring levels of agreement) with both even and odd numbers of answers possibilities (Likert, 1932). The choice of using a Likert scale is due to possibilities of communicating the findings in the survey as e.g.; ‘xx% agree or partly agree’. However, this way of presenting statistics may entail a blurred result, because the category ‘partly agree’ contains both agreement and slight disagreement with the utterance. The slight disagreement may be of interest since it might contain information on the reasons for the slight disagreement that the close-ended questions do not reveal. The assumption is that the open-ended questions will disclose the ambiguity of the close-ended questions.

Example of a Likert scale question from the survey that asked the lecturers about their views on DT and their practices in relation to DT and teaching:

(‘Enig’=Agree, ‘Uenig’= Disagree)

Hvilke af nedenstående udsagn om anvendelse af it i undervisningen er du mest enig i i forhold til din egen undervisning?

Vurder gerne hvert udsagn for sig uden at sammenligne med dine svar på lignende udsagn.

	Enig	Delvist enig	Delvist uenig	Uenig	Ved ikke
Når vi bruger it i undervisningen lærer de studerende mere (generelt)	(1) <input type="checkbox"/>	(2) <input type="checkbox"/>	(6) <input type="checkbox"/>	(3) <input type="checkbox"/>	(5) <input type="checkbox"/>
Når vi bruger it i undervisningen bliver underviseren mindre vigtig	(1) <input type="checkbox"/>	(2) <input type="checkbox"/>	(6) <input type="checkbox"/>	(3) <input type="checkbox"/>	(5) <input type="checkbox"/>

Figure 8 Example of a Likert scale question from one of the surveys

The surveys used matrix questions that asked for the extent of something measured in ‘degrees of utilisation’ of something:

(‘I meget høj grad’=great extent, ‘I ringe grad’=small extent)

I hvor høj grad bruger du allerede disse tjenester og teknologier i forbindelse med din undervisning?

	I meget høj grad	I høj grad	I nogen grad	I ringe grad	Bruger ikke	Ved ikke
Smartphone	(1) <input type="checkbox"/>	(2) <input type="checkbox"/>	(3) <input type="checkbox"/>	(4) <input type="checkbox"/>	(6) <input type="checkbox"/>	(5) <input type="checkbox"/>
Tablet (iPad)	(1) <input type="checkbox"/>	(2) <input type="checkbox"/>	(3) <input type="checkbox"/>	(4) <input type="checkbox"/>	(6) <input type="checkbox"/>	(5) <input type="checkbox"/>
Bærbarcomputer	(1) <input type="checkbox"/>	(2) <input type="checkbox"/>	(3) <input type="checkbox"/>	(4) <input type="checkbox"/>	(6) <input type="checkbox"/>	(5) <input type="checkbox"/>
Google Drev eller lignende	(1) <input type="checkbox"/>	(2) <input type="checkbox"/>	(3) <input type="checkbox"/>	(4) <input type="checkbox"/>	(6) <input type="checkbox"/>	(5) <input type="checkbox"/>

Figure 9 Example of question assessing degrees of use

The survey collection (see Appendix 4) that informs this investigation is constituted of six different surveys:

- 1) Views, potential and practices regarding DT and teaching (lecturers)
 - a. Response rate
- 2) Views, potential and practices regarding DT and teaching (Students)
- 3) Utilisation and practices of teaching with presentation software (lecturers)
- 4) Utilisation and practices of learning from presentation software (Students)
- 5) Investigation of the digital personal learning environment (Students)
- 6) Investigation of the character of e-learning and the difference between e-learning and traditional teaching in an international context (international researchers)

The surveys contained a request for the respondents to partake in interviews. This resulted in 12 (+6) interviews with colleagues that volunteered to be interviewed and 6 interviews that were arranged later.

The surveys were digitally distributed through UCNs email system and the treatment of the data was done in UCNs survey service, SurveyXact (see www.surveyxact.com).

5.2.3 DESIGNING THE INTERVIEWS

The interviews were designed as semi-structured research interviews (semi-standardized interviews); they were built around the discourses identified in the baseline survey (presented later in this chapter). The aim of the interviews was partly to solidify the validity and reliability of the survey (Louise Barriball & While, 1994 p: 2) and partly to find and saturate the data for the “Immanent Critique”.

The interviews aim to acknowledge the fact that interviewer and interviewee know each other in advance, however, the interviews should also capture enunciations of the tacit knowledge that the practice also contains (see Appendix 3 for ‘Interview Guide’). So, what Scollon calls ‘the zone of identification’ was actually a reverse process of reacquainting with the familiar (S. W. Scollon, 2004 fieldguide).

The procedure for doing the interviews was inspired by ‘Doing Interviews’ by Steiner Kvale (Kvale, 2008). In ‘Doing Interviews’ Kvale lists a set of quality markers for a ‘good’ interview, which has guided the interviews conducted for this thesis (Kvale, 2008p 80). These were used to help form the interview:

- The extent of spontaneous, rich, specific and relevant answers from the interviewee.
- The shorter the Interviewer's questions and the longer the subjects' answers, the better.
- The degree to which the interviewer follows up and clarifies the meanings of the relevant aspects of the answers.
- To a large extent the interview is interpreted throughout the interview.
- The interviewer attempts to verify his or her interpretations of the subject's answers in the course of the interview.
- The interview is 'self-reported', it is a self-reliant story that hardly requires extra explanations.

Kvale explains that the last three bullets are especially important to the semi-structured interview meaning that

‘Of the six quality criteria for a semi-structured interview proposed in Box 7.2, the last three, in particular, refer to an ideal interview — suggesting that the meaning of what is said is interpreted, verified and reported by the time the tape recorder is turned off. This demands craftsmanship and expertise and presupposes that the interviewer knows what he or she is interviewing about, as well as why and how.’ (Kvale, 2008p 81)

The interview guide (see Appendix 3) was designed along the lines of Kvale’s suggestions but during the interviews Uwe Flick’s notion of ‘probing’ (Flick, 2009p 150) was utilised. ‘Probing’ is a technique for getting deeper into a subject guided by the answer that the interviewee gives.

The following is an example of *probing* from the interview with ‘lecturer 11’. The context is that lecturer 11 has explained how she uses ODF as a means to maintain relations between her and the students and to keep the students’ attention on the theoretical aspects that should help them act in practice while they were doing their internship. The intention was to identify the

mechanisms that led to her pedagogic decision of doing so. Hence, I probed for answers that could help identify the knowledge and experience that she drew on to make the pedagogical choice of using online discussion. I asked her to think about which prior experience could have led to her choice and after a while, she started to talk about her experiences doing a Master programme at University, where online discussions were a big part of the pedagogic design. She had not, consciously, thought of pedagogies of the Master programme while designing her own course, however, the experience from the Master programme presumably inspired her to think in the direction of using online discussions. Her own experience with online discussions was mixed between a sensation of learning a lot and at the same time a sensation of putting in a tremendous effort. The way that online discussions fora keeps track of each learners activity leaves no room for ‘lurkers’, you either engage or you are not part of it. This pedagogic design is investigated further in the article ‘Utilising DT for dialogue and evaluation – a quasi-scholastic method in action’ (Kjærgaard, 2016b) and in the article ‘Designing for Dialogue and Digitality in Higher and Continuing Education’ (Sorensen & Kjærgaard, 2016).

The probing technique was used whenever the relation between DT, students and lecturers came up. Another example is in the interviews with lecturer 13 and lecturer 14. While discussing the relation between PPT and lecturers and the students, lecturer 14 says, that some students may complain to the administration if the PPT are not uploaded before the lessons. The interview took a departure from the interview guide, which led to a series of improvised questions on the students’ needs and expectations in relation to PPT.

Summing up the two examples show that interviews produced important information that would not have emerged if the interview guide had been followed strictly. The answers that the interviewees gave and the probing of the interviewer lead to an active dialogue that eventually identified the theme of the ‘Immanent Critique’.

5.2.4 DESCRIPTION OF PROCEDURE

The data was produced in two interrelated strands. The two strands interrelate in the sense that the issues addressed in the ‘Immanent Critique’ have indicated the relevant themes for the ‘Past Research’ (Chapter 7) and for the ‘Framework for suggestions for Development’ (Chapter 8).

The data production process can be visualised in a timeline:

	2012	2013	2014	2015	2016
Activity	Action Research Observations	Action Research Surveys Observation	Surveys, Observations, Interviews	Surveys, Observations, Interviews	Observations interviews
Context	Developing pedagogies for using DT in English At TE	English A CE Developing e-learning concept	The ‘Immanent Critique’	Deleuzean Suggestions for Development	Deleuzean Suggestions for Development

Table 6 Timeline of data production

5.3 DATA ANALYSIS

This section presents the analysis of the data for the investigation of the application of DT in University College teaching in a lesson.

5.3.1 PROGRESSION OF DATA PRODUCTION

The first step in the DREIC model (see Chapter 4.1) is to describe the observed and identified emergences in the practice of using DT in a lesson at UCN.

- a. The description is done through the development of categories. These categories seek to describe the overt and observable practices.
- b. The retroduction is done by analysing the data for mechanisms, structures, positions/practices and agents in categories that could potentially produce the emergence of the practice.
- c. The elimination process is to evaluate the ‘reasonability’ of the analysed ‘abstracts’ in the investigation.
- d. Identification: find investigate reasonable mechanisms that could produce the phenomena in the chosen ‘abstract’ – leading to the ‘Immanent Critique’
- e. Correction: evaluate possible sources of bias.

Six identified categories for developing abstracts

The baseline survey and the interviews helped identify 5 categories that led to the formulation of the abstracts described below:

Abstract 1: Responsibility statement: ‘It is the student's own responsibility to utilise the technology that they bring to lessons in a fruitful way’ (agree or partly agree 87%).

The place and time, the nexus of practice, of this discourse are in the lesson. The discourse of responsibility regards the relation between the student and the lecturer and their shared presupposition of their respective roles in the lessons. The lecturers express that their agenda is being together with the students in an academic context supported by pedagogical activities in a lesson. In other words, this abstract interprets the lecturers understanding of their role in the lesson as presenters and pedagogues of academic content and activities. They may not see themselves as inspectors, or police, of the students’ digital behaviour, therefore, 87% agree that it is the student's own responsibility to learn with their own DT.

Abstract 2: Competency statement: ‘It has a huge potential but I do not have the necessary skills and competencies to use it’ (agree or partly agree 50%)

The lecturers’ sensation of lack of competency to free alleged potential in DT may not be regarded as relevant or important enough by the lecturers to seek supervision from the local ICT consultant at UCN. There seems to be a shared agreement of an unfreed potential the investigation seeks to explain why it is not in the interest of the lecturers to free the alleged potential, because on an institutional level the policy and strategy documents state elaborate goals for utilising DT in teaching (Policy for ICT and learning UCN 2015, 2013).

Abstract 3: Experience statement: ‘It is necessary to work with DT in teaching because the potential of utilising DT will not be observable until students and lecturer have gained a lot of

experience utilising DT' (Agree or partly agree 61%).

The time and place, the nexus of practice, for this discourse are even less palpable. This discourse emerges amongst lecturers who have some experience with utilising DT in their teaching. This discourse is a 'Gordian Knot', in the sense that it requires some experience with DT to realise a lack of competency and a potential gain of using DT. In Chapter 7 this discourse functions as a part of the suggestion for future practices in University College teaching.

Abstract 4: Possibilities statement: 'The presence of DT in the lesson opens for new opportunities' (agree/partly agree 60%)

The 'new opportunities' that DT opens for may be related to the lecturers urge to change pedagogies or to solve pedagogical problems in his/her teaching. The relation between the lecturer's quest for solving pedagogical problems and the lecturer's interest in the academic subject appears to be crucial to whether the opportunities are used for presentation purposes or for communication or collaboration purposes.

Abstract 5: Potential statement: 'The presence of DT in the classroom holds great potential' (agree, partly agree 91%).

The time and place, the nexus of practice, for this discourse are the least palpable of the abstracts. At best it expresses a Deleuzean 'plane of consistency' where the virtual potential of DT might help form new pedagogical ideas and that these ideas will be stratified into the 'plane of organisation' as actual pedagogies. However, the empiric data shows that that is not the case in a broader perspective. The potential may remain an unfreed potential.

Synthesis of Abstracts: Momentum statement: The way that the program is organised, the way technology is applied and the way exams are carried out lead to the formulation of 'Full circle of PPT'(see Chapter 5.4). This refers to the huge momentum that PPT seems to have in all aspects of the students learning the process and in the teachers teaching.

The time and place, the nexus of practice, of this discourse, is in the lesson. However, this discourse stretches from before the lesson all the way to exams.

The 'momentum' statement, later dubbed the discourse of the 'Full Circle of PPT'. This abstract was coded for axial relationships with other categories and as it turned out they all interrelate, however, the most plausible mechanisms to trigger the 'momentum' statement seems to be the 'competency statement' and the organisation of the program or education in general. The axial coding did not show different responses in different age groups, seniority levels or genders. Furthermore, the interviews and observations didn't show axial relations either. This leads to the assumption that the momentum of the use of PPT is shared amongst the programmes at UCN.

5.3.1.1 Validity

The baseline surveys' (Appendix 4, survey 1) level of validity and representativity in relation to the entire faculty of lecturers at UCN was verified through cross checking between an 'absolute data source' from the Human Resource (HR) department and the survey's demographic statistics. In this case, the absolute knowledge from HR concerning the

variables; seniority, gender, and age were used to cross-check with the seniority, gender, and age of the demography of the surveys.

Lecturer demography:

Control statics from the HR, actual numbers January 2015.					
Program	Average age	Average seniority	Gender distribution		Population
Teacher E	52,1	13,1	52% male	48% female	49
OT	42,9	8,1	12,5% male	87,5% female	15
Finance	45,1	9	55% male	45% female	20
Nursing	48,7	8,3	6,3% male	93,7% female	48
Demographic statistics from survey					Response rate
Teacher E	55,8	12,3	54% male	46% female	24/49 49%
OT	46,4	9,6	29% male	71% female	7/15 47%
Finance	46,7	8,1	50% male	50% female	6/20 30%
Nursing	49,2	8,6	12,5% male	87,5% female	24/48 50%

Table 7 Teacher demography, control sample

As it turns out the statistics from HR resembles the population in the surveys and interviews. This is no guarantee that the survey data and the interviews are representative to the entire organisation; however, it indicates that on these three points of interest the data is representable. If the demographic answers in the survey were differing from the HR data, then the survey data could potentially have been biased. The fact that the statistics match constitute a fair foundation for concluding that the results of the analysis of the empiric data are not biased in favour of a specific age group, gender or level of seniority.

5.3.2 DOMINATING TECHNOLOGY IN TEACHING AND LEARNING AT UCN

This section describes the dominating DT in lessons at UCN, Teacher Education in particular. The overriding DT that lecturers use in a lesson is PPT it is unparalleled by any other DT. By that PPT becomes a powerful mechanism that plays a determining part in the constitution of the lesson.

In order to understand the state of PPT use more lecturers were interviewed and two additional surveys were conducted (see Appendix 4, surveys 3 and 4). One investigating lecturers' use of PPT and one investigating the students' use of the lecturers PPT. 429 students (response rate approximately 43%) participated (60 partial response, 369 full response). 76 lecturers (response rate approximately 72%) participated (18 partial response, 58 full response).

The informants in the interviews regard PPT as a 'necessary evil'.

'Isn't that just the way it is, it is expected that we use PPT. I actually think that we should be offered a course on how to use the functionality of PPT.' (Translated from Danish, lecturer 3)

The lecturers may be aware that PPT is a determining mechanism in their teaching, however, they are also aware that PPT is a part of a habit. The habit of PPT is so firmly constituted that PPT appears to be expected by students, programme directors and colleagues.

Explicit critiques of PPT in the interviews only occurred after ‘probing’ for the deeper reason for using PPT.

If we take a closer look at the quantitative measures, lecturers use presentations in most lessons and they spend 25-50% of the lesson on presenting.

Frequency of PPT uses in lessons	
Every lesson	24%
Most lessons	41%
Half of the lessons	22%
Few lessons	10%
Never use	4%

Table 8 Frequency of PPT uses in lessons

Time spend on presenting	
Lesson time	Frequency
0 %	9%
25%	43%
50%	37%
75%	9%
100%	2%

Table 9 Time spent presenting via PPT

Based on the statics above, the interviews and the observations, the frequency of PPT use in lessons can be summed up to:

Most lecturers present via PPT half of most lessons

This, in turn, means that moving the presentation to the students’ preparation for the lessons would potentially free half the time in most lessons. However, in the practice of teaching a lesson at UCN it is presumably not expedient for the lecturer to eradicate the presentation of academic content completely. It may be more appropriate for the lecturer to be aware of the empowerment to balance the amount of time spend on PPT in the lesson that DT gives.

5.3.3 SHARING OF POWERPOINT

This section describes how PPT files are shared. The LMS is, amongst other, a structure supporting the sharing of PPT files. The PPT files are seen as mechanisms that are prone to produce learning by the lecturers and by the programme directors, according to lecturers 10 and 12. So, in that sense, the PPT are important academic ‘contractions’ that are significant actants in a lesson.

The lesson is seen as the social structure that provides the position/practice system for the PPT to emerge as an important actant. In that sense, the PPT achieves a role and a position in the system. The PPT seems to become an entity in itself that come to be detached from the lecturer, who made it, and the context in which it was made.

The presentations are generally shared before lessons (76%) and they are most commonly shared on LMS in closed lesson specific sites or folders. Only rarely are the presentations shared to a wider audience (74% never share openly on the internet). However, the presentations are shared with faculty colleagues (47% share most or all presentations). The presentations are shared on the LMS in OT and Nursing but through more individualised channels in the other programmes (email, dropbox, google drive etc.). The lecturers (lecturer 8, 9 and 10) in the health programmes (mainly in OT) express a practice of sharing and using each other's presentations this appears to be less common in Teacher Education.

The lecturers in OT mention that the practice of sharing PPT is a consequence of an obligation to teach courses that might be on the periphery of the lecturers' specialist area. The inclination towards sharing also seems to be relative to the size of the faculty. If the faculty is large (Teacher Education, Nurse Education) then lecturers may be more likely to teach within their specialist area, whereas if the faculty is small then the lecturers have to be more broad in their competencies (OT, Radiology, Ba. of National Heritage etc.).

The idea of sharing PPTs as 'Open Educational Recourses' (OER) may be seen in relation to a similar situation of sharing OERs investigated by Grainne Conole in the book 'Designing for Learning in an Open World' (Conole, 2012). Conole investigates how teachers in schools design learning interventions. In the quote below Conole summarises the difference between the teacher's expressed sense of the value of the OERs and the actual adaption of other teachers OERs.

'Those interviewed recognised the value of sharing and reuse, but there was little evidence that they shared their designs with others or adapted and repurposed designs created by others.' (Conole, 2012 p: 105)

The quote may also address a fragile element of sharing and developing OERs that could hark back to the distinction between 'information' and 'knowledge' elaborated in Chapter 1.3.1. Sharing OERs may be understood as sharing information and not as sharing actual knowledge. The process of adapting other lecturers' pedagogical designs may require actually experiencing how the designs work (see Chapter 7, Article 4)

5.3.4 CONTENT ANALYSIS OF POWERPOINT

This section presents and analyses a selection of PPTs from lecturers at Teacher Education, Ba. of Occupational Therapy and Nurse Education.

The collection of representative presentations was gathered in order to find out whether the content of the actual presentations used at UC was sharing the characteristics that Tufte pointed out in his article to be problematic. So, the main objective is to investigate if the PPT consist of short text in bullets, and by that adhere to the 'cognitive style' suggest by Tufte and Parker (see Chapter 2.2.1.2) The Collection contains 51 presentations from teaching at UCN. The method of analysis was to quantify the occurrence of specific content forms in PPT.

The chosen content forms were:

- Bullets
- Quotes
- Graphs
- Models
- Images
- Videos
- Animations

The informants in the interviews also replied to the surveys and in many cases they also supplied sample PPTs. Apart from that, additional lecturers from all four programmes were asked to supply samples of their PPTs.

The table below shows the statistics of the analysis of the presentations. The statistics show how many slides contain a given content type or modality is in relation to which programme they were sampled from:

Program/Content type	Bullets AVG	Bullets SD	Quotes AVG	Images AVG	Models AVG	Models SD	Video AVG	Graphs AVG
Teaching	66,3 %	11,7	3,7%	1,8%	8%	18,1	0%	0%
Nursing	63,6	15,1	5,1%	24%	2,3%	6,1	1,5%	0,6%
Finance	55,4%	21,6	0%	4,4%	4,2%	5,9	0%	15,4%
Occupational t.	50,5%	23,4	3,8%	47%	1%	1,7	4,1%	9,3%
Average	59%		3,2%	19,3%	3,9%		1,4%	6,4%

Table 10 Statics of content I PPT

Headlines in bullets take up an average of 59% of the slide in the sample PPT.

If the PPT content analysis is compared to what the lecturers responded to the survey it shows another aspect of the usage of PPT. The question, in this case, is; how frequently does a given content type or modality occurs in ‘all or most’ presentations according to the survey statics:

Program/Content type	Bullets AVG	Quotes AVG	Images AVG	Models AVG	Video AVG	Graphs AVG
All programs, most or all presentations contain:	78 %	36%	78%	8%	19%	21%

Table 11 Survey statics on PPT content

The PPTs vary from subject to subject and from topic to topic. However, they share some common traits. It is common that the presentations show ‘contractions’ of theory:

Begrebsudvikling og analysemodel

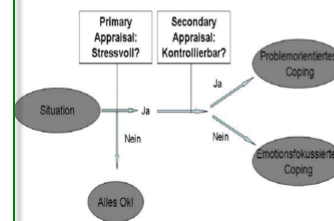
- **Skrivehændelse:** henviser til situationer, hvor elevskrivning indgår.
- **Skrivepraktik:** er de generelle kulturelle måder at bruge skrift på, som folk benytter deres liv.
- **Skrivekultur:** værdier, holdninger og grundforståelser knyttet til skrivning.



Figure 10 PPT example, contraction or theory subject Danish, Teacher Education

Centrale begreber hos Lazarus

Copingprozess nach Lazarus & Folkman (1984)



- Primær vurdering
- Sekundær vurdering
- Emotionsfokuseret mestring
- Problemfokuseret mestring

Figure 11 PPT example, model, and contraction or theory subject Stress, Nurse Education

It is also common that the presentation contains the complete set of directions for the lesson. That is information, tasks, agenda, quotes, references etc. In the example below to the left (figure 12), the lecturer includes questions for discussions to be conducted in the lesson at that specific time in the lesson. It serves as a ‘plateau of intensities’ in the sense that it orchestrates a ‘self-organizing chaosmos’. It marks a shift from arborescent cosmos (the presentation) to rhizomatic chaosmos (the activities) (see Chapters 6.1.3 and 6.1.6). The position/practice system is also changed. The students shift from ‘receivers of information’ to partakers in ‘communities of practice’ of solving the tasks. The lecturer’s role in the position/practice system shifts from ‘instructor’ to ‘facilitator’. These shifts in the position/practice system are important because they may contribute to the students’ potential agency.

The example to the right shows an agenda. The lecturer uses PPT to guide the students through a specific route (figure 13). In this specific case, the lecturer also organises the LMS folders to follow themes and lessons (figure 14).

Fælles rekonstruere
Eleverne får

- Eleverne skal nu selv løse hvordan de arbejder med det der har svært ved det, og rekonstruere lærerens med andre eksempler.

- Diskuter: Får i sat eleverne i gang med at arbejde med problemstillingen?
- For eleverne i denne proces mulighed for at forklare hinanden hvordan de forstår opgaven?

Discuss:
Do you engage the pupils in solving the problem?
Do the pupils get a chance to explain how they understand the assignment?

Figure 12 PPT example, subject Math Teacher Education

Dagens forløb

- Registreringen
- Lidt om praktikugen
- Oplæg / diskussion om den læste bogen
- Et blik på den nævnte billedbog Da Børge B blev gennemsigtig.
- Grøbet bearbejdningen af Dorte Karrebæks billedsprog og billedbøger
- Opsamling

Agenda of the day

- Registration
- Info about internship
- Presentation, today's topic
- A glance at the book
- Group work
- Summing up

Figure 13 PPT example, subject Danish Teacher Education

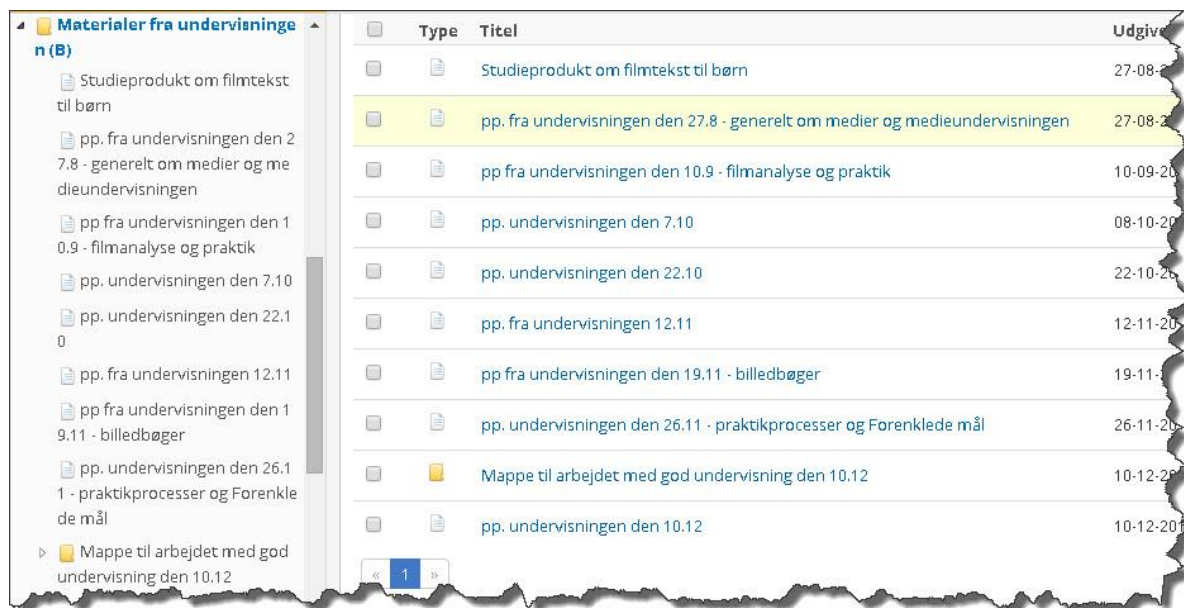


Figure 14 Example of structure in LMS

The examples (figures 12-13) show that one of the main concerns is to present structure, which is also supported by the qualitative statements (Appendix 4, survey 3, qualitative statement 3). The lecturers focus on presenting a clear, linear progression that the students find easy to follow. This relates to the notion of ‘efficiency’ in the definition of ‘quality’ in a lesson presented in the Introduction (Chapter 1.1.1). PPT combined with the systematic use of LMS seems to result in a sense of ‘efficient’ teaching, that is, teaching without wasting time, which may lead to an understanding of ‘densification’ as a constant flow of PPT slides.

The examples where lecturers use the PPTs and LMS structure as an all-encompassing lesson and course organisation and it becomes a series of causal mechanisms and a structure that, when joined together in the practice of a lesson, gives form to the discourse, so it becomes a ‘virtual problematic field’.

This entails two problems;

1. The projector is on all the time being the visual centre of attention.
2. It leaves little demand for the students to attain agency in their learning process.

The first problem is a problem because visualisation technology becomes deterministic to the practice of teaching and learning in the lesson. Everybody may be looking mainly towards the PPT slide on the projector screen in the centre of the room for answers. Very few of the students in the observed lessons write down the questions and make their notes point of departure for the discussion/task at hand.

The examples (figures 14-15) also show that the PPT in connection with an arborescent structure in the LMS becomes a timescale that encapsulates both the lesson and the entire course. The timescale is measured in ‘chronons’ time units (lessons) and it does not leave room for ‘aionic’ time units of experience (learning instances, acknowledgements).

The survey shows that images, videos, and graphs are fairly common in presentations in general but the analysis of PPT content reveals that even though images, videos and graphs are present in the analysed presentations these content types are not taking up much space in the presentations. So, there may be a slight discrepancy between the quantitative survey statistics and the qualitative analysis of actual content in the selection of PPTs, nonetheless both datasets lead to the concluding comment:

Text presented in short sentences in bullets are the dominating content form or modality in PPT at University College North.

When it comes to using animations (movement of objects in PPT) in PPT 51% state that they never use animation. The sample collection of PPT indicates that this number might be even lower in reality. This is properly due to the fact that the presentations are uploaded to the LMS before or shortly after the lesson (73% share most or all presentations with students) in which case animated bullets and other animations that are intended for deployment simultaneous with the lecturer's talk would blur the communication value of the presentations as support for preparation for the lesson. Another important reason why animations are not common could be that many lecturers share the presentations in PDF format, which does not show the animations. The reason for this, predominantly, monomodal use of PPT is not only lack of technological literacy, as some scholars would claim (Arstorp, 2015a p: 288). The lecturers are familiar with the possibilities in PPT, however, the purpose of PPT seems to have shifted from mere presentation of content to documentation of content. In the interviews lecturer 16 explains that PPT has a double purpose in his lessons; 1) it is the vehicle for presenting content and for organising the lesson and 2) it contains the notes for the lesson. He says that his PPTs contains more text than is expedient for presentations because he also uses the PPT as full lesson notes for the students' future work on the subject (from an interview with lecturer 16).

In need of a new digital tool for teaching?

'Lecturer 16' describes a hybrid use of PPT that transforms PPT from mere presentation software into a 'learning material authoring tool'. This glimpse of a morphogenesis may be interesting because it indicates that something novel might be taking place. Lecturer 16 may be on the brink of needing a new tool for making his presentations that cater more for a holistic approach to creating learning materials than PPT.

This could indicate that a development of competencies to use 'author ware' normally associated with e-learning content such as 'ToolBook' or 'Adobe Authorware' could be the next fruitful progression for 'lecturer 16'. The idea of using e-learning content creation tools for making content to traditional lessons would be a novel hybrid where the benefits of e-learning content could contribute to traditional lessons. Unfortunately, 'author ware' software may be time-consuming to use, in my experience, and the licences are costly to acquire (Toolbook price example \$1895/user/year). So, even though there is a slight indication that PPT might not be the appropriate tool for lecturer 16 (and others) author ware might not be the solution on a broader scale. Another solution for lecturer 16 (and others) could be to utilise the functionality of the LMS to create learning material.

So, the two content types (video and animation) that separate PPT from the old transparencies on OHPs are not put to use extensively. This indicates that the lecturers in this survey are in the second wave in Celsi and Wolfenbarger's wave metaphor. Which suggests that they may mostly use digital technologies to fortify and sustain the analogue behaviour.

The actual novel idea would require something entirely different, for instance, a new hybrid connection between known entities. Not easier or faster, but different (Deleuze, 1994 p: 78). In a Deleuzian understanding of PPT and the habits it maintains, it is unlikely that PPT could improve a lesson's potential for catalysing learning compared to the potential of the OHP because the principal behind the pedagogic design would be similar, which is that 'transmission' of information can lead to learning. In order to create novel ideas, Deleuze says that you need a rupture, something that makes you think differently, which could be an 'author ware'.

5.3.5 LECTURERS' REASONS FOR USING POWERPOINT

This section presents and analyses the lecturers' reasons for using PPT in lessons. Furthermore, the section presents the most quintessential statements from the open-ended answers in the survey on the lecturers' use of PPT in lessons (see Appendix 4 for a closer look at all answers).

The questions asked were: 'What do you use PPT for, and what part does PPT play in your lessons?' 55 lecturers out of 61 responded. The respondents came from 4 different programmes. 48% of the respondents came from Teacher Education:

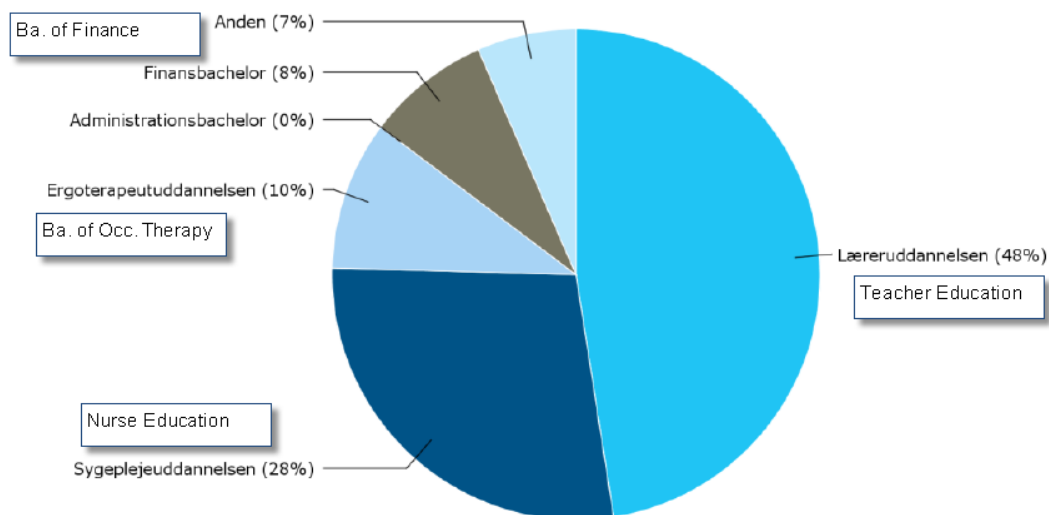


Figure 15 Distribution of respondents according to programme

The statements from the other programmes were filtered off leaving only statements for Teacher Education. This filtering was done to secure relevance in relation to the suggestions for the development of Teacher Education. Filtering the statements according to the programme didn't change the collective enunciation of the statements, which may lead to the claim that PPT is used for the same purposes across programmes as long as they are all on the same academic level.

The three most protruding statements, which emerged from coding the answers to the open-ended question in the survey (Appendix 4, Qualitative Statements 3) are:

1. Multimedia – 21 out of 55 (38%) statements contain expressions of the use of images, graphs, videos, models etc.
2. Structure -21 out of 55 (38%) statements contain expressions of ‘Structure’ as a positive reason for using PPT.
3. Tasks-15 out of 55 (27%) statements contain expressions of ‘Assignment, questions or task’ as a positive reason for using PPT
4. Overview -14 out of 55 (25,5%) statements contain expressions of ‘Overview’ as a positive reason for using PPT

The next question to the same population was: ‘How does PPT improve your lessons?’ 49 out of 61 lecturers responded. One lecturer puts it this way, which is a different, and perhaps more honest, explanation:

‘Den bliver ikke bedre. Jeg er bare mere rolig...’ (Original lecturer statement)

‘It [the lesson] does not get better. I’m just more confident/at ease...’ (lecturer statement translated into English)

The coding of the statements shows there is a connection between what lecturers use PPT for and how they think it makes their lessons better. However, there are also indications that the reasons for using PPT are not entirely pedagogical. Several statements report a quest for communicating clearly, for keeping track of the key issues in the themes in the lesson and for making sure that the lesson follows the syllabus and the curriculum. In other words, PPT provides the lecturers with a tool for lesson-control and it creates a shared scaffold for both lecturers and students to work from:

‘Jeg bliver mere præcis og struktureret.’ (Original lecturer statement)

‘I become more precise and structured.’ (lecturer statement translated into English)

And:

‘[PPT] sikrer mig overblik og dermed forhåbentlige en bedre undervisning.’ (Original lecturer statement)

‘[PPT] ensures my overview and by that my teaching, hopefully, gets better.’ (lecturer statement translated into English)

And:

‘Giver en form for sikkerhed idet jeg har dispositionen til timerne.’ (Original lecturer statement)

‘[PPT] gives a kind of security because I have the agenda for the lesson.’ [on the slides]. (lecturer statement translated into English)

And PPT is expected and convenient in a lesson:

'Jeg er ikke sikker på, at den bliver bedre af at bruge PPT - jeg tror, at 'dogme-undervisning' med tavle og kridt vil være bedre - de studerende ville blive tvunget til at tage egne noter af det hele - PP er en sovepude. Men det er en kamp - de studerende vil have PP; PPT det er lettere for mig, så...' (Original lecturer statement)

'I'm not sure that it [the lesson] gets better by using PPT - I think that 'handheld-education' with blackboard and chalk would be better - the students would be forced to take their own notes of everything - PP is a sedative. But it is a struggle – the students want PP; PPT it's easier for me, so...' (lecturer statement translated into English)

This quote pinpoints the experience that analysing the data has given. The momentum of PPT use seems more powerful than one lecturer can withstand or change.

The most protruding theme of 'multimedia' may be interesting because, the ability to use images, videos, and other graphical content is not as evident in the lecturers' description of how they use PPT or in the PPT content analysis. However, the quest for controlling the progression of the lesson could also be interpreted as reliance on mechanisms for controlling time and speed of the lesson.

5.3.5.1 Summing up the lecturers' reasons for using PPT

The lecturers' use of PPT seems to relate to both the review of 'quality' and the understanding of 'quality' interpreted from the 'Development Contract' (UCN/ministry of Education). Furthermore, it seems to follow the line that Huffman and Huffman present in 'Beyond basic study skills: The use of technology for success in college'. Huffman and Huffman concludes:

'[...] our study suggests that students who use technology that matches the instructor's expectations are more likely to succeed in their classes.' (Huffman & Huffman, 2012 p: 587).

If the statement in the quote above also applies in the context of this thesis is not investigated, however, the empiric data makes it probable to conclude that it is a common practice amongst students to use the DT that the lecturer uses during the lesson to structure their path from lesson to exam.

When analysing the lecturers' responses in regards to their use of PPT several variations of similar practices emerge that may be categorised into three categories:

- Fragmented practice: PPT for presenting a single subject from a specific discipline (10-15 slides about a narrowly scoped subject)
- Systematic practice: PPT as the all-encompassing guideline and structure for the entire series of lessons for the day. Previous presentations organised in appropriate folders in LMS to make it easy for the students to find the presentations for later use.
- Hybrid practice: Enriched PPT-containing both presentation of the subject of the lesson, the lecturer's notes on content and additional resources for further investigation of the subject.

Hence, it becomes ‘useful’ because it establishes a ‘virtual problematic field’ in itself. So, using PPT as a content and note-providing device may be understood as a teaching skill.

5.3.6 STUDENTS’ USE OF LECTURERS’ POWERPOINTS

This section describes what the students use the lecturers PPT for according to statics from Survey 4 and the open-ended answers in the 439 Teacher Student’s statements in Survey 4 (Appendix 4, Survey 4 and Qualitative Statements 4).

The surveys asked both close-ended and open-ended questions in regards to the students’ use of the lecturers’ PPT. The results of the most relevant close-ended questions are presented in figures 18, 19 and 20 below:

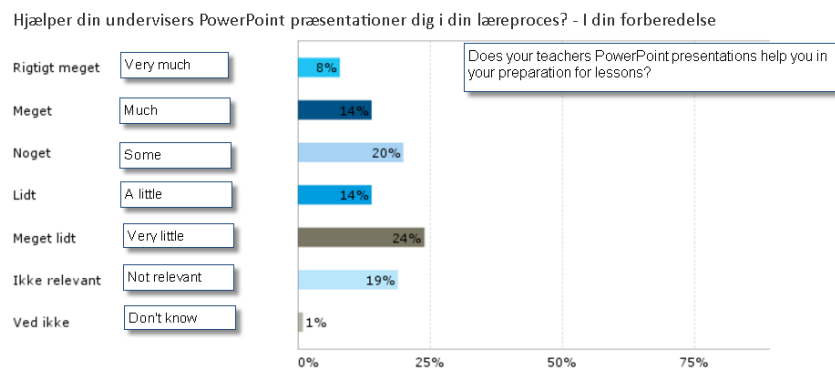


Figure 16 Does the lecturers’ PPT help you while preparing for lessons

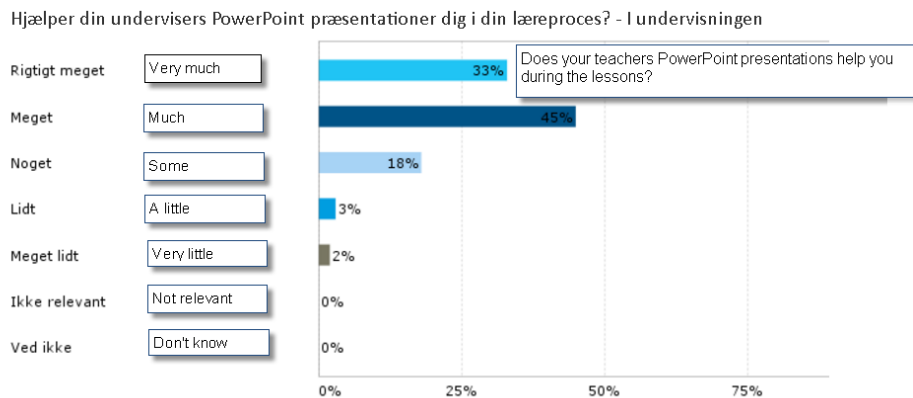


Figure 17 Does the lecturers’ PPT help you during lessons

Hjælper din undervisers PowerPoint præsentationer dig i din læreproces? - Eksamensforberedelse

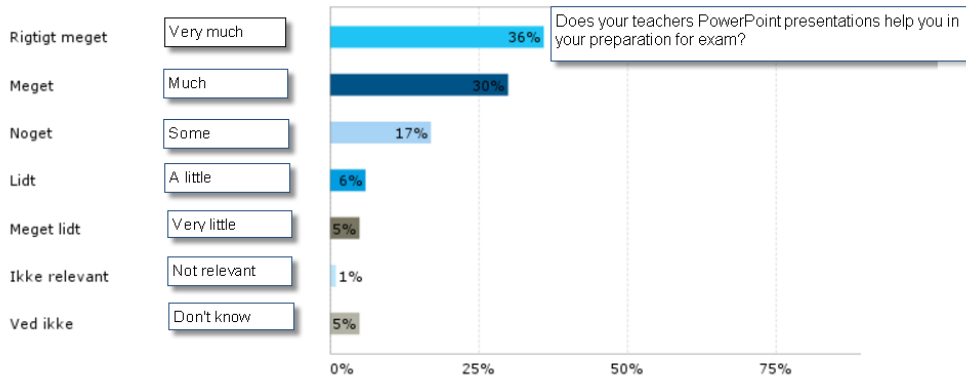


Figure 18 Does the lecturers' PPT help you preparing for exam

The responses show that the vast majority of the respondents find the lecturers PPT highly useful during lessons and as a part of their exam preparation. This finding indicates that PPTs are vital, overt mechanisms of learning to the students.

In the qualitative statements from the students, they elaborate on how they use the lecturers' PPTs during the lesson. A student states the following (see Appendix 4 for details):

'Jeg noterer, hvad der står på PP[T] og supplerer med underviserens "guldkorn".' (Original student statement in Danish)

'I make notes of what is on the PPT and add the teachers 'Best Bets'.' (Student statement translated into English)

The students 'subtract' the digest of the lecturer's lecture in written notes in the text field below the lecturer's slide in their local copy of the lecturer's PPT file:

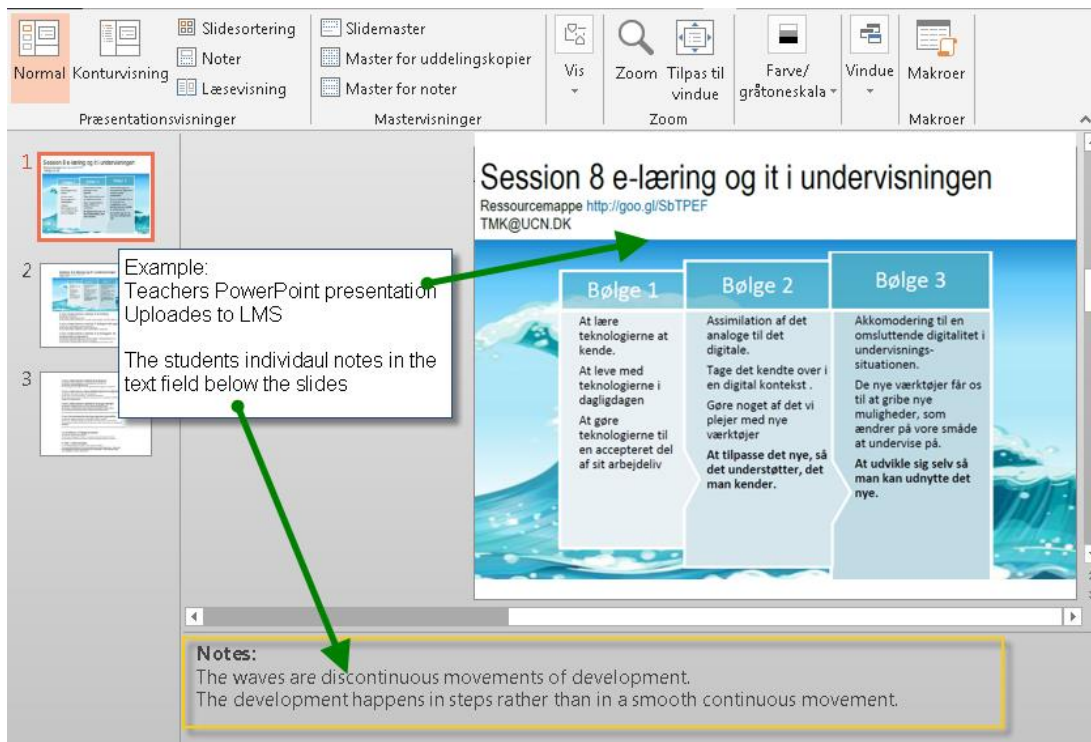


Figure 19 Example of how students may take notes in the lecturer's PPT

In relation to this note-taking practice, it may be inconvenient for the students if the lecturer decides not to use PPT or if the lecturer decides to experiment with other presentation tools such as Prezi or Keynote.

The students also highlight the opportunity to archive the presentations for later use and to keep the illustrations and models that presentations might contain, one student puts as follows:

'Jeg bruger dem til notattagning under undervisningen, da mine noter er samlet et sted og sammen med eventuelle illustrationer og modeller.' (Original student statement in Danish)

'I use them [lecturers PPT] to take notes during lessons so that my notes are gathered the same place as occasional illustration and models.' (Student statement translated into English)

The students use the PPT in connection with their notes to document the essence of the lecture for later use:

'Jeg tager noter ved hvert dias, således jeg kan vende tilbage til præsentationen og få samme udnytte ud af det som til undervisningen.' (Original student statement in Danish)

'I take notes at each slide so that I can return to the presentation to get the same exploitation of it after, as during the lesson.' (Student statement translated to English)

On a more critical note, the students reflect that if the lecture and the content of the PPT are coinciding then the lecture becomes redundant:

'[...] Dog, hvis det underviseren fortæller er nøjagtigt det som står i PPTet, så føler man det er spild af tid og at man blot kunne have læst PPTet hjemme i stedet for at deltage.' (Student statement translated into English)

'[...] Though, if what the teacher tells is exactly the same as what is in the PPT, then you feel that you waste your time and that you could have read the PPT at home in stead of participating in the lesson.' (Student statement translated into English)

The students also suggest that the PPT are presenting the content in a way that is easier to understand than the formulations in the course books, one student put it as follows:

'Jeg bruger den til at søge mere forståelige svar, end jeg finder i mange bøger.' (Original student statement in Danish)

'I use it [lecturers PPT] to search for more understandable answers than I find in many books.' (Student statement translated into English)

The latter incident raises a series of questions.

1. Did the student read the book thoroughly enough?
2. Is the 'contraction' of academic content presented in the presentation easier to understand because it is less in depth?
3. Are the course books too difficult?

I find these questions relevant for further discussion, however, the second question appears more operational for investigation than the first and the third. The students' study ethics and the course design are not directly relevant to this thesis. Hence, the themes in the articles presented in chapter 7 are dealing with the second question by trying to hone in on the 'virtual problematic field' of a lesson. The articles do so by focusing on the dialogue about the content instead of focusing on the presentation of the content.

The second question from the list above becomes even more interesting, when the students use the lecturers' PPTs as their anchorage for exam preparation:

'Det har været en stor hjælp til især mine eksamensforberedelser, da mange af dem opsummerer litteraturen, der har været opgivet for semesteret - det sparer derfor noget forberedelsestid i en allerede travl tid. Generelt godt at have set i forhold til opgaveløsning og gruppearbejde, da det som sagt er en opsummering. Benytter dem også under undervisningen ved at tilføje uddybende noter, hvis underviser kommer med noget yderligere eller, at jeg selv gerne vil have noget udspecificeret.' (Original student statement in Danish)

'It [The lecturer's PPT] has been a great help especially for my exam preparations, as many of them [PPT] summarise the literature that has been read throughout the semester - saving preparation time in an already busy time. Generally good to have in relation to problem solving and group work, as it is a summary. [I] also use [PPT] during lessons by adding

explanatory notes if the teacher has additional remarks or if I would like to add something specific.’ (Student statement translated into English)

So, when the content of the PPTs seem to be dominated by ‘academic headlines’ and the students in this survey appear to use the lecturers’ PPTs as a source for exam preparation, then I think it is worth discussing whether there could be a potential risk of overvaluing the depth of learning in oral exams.

5.4 RESEARCH FINDINGS: THE FULL CIRCLE OF POWERPOINT

The purpose of this section is to synthesise the findings in data analysis and to formulate an ‘Immanent Critique’ that leads to the notion of the ‘Full Circle of PPT’. It is also to indicate that the lesson might not constitute the actual ‘problematic field’ of the learning objectives from the curriculum, but rather a ‘virtual problematic field’ that arises in the course through the pedagogic design of the lesson, meaning that the lesson in itself becomes ‘something’ to learn.

The research findings show that using bullets to present short text is common which makes Tufte’s article (Kangas, 2012; Tufte, 2003; Zachry & Thralls, 2004) (see Chapter 2.2) relevant to this study.

Most PPT analysed in this investigation present a theme or a specific subject. But the lecturers also use the presentation to guide the progression of the lesson. Taking all differences and variations into consideration the dominating modality is text in short sentences.

In Tufte's article about the cognitive style of PPT (Tufte, 2003), Tufte appears to be concerned with the reinforcing and, potentially, imposing presentation of short text in a convincing manner that may lead to unreflected reception of the messages presented in the PPT. This concern led to the coding phrase named ‘The Full Circle of PPT’.

The collection of data for this study shows a common practice, where the lecturer may plan his/her lesson by assembling a PPT, the students may support their preparation for the lesson by leafing through the presentation, the lesson consists of the lecturers talk guided, supported and determined by the PPT in conjunction with activities. Furthermore, 68% of the respondents in the student survey state that preparing for exam takes the point of departure in the presentations.

The actual oral examination situation is not investigated for ethical reasons, however, it would be highly interesting to look into the communication in the examination room during oral examinations to gain insights into the actual depth of learning that the examination assesses and by that seek to answer the question if the headlines from the PPT constitute the vocabulary for the examination without in-depth probing.

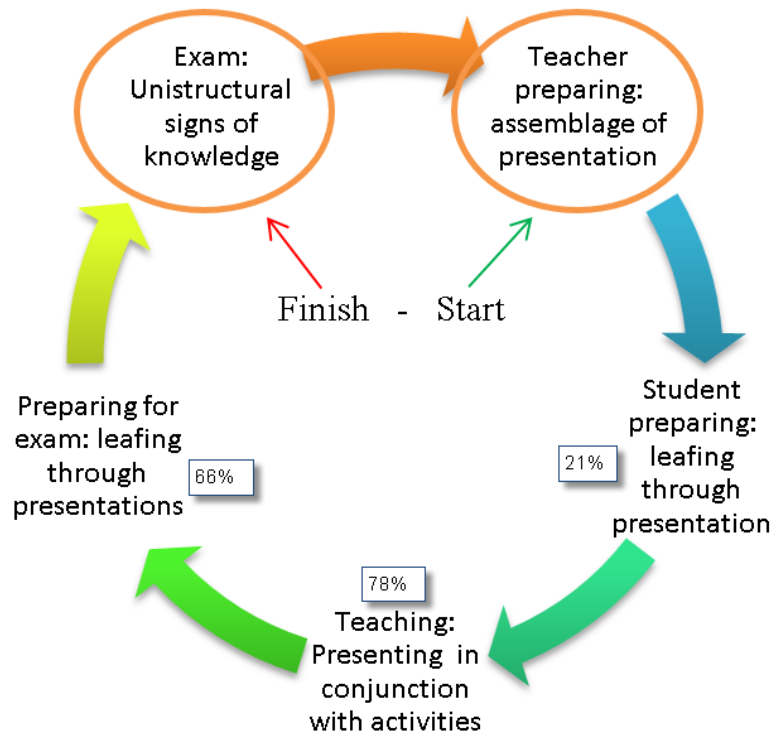


Figure 20 The Full Circle of PPT

The percentages in the figure (Figure 32) are referring to the share of the students who regard the lecturers PPT as ‘helpful’ or ‘very helpful’ in that specific part of their learning process. The students ascribe most value to using the presentations during lessons and for preparing for the exam.

An interesting discrepancy between students and lecturers is that only 5,5% lecturer statements contain the word ‘Exam’ as a positive reason for using PPT, while 66% of the students mention that the lecturer’s PPT are important to them as preparation for the exam.

This is interpreted as a difference in ‘needs’ between the students and the lecturers. The lecturers ‘need’ to present the content to meet demands in the curriculum, while the students ‘need’ to pass exams.

The notion of the ‘The Full Circle of PPT’ is a simplified version of the complex nature of the teaching situation and in all the interviews and observations in this study the lesson has contained more than an instructor and a PPT, however the role of presenting instructor is a significant part of almost all lecturers’ practice, according to the data (93% of the respondents use PPT in their lessons) and more than half of these presentation consists of short bullet organized text. So the role of presenting instructor, presenting short texts organised in bullets is a considerable part of most the lecturers’ practice (with the exception of music, crafts, and physical education lecturers). The use of PPT is visualised as a circle because the circle describes a repeating habit with little spiral elevation, it indicates that the lesson is a self-contained loop of actions that rarely takes a ‘line of flight’ to a novel practice (Carlin & Wallin, 2014 p: 97).

This raises two questions: is the simplification of complex matter into short text affecting the depth of learning and thus making it unistructural (Biggs & Tang, 2011), and is it reducing the lecturer to being a presenter of headlines? There are several observable indications of both presenting of academic headlines and of unistructural learning in the data. A student expresses the complexity as follows (Appendix 4, qualitative statements 4):

'Undervisere kommer alligevel med et eller andet til PPTs – læser ikke bare slides op. Der kommer altid et eller andet.' (Original student statement in Danish)

'The lecturer always bring something else supporting the PPT – does not just read the slides out loud. Something else always pops up.' (Student statement translated to English)

So, the question is not whether the promoting of unistructural knowledge through PPT is of lesser quality, but rather how we can reach more elaborate levels of knowledge after witnessing the presentation. The presentation of content could be interpreted as an important and necessary stepping stone for learning within that line of thinking.

The real problem may be if the presentation of content is the only element that gets attention from the students.

The student statements in the surveys state that they use the lecturers' uploaded PPTs to:

- Quick leaf-through during preparation, if the PPT is uploaded before the lesson.
- Write notes, either directly in the text field below the slides in PPT or in word document.
- Follow slides on the students own laptop screen during lesson
- Use the presentations to create a quick overview of the most highlighted elements of a subject.
- Use the presentations to recall the highlights of the subject in question during exam preparation.

5.4.1 SUPPORTING DIGITAL TECHNOLOGIES AND WEB 2.0 SERVICES

This section describes the use of other digital technologies/services (links, video, audio software ect.), then PPT/Projector, emerging in the data, which may be utilised to support the PPT.

Most of the lecturers in this study use PPT as presentation software without any supporting digital services. However, the survey and the interviews show a range of supporting technologies/services that 'early adapters' (Rogers, 2010) of DT have made part of their practice. These digital technologies/services include:

1. The most common supporting technology is hyperlinks to the internet (resource pages, video clips, definitions etc.).
2. The second most common supporting technology is embedded video clips.
3. The third most common supporting technology is student response systems (e.g. Socrative.com)

4. The fourth supporting technology is video conference to bring in practitioners, real time, into the teaching context.

When it comes to digital supporting technologies/services the deviation in occurrence is extreme; going from almost all lecturers using links to only one lecturer (lecturer 10) using a video conference to bring in practitioners real time during lessons. Student response systems are slowly becoming more and more common and the uses of video clips are also fairly common (but not necessarily frequent). The links to videos are thought as extra learning materials that the students can watch after the lesson (lecturer 8).

Interactive Whiteboards

In the discussion of digital supporting technology, it may be appropriate to address Interactive Whiteboards as an adjacent to PPT. During the last 10-12 years (starting in 2005 at Teachers Education UCN) Interactive Whiteboards (IWB) have become more and more common in the classrooms and since 2009 IWB has spread to other programmes in UCN as well. Today many classrooms are equipped with either IWB or an interactive projector at UCN. However, only one lecturer mentions IWB as a positive part of his/her practice in the data. Conversely, six teacher-students mention that they would have benefitted from a course in IWB pedagogy. Furthermore, there may be a discrepancy between the usefulness of IWB in University College teaching and usefulness of IWB in the future practice of a school teacher. Arstorp, Heiberg, Pagaard and Skov from University College Capital (UCC – Copenhagen Denmark) investigated how IWB worked at Schools and they conclude that IWB reinforces monologue and instruction instead of promoting interaction (Arstorp, Heiberg, Pagaard, & Skov, 2011 p: 46). They also conclude that the uptake of IWB is too low at Teacher Education (UCC) for IWB to matter as a relevant technology. This indicates that IWB change domain from ‘teaching technology’ to ‘content of teaching’, which is something that is ‘taught’ and not ‘taught with’ (Arstorp et al., 2011 p: 41-45).

5.4.2 TYPOLOGY OF LECTURERS' USE OF DIGITAL TECHNOLOGY

The majority of the lecturers, informing this investigation, could be said to be on the second ‘wave’ in a mixed analogue/digital state, meaning that they seem to assimilate digital technologies to analogue behaviour. In the table below (Table 12), the lecturers are categorised into four a typology of categories. The typology is created on the basis of the survey data, the interviews and the field notes from the observations. The typologies of lecturers and students are tools for understanding the context of the lesson and they represent a ‘reasonable’ understanding of the diversity amongst lecturers, however, it is not a generalisable.

The typology is divided into four categories starting from analogue (pre-wave 1), analogue/digital (wave 1-2), digital systematic to digital eclectic. The typology is not assessing the quality of the specific ‘type’, it is merely organising the different types of lecturers according to their use of DT. The quality of the teaching is a more complex matter that relates to the aim of the course, the organisation of the programme and the curriculum. The curricula seem to cater more for the ‘analogue’ instruction and leave little space for developing actual digital practices, apart from digitally enhanced instruction. The ‘analogue’

lecturer-type might even be better at preparing the students for exams because most aspects of the context have analogue heritage. Furthermore, the organisation of the programmes is following the principals of the organisation from before digital technologies entered education, which may entail very little deterministic influence from the digital technologies.

	Analogue	Analogue/Digital	Digital Systematic	Digital Eclectic
Utilisation of DT	Blackboard/ whiteboard Overhead projector Flip over	PPT Writing and drawing on blackboard to supplement PPT and discussions LMS to share PPT LMS to share texts	Exclusively uses digital presentations. LMS to share PPT LMS to handle hand-ins LMS to share resources LMS to share knowledge amongst colleagues LMS to create and evaluate tests	Exclusively uses digital services. Uses LMS as a backbone but will take in any digital tool needed.
Digital activities	Email	Email/messages in LMS	Email/messages in LMS Student response systems (socrative) SMS	Messages in LMS Messages in social media. SMS Student response systems, co-creation platforms (google, MindMeister, prez!, padlet, edmodo, todaysmeet etc.)
Causality – mechanisms that trigger utilisation	Own negative experience using technology in teaching. Laggard mentality.	Own positive experience with practical advantages of using PPT and LMS functionality.	Own positive experience in being taught digitally. Academic interest in providing access to resources. Interest in efficient evaluation of learning. Academic interest in sharing learning material easily. Personal interest in developing digital skills.	Own positive experience in being taught digitally. Personal interest in media and web. Identity building through being a 'modern' lecturer.
Wave	-	1/2	2/3	3
Compliance with UC strategy	NO	Somewhat	Yes	NO
Occurrence	>10%	Approx. 40%	Approx. 40%	>10%

Table 12 Typology of lecturers

The typology shows the lecturers use DT for practical reasons rather than for pedagogical reasons. They seem to use LMS because it is an easy way of distributing digital texts and PPT files and because it is a convenient way to organise (and document) a course. The practical reasons for using LMS also have a pedagogical aspect, in the sense that it allows students to communicate with the lecturers easily and it allows them to access digital course content easily.

5.4.3 TYPOLOGY OF STUDENTS

Through the surveys, interviews and observations of teaching at UCN (Programmes for Nursing, Occupational Therapist and Teaching) four generic types of student practices emerged in relation to utilisation of DT. The four practices regard the students' utilisation of their own devices during lessons.

The typology applies to the local context of UCN and may not be generalisable:

	Analogue	Analogue/ digital	Digital systematic	Digital eclectic	Marginalised students
Activity	Takes notes with pen and paper. Brings no device other than smartphone	Takes notes with pen and paper. Has computer (95%) or tablet (>5%) that is used to view lecturers PPT and fact checking	Takes notes on the computer (95%) or tablet (>5%). Uses the lecturers PPT as their point of departure. They have a local copy of the pptx file, that the lecturer shares before teaching and writes notes in the text box below the slide in MS PPT	Takes notes in PPT has more than three additional tasks running at the time. The additional tasks appear to be Facebook, email and some sort of game. The game is substitutable with a web shopping	Do not take part in discussions. They use their device for social media, games and web-shopping
Occur.	>10%	>10%	<50%	Approx. 30%	Approx. 10%
Excuse rate to other ecotones	0	Approximately 30% of entire population take an excuse every 15 minutes the excuse lasts >5 minutes	Approximately 30% of the entire population take an excuse every 15 minutes the excuse lasts >5 minutes	Constant cross between academic, private and entertainment ecotones	This group appears to be in the private or entertainment ecotones throughout the entire lesson

Table 13 Typology of students

The potential issue of the students' use of Social Media during lessons did not appear to be as dominating as presumed. However, the multitasking user interfaces of Windows and Apple OS allowed the students to keep a Social Media 'window' open without actually having it on the screen. This permitted the students to make quick shifts between 'windows' on their computer screens to keep track of Social Media during lessons, without actually participating in Social Media. This indicates a hybrid use of Social Media in lessons, where the student is logged on and surveying social media, without being fully engaged in social media. It is not within the scope of this thesis to investigate how the presumed mixed attention between social media and lesson activities affects the students' learning, even though it is deemed highly interesting to the understanding of how the students own laptops effect the outcome of the lesson.

5.4.4 SUMMING UP STUDENTS AND LECTURERS USE OF POWERPOINT

The vast majority (92%) of the lecturers are digital using technology during lessons (laptop, LMS, email) to make sharing content easier, to make communication easier and to handle hand-ins easier and more systematically.

So, the keywords for the lecturers' use of LMS are;

- systematic overview
- convenience
- efficiency
- ease

For the students the keywords seem different regarding the lecturers use of LMS;

- complex communication
- difficult structure
- varying strategies from lecturer to lecturer (course to course)
- lack of overview

The students express simple needs when it comes to LMS; systematic presentation of, when to be where what to prepare and easy access to past and future content. So they turn to facebook for a more convenient tool. This results in the establishment of an ‘interpretive system’ that translates the alleged complex, varying and difficult communication practices in the LMS to what the students regard as a more comprehensible protocol in a facebook group.

5.4.5 PLATEAUS IN A LESSON

The investigation also revealed a series of discourses that seemed to create ‘plateaus of intensity’ in the lessons. These appeared to be discourses of narrative and not discourses of information (Gee, 2013), in the sense that they told stories and did not present information. These stories explicate the actual ‘problematic field’ from the future practice of the professions and it creates relations between theory and practice, between the individual student and the shared experience and between individual experience and the theme of the lesson. James Paul Gee argues that the brain registers narrative deeper than information, in the sense that information is not registered until it becomes part of a narrative (related pieces of information are associated with each other – like a narrative) (Gee, 2013 p: 24). These ‘plateaus of intensity’ were identified in the observations as events that summoned attention without any impersonal interference, much like a ‘self-organizing chaosmos’. The lecturers in the interviews put it this way:

*‘When I sense that the students are losing concentration, I tell a story from practice.’
(lecturer 8, with practitioner’s background)*

The narrative discourse from the professional practice creates a ‘fold’, which shows that the ‘event’ of the lesson is made out of the same matter as the professional practice that the students study. In that sense, it shows a glimpse of the future to predict the competencies that the student is going to need. That way the lesson becomes a ‘fold’ of the anticipated future. This type of ‘plateau’ is common, however, it may only be applicable in subjects that refer directly to the practice of the profession.

The narrative discourse may also take the point of departure in other ‘events’. The lecturer in the quote below creates ‘plateaus’ by opening for personal narratives in relation to the academic subject:

‘I do not refer to practice...I ask general questions about the students’ personal experiences in relation to the topic of the lesson, so that all students, potentially, can contribute.’ (lecturer 11, without practitioner’s background)

The fact that the two lecturers create ‘plateaus’ differently could be due to their different backgrounds. A lecturer without practitioner’s background may have to make up plausible narratives from practice, whereas a lecturer with practitioner’s background has experience from practice to build narratives on.

Another example of how the lecturers build ‘plateaus of intensity’ is from the observation field notes:

'The lecturer engages the students in small group discussions on how the theoretical theme might cohere to their experiences with practice.' (lecturer 11)

One of the differences between a narrative and information may be that the narrative contains relations. In the three examples above these relations are created between the academic agenda and the student's immanent desire to become a practitioner. It seems to be an inclusive way of creating a 'plateau of intensity' that opens for engagement on a personal level.

5.4.6 DISCUSSION OF FINDINGS – THE 'IMMANENT CRITIQUE'

The interpretive statement 'Full Circle of PPT' makes up the digest of the 'Immanent Critique' and it seeks to answer to research question 1a:

How is Digital Technology used in a lesson in University College?

The "Immanent Critique" is formulated on the basis of a series of 'transcendental arguments' found in the data. These arguments are that DT is forming a cyclic movement of academic 'headlines' in PPT that start with the lecturer's planning of the lessons and ends with the students taking the exam. The PPT could contain many modalities they could even break away for the inbuilt linearity, but the presentations in the observations and the analysed presentations in the previous section do not, so even though many other possible scenarios are thinkable the reasonable conclusion, in this case, is that the presentations may constitute linearity and 'headline pedagogy'. However, the problem is not that the lecturers do not utilise PPT to its full extent, the problem may be that the use of PPT as the circumstance for teaching determines a specific pedagogy. A pedagogy that seems to maintain the alleged notion that presentation of information in headlines is substantial and legitimate activity in a lesson at UCN. Furthermore, the observations and interviews indicate that the dialogue in the lesson is not always between students and lecturers sometimes it appear to be a dialogue between the lecturer and the PPT projection. The image below (figure 21) is taken during an observation in Nurse Education. However, the image represents a reoccurring practice in most courses/programmes. It is backed up by a statement from a lecturer in data (Appendix 4, qualitative statements 3):

'Problemet er at præsentationssoftware har en tendens til at lukke undervisningen og gøre den monologisk.' (Original lecturer statement in Danish)

'The problem with presentation software is that it has a tendency to encapsulate teaching and make it monologic.' (Statement translated in to English)

The room is equipped with both blackboards and a projector screen. The projector screen takes centre stage, however, the lecturer (lecturer 8) also uses the blackboard for elaborate definitions etc. This is how most rooms at UCN are set up. Very small changes could have changed the dynamics of the situation. If for instance, the lecturer had utilised the students own DT to distribute the presentations to all students in the lesson she could have turned off the projector at discussed the content of the PPT with the students.



Figure 21 Image from teaching – presentation in focus

The next example is a lesson where the students have discussed the content of the lesson in an online discussion forum during the preparation for the lesson, which means that the lecturer (lecturer 1) do not have to present content, she can focus on qualifying the posts in the online discussion forum with the students. This change in pedagogy changes the dynamics of the lesson. The dialogue becomes the focal point and the students produce arguments for their understanding of the topic instead of merely trying to remember the bullets from the PPT presentation.

Below (Figure 22) is an image is taken during observation in Teacher Education. The image shows a situation where the students are engaged in discussing in an Online Discussion Forum (ODF). The discussion was started by the lecturer during the preparation for the lesson and it was based on a series of texts and tasks presented by the lecturer. The discussion of content during preparation made a PPT presentation redundant and by that the lecturer (lecturer 1) became free to engage in dialogue with the individual students/groups about the content of the lesson. The lessons in this field observation show, what I estimate as a successful attempt to address the claim in Ad. 5 in the Act on Teacher Education, that DT enables the teacher to be more in dialogue with the students (see Chapter 1.1.1).



Figure 22 Image from teaching - dialogue in focus

DT provides other means for presenting information that does not necessarily take up time in a lesson, such as lecturer produced video clips etc. These ‘other means’ that DT provide are

discussed in Chapter 7 and in the articles ‘Utilising DT for dialogue and evaluation – new scholastic methods and smartphones in action’, ‘Deep learning in the Open Source Learning Streams’ and ‘Dialogue and Digitality in Higher and Continuing Education’, readers may find these peer-reviewed articles in collection ‘Past Research II’.

The linear progression of a lesson maintained by PPT appears to be a congealed habit that is fortified by other mechanisms in and around the lessons at University College.

The mechanisms and structures that produce transcendental arguments for the ‘Immanent Critique’ are educational policies and the organisation of the programme in connection with the habit of using PPT. The recent Teacher Education Act 2013 leads to a situation where DT is reinforcing parts of the practices from before projectors and PPT and diluting others.

The ‘Immanent Critique’ suggests that the lecturers’ time during a lesson would be better spent in dialogue with smaller groups of students. This suggestion is backed up the surveys and interviews (see Appendix 4). When asked what the most important part of teaching is, both lecturers and students reply, that dialogue between lecturer and smaller groups of students is the organisation that they assess to be most likely to catalyse learning. So, instead for using DT to present information (lecturers) or to cross ‘ecotones’ to private discourses (students), the ‘Immanent Critique’ suggest a utilisation of DT that facilitates dialogue and allows for a stronger focus on dialogue in smaller groups in the lesson.

The assessment that ‘quality’ could be actualised as academic dialogue in smaller groups is shared by most respondents both lecturers and student. However, the organisation of the programmes does not directly catalyse that type of community.

The incentive to develop the utilisation of DT in lessons could be interpreted to represent a discrepancy between the ‘interest’ of the policymakers and the ‘desire’ of the lecturers and students. The data also suggests that the lecturers are interested in developing a practice on the basis of the content of their subjects, habit and the practical conditions for meeting the demands of the students and the curriculum. This seems to result in practices for utilising DT that supports just that.

This deadlock does not address any of the challenges that University College may face. In relation to similar challenges in schools, Conole quotes Falconer and Littlejohn in her attempt to pinpoint three main challenges as follows:

‘Falconer and Littlejohn (2008 , p. 20) argue that there are three challenges facing teachers: (1) the increasing size and diversity of the student body, (2) the increasing requirement for quality assurance and (3) the rapid pace of technological change.’ (Conole, 2012 p: 101)

These three challenges are all present in the daily practice at University College. The size of classes are increasing to a maximum of 45 students per class, however, Teacher Education still maintains a structure of ‘one lecturer-one class-one classroom’. There are no larger scale lectures. At Nurse Education, they introduced lectures in the mid 90ies. So, it is a specific organisation that applies to Teacher Education at UCN. This organisation could be interpreted to represent a wish to mirror the organisation of school classes.

The University College also has a series of formal demands that are determined by the ministry of Education (Accreditation and Contract of Development). These formal demands result in increased focus on quantitative evaluations of student satisfaction and achievement.

It is not within the knowledge of this thesis to claim that that student diversity is increasing. However, the student counsellor team do report an increase in meetings with students (Approximately 25% 1st semester). But if this increase is due to increased attendance control is not investigated.

‘The rapid pace of technological change’ that Conole addresses are, however, also relevant to Teacher Education at UCN. During the past 8 years (University Colleges in Denmark were constituted in January 2008) lecturers at Teachers College have faced:

- 3 different LMS
- 3 different attendance control systems
- 3 email systems (Lotus, Firstclass and Outlook)
- Introduction of compulsory digitally shared calendar (MS Outlook)
- Introduction of compulsory digital work time reporting system (Smart Klik)
- Introduction of digital exam system (WiseFlow, not LMS)
- 3 different Intranet solutions
- Introduction of digital expense refund system
- Introduction of digital ordering system
- Introduction of digital IT help desk

These may not all be stressful changes, conversely, the reasons for implementing them are not pedagogical. Hence, they presumably so not directly contribute to an improvement of the pedagogies. The digital services in the list above may serve as a great foundation for ‘distance education’ or e-learning, because they facilitate action and interaction from a distance, however, they may not have a direct effect on a traditional lesson because in a traditional lesson at UCN the students and lecturers meet physically and interact. So, UCN may have developed an infrastructure to facilitate e-learning without actually developing pedagogies for e-learning or programmes that need this infrastructure.

The changes in infrastructure may, in turn, lead to a situation of either ‘rigor mortis’ or ‘sommambulism’, when it comes to digital technologies/services, as McLuhan put it (McLuhan, 1994).

So, DT is generally not seen as a pedagogical tool by the lecturers, it may, in some cases, be seen as a volatile slightly irritating factor. All the lecturers in the interviews express that in the context of the lesson PPTs are expected by all actors in the lesson, the use of PPT is not even regarded as their own conscious choice. In fact, PPT is one of the few digital technologies that the lecturers do not regard as volatile and irritating.

5.4.7 CONFLICT BETWEEN LMS AND PLE

This section describes a potential conflict between the DT and digital services that are used in a lesson. A lesson is mostly understood as traditional teaching and not e-learning, which

indicates that the LMS may be used as TMS or Teaching Management System as Gert Biesta puts it. Biesta insists that the language in which we discuss education is conditioning the understanding of what we discuss (Selwyn, 2014 p: 129-130). If the LMS were a system for managing learning it would be a system that the students utilised and not an organisational platform for the lecturer and the University College. However, there is also a conflict between the LMS and the tools for learning that the students freely choose to incorporate into their personal learning environment (PLE).

The surveys conducted to support Chapter 7 also investigated the students PLE. According to the student statements in that survey, the students PLE consist of LMS, the lecturers' PPTs, Google Drive, Google search, email and facebook groups for courses. The most important of those being the facebook group.

The facebook groups are started by students and maintained by students. The lecturers are rarely invited in. According to informal student reports, the most common use of the facebook group is to share the information from the LMS and to sort out practical issues regarding timetable etc. This means that the LMS is practically bypassed by the facebook groups. So, the digital nexus of practice, 'where the rubber meets the road', is not in the LMS. The real nexus of practice is on facebook and this practice is covert from the lecturers. This notion indicates that the LMS is a false representation of a nexus of practice. The nexus of practice in the LMS is, thus, interpreted to be an arborescent hierarchy build by lecturers to create a structure for the causal mechanisms that produce the emergence of the lesson. Conversely, the real causal mechanisms seem to be nested in the immediate needs of the students and they may not need an arborescent hierarchy they may need a rhizomatic exchange that takes shape according to the needs that emerge. So, unless UCN wants to develop an e-learning programme, then most students and lecturers could make due with a very minimal Teaching Management System that contained timetables, hand-in functionality, texts and other resources and a formal channel for communication. A TMS that answered four simple questions unequivocally:

- Where to be
- When to be there
- What to prepare
- What to expect from the lesson

5.5 SUMMING UP CONCLUSIONS ON THE 'IMMANENT CRITIQUE'

The notion of 'The Full Circle of PPT' constitutes the 'Immanent Critique' of the use of DT in a lesson at UCN. It seeks to answer question 'a' in the areas of interest:

- a) How is DT used in a lesson at UCN?

Furthermore, it helps answer the research question:

How can lecturers design 'densified' lessons that focus on dialogue catalysed by digital technologies?

One of the key barriers is nested in the ‘Momentum discourse’. As discussed in the ‘Data analysis section’ the students expect PPT and the lecturers use PPT in lessons to provide structure, overview and in some respect also multimodality. The lecturers seem to use PPT to communicate as clearly as possible and to keep themselves on track. One lecturer says that the use of PPT makes him/her feel more confident about the lesson. The statements from lecturers also indicate that PPT is a control mechanism. A mechanisms controlling; progression, time, agenda, activities, content and securing the lecturer’s and the students’ overview of the lesson. Furthermore, PPT creates a scaffold for passing exams (students) and to meeting curriculum requirements (lecturers).

The conclusion is that the use of PPT may lead to ‘headline pedagogy’. That is a pedagogy, which rapidly presents a large number of academic ‘contractions’ that may leave both lecturers and students with a feeling of being efficient (Barrett et al., 2006). The dialogue appears in some cases to be a ‘conversation’ between the PPT slide and the lecturer, and not between the lecturer and the students. There may be so much momentum in the use of PPT that it is difficult for the individual lecturer to change or develop the practice of using PPT.

This indicates that the use of PPT has reached a level of de facto standard for what DT to use and also how to use it. PPT also becomes a leverage for political and financial changes within University College in the sense that the notion for ‘densification’ becomes possible by the rapid presentation from the PPT makes possible. In contrast, the sheer practicalities of changing Over Head Projector transparencies slowed down the pace of presentation in the analogue classroom. When transparencies are substituted with PPT slides there is no practical limit to the pace of the presentation. This, in turn, makes the conflict between ‘chronos’ time and ‘aionic’ time stand out even clearer. The guiding timescale is not the ‘aionic’ pace of the students’ perception of the content it is the timescale of the lesson and lecturers ability to present the content within that timescale. However, the problem is not PPT as such, the problem may be the mechanisms, structures and position/practice systems that lead to the extensive and monologic use of PPT. These mechanisms, structures and position/practice systems are interpreted to be:

- The organisation of the programmes:
 - Timetables, room allocation, timescale, position/practice system between students and lecturer. Maintaining a practice of ‘transmission’ of information for ‘half of most lessons’ (Chapter 5.3.6).
- The curriculum of the programmes:
 - The number of learning goals and competencies that students are expected to achieve in a limited number of lessons maintains the practice of PPT.
 - The educational policies from the Ministry of Education:
 - Achieve more goals in fewer lessons – ‘densification’ and ‘academic sharpening’
 - Historic trajectory:
 - Former practices are assimilated in digital environments increasing the possible speed of instruction.
 - The position/practice between students and lecturer

- First the position of ‘professor’ than the position ‘pedagogue’ – practice with focus on content and secondary focus on activities
- Students are regarded as responsible for the fruitful utilisation of their own digital devices in lessons.

The position/practice between the roles of student vs. pupil is contested. The role of the students is articulated as a learner with agency and a strategy to learn on his/her own. However, the mechanism of compulsory attendance at Teacher Education and imply that students are supported like pupils, which might contrast the wish to develop the students’ agency to take the initiative to arrange academic activities as described in the ‘study activity model’ (figure 1, page 6).

It is the interest of this thesis to reimagining the notion of ‘densification’ (see Chapter 1.1) and develop a practice seeking to free time dialogue in the lesson (as putforth in table 1, page 2).

However, with the interest of looking forward, the fact that 97% of the lecturers use PPT regularly may confirm that most lecturers have an extensive collection of PPT in their archives. This makes it feasible for the lecturers to mediate the talk that normally accompanies the PPT in the lesson and the PPT in pre-produced video clips.

So, by taking the point of departure in the DT that many students and lecturers are familiar with, it seems possible to displace the presentation of content, so it does not take up time in the lesson. If the PPTs are mediated into video clips that can be watched between the lessons, then the time in the lesson can be used for dialogue about the content. This notion resembles the idea behind ‘Flipped Classroom’ (Schwartz, 2014; Tucker, 2012), however, in this context it is preferred not to use that term because it may refer to a specific method. In this case, lecturer produced video clips are thought of as one of several possible mechanisms of allocating time in the lesson for dialogue and pedagogic activities. The past research investigates other ways of re-organising the lesson in order to allocate time for dialogue and pedagogic activities.

PART 2

6 PAST RESEARCH –THEORETICAL PERSPECTIVES

This chapter presents and discusses the philosophical concepts applied in the articles (chapter 7) and in the suggestions for change (chapter 8). The main philosopher is Gilles Deleuze and to some extent Felix Guattari. The chapter also hones in on why Deleuze and Guattari are relevant as philosophers of educational development. If the reader is searching for a short introduction to the Deleuzian concepts, Appendix 6 presents an abridged version of this chapter.

These philosophical concepts are chosen because they offer an ‘image of thought’ that I interpret to encapsulate, what is understood as important features of DT that allow co-creation, sharing, accessing information and empowering users in the process of learning. The sharing and co-creation functionality in Web 2.0 tools seem to support a rhizomatic approach to designing pedagogies. And the Web 2.0 tools offer the possibility of reimagining the position/practice system of a lesson. The Web 2.0 tools utilised in the articles were chosen based on; availability to the students, functionality, usability and affordance. However, the Web 2.0 tools were also assessed in relation to the existing research on the field (Bennett, Bishop, Dalgarno, Waycott, & Kennedy, 2012; Conole & Alevizou, 2010; Huang, Hood, & Yoo, 2013). Huang, Hood and Yoo address the possibility of a gender divide in the use of DT in education and they find that female students are more anxious in relation to using Web 2.0 in general, however, they claim that the gender divide does not apply to the use of social media and video sharing (Huang et al., 2013 p: 63). In fact Huang, Hood and Yoo contend that the use of online video and social media might promote the use of Web 2.0 in higher education (Huang et al., 2013 p: 57). Since there is a majority of female students (66% female/33% male, (Lange, Johannesen, & Henriksen, 2010 p: 12)) at Teacher Education the notion of promoting ‘safe technologies’ also inspired the choices of Web 2.0 tools.

The affordances of DT and Web 2.0 tools that the Deleuzian concepts qualify are:

- Simultaneous co-creation in combination with asynchronous editing from multiple students in multimodal products (Google Drive, Prezi, TikiToki, MindMeister etc.).
 - Facilitates for working together in the lesson as well as working individually outside of the lesson.
- Sharing of information in open networks (twitter)
 - Facilitates swift sharing of annotated information sharing organised by ‘mentions’ and ‘hashtags’.
- The possibility of making, commenting, editing and create subtitles to videos (YouTube)
- The general possibility of creating, sharing and producing by the means of one’s own capabilities

- Seemingly, the overt ‘masters’ are done away with, the student can figure the techniques out by the means of available sources, ‘tinkering’ and ‘trial and error’

In that sense, the philosophical notions presented in the following section are intended to bring thinking to the practice of utilising Web 2.0 tools. It is the notion that if the philosophical/pedagogical ideas follow the ways in which the Web 2.0 tools work then the pedagogical designs that are nested in the functionality of the Web 2.0 tools will be different from ‘traditional’ lesson activities and lead the students in a more ‘vitalistic’ direction.

Deleuze offers a view on human thinking referred to as a ‘rhizomatic image of thought’, human ability to create and the importance of setting ‘difference’ aside from ‘repetition’ that makes his concepts stand out. The aspiration in this thesis (the articles in Chapter 8 and the suggestions for development in Chapter 7 in particular) is to reimagine the ‘lesson’ in University College teaching.

Deleuze is used in several contexts, mostly within social science and aesthetics but there is an interest in using Deleuze to understand and develop education and learning (Hultman & Lenz Taguchi, 2010; Mazzei & McCoy, 2010; Olsson, 2009; Sellers & Gough, 2010; Semetsky, 2006; Semetsky, 2009; St Pierre, 2004). But, even though Deleuzean ideas are beginning to find their way into educational research it is far from mainstream.

Overt issues of concern regarding the introduction of Deleuzean concepts in education

What I interpret as the biggest problem with Deleuzean thought in an educational context is that it contrasts the teleological, learning the objective-oriented practice of education at UCN and insists on a deontological learning for life agenda. As the introduction to Deleuze will explain, Deleuzean thought is mainly about focusing on ‘life’ and the ‘positive difference’ that a human creativity can unfold in ‘natural’ circumstances. The ‘entelechy’ (power to free potential and create) of humans set ‘life’ apart for ‘non-life’ in Deleuzean thought. Deleuzean thought offers a view on what is important in order to free potential and that is one of the reasons why I made the attempt to be inspired by Deleuzean ideas. Another issue is that the Deleuzean ‘image of thought’ operates through the means of ‘natural selection’, indicating that pedagogical designs created on the basis of the metaphor of the ‘rhizome’ do not automatically support students that do not have the immanent agency to form connections in the ‘rhizomatic’ pedagogical design. This indicates that a Deleuze-inspired pedagogical design may need a support structure that is not necessarily Deleuzean.

Another reason is that a focus on ‘life’ in the context of investigating the use of DT in education hones in on what a human lecturer can contribute with that is unique to the haecceity of a human lecturer, as opposed to even the most complex and advanced e-learning context. In the studies of ‘Artificial Intelligence’ and ‘post-humanity’ the predictions of how digital technologies could change conditions and practices of humanity are based on the mathematical notion of a (Technological) ‘Singularity,’ that unifies everything to one ‘substance’ constituted by digital computing power and deep-learning algorithms that exceed human intelligence. Professor (emeritus) of maths and Computer Science from University of

San Diego Vernor Vinge, suggested in 1993 that the conditions for a ‘singularity’ of this sort is; ‘awake’ computers, superhuman intelligence, ‘large computer networks’, ‘intimate computer/human interfaces that extend human intelligence, and the notion of actual improvements of the human intellect (Vinge, 1993 p: 2). These predictions of what a ‘singularity’ would require to emerge could be interpreted in terms of the contemporary DT.

- ‘Large networks’ translates to the internet
 - Information and news are travelling freely
 - People apparently want to share knowledge freely
 - Wikipedia
 - YouTube
 - Etc.
- ‘Intimate interfaces that extend human intelligence’ translates to a smartphone
 - The smartphone becomes a bionic extension with a visceral connection to the body through ‘vibration’.
- ‘Awake computers’ translates to the state of ‘omnipotent onlineness’
 - GPS extends sense of direction
 - Spell check extends writing skills
 - Human memory is exceeded by:
 - Smartphone phonebook
 - Google information search
 - Outlook calendar
 - Etc.

Vinge also suggests how humanity could change the presumably inevitable emergence of the ‘Technological Singularity’:

‘Suppose we could tailor the Singularity. Suppose we could attain our most extravagant hopes. What then would we ask for: That humans themselves would become their own successors, that whatever injustice occurs would be tempered by our knowledge of our roots.’ (Vinge, 1993 p: 19)

Vinge sees this as the second wave of human development, the first wave being to develop tools to produce increasingly more intricate products (from stone axes to microprocessors). The second wave is understood as the development of tool to support cognition and thinking:

‘In the last few thousand years, humans have begun the next step, creating tools to support cognitive function. For example, writing is an off-loading of memory function.’ (Vinge, 2008 p: 78)

The two notions; letting humanity be the successor of humanity and to think of tools to support thinking and not just off-loading are fundamental to the selection of Deleuzian concepts.

If the ‘technological singularity’ is an inevitable condition in a near future, then it is interpreted to be of utmost importance to investigate which elements of teaching a lesson at

University College that could be off-loaded to a relevant technology and which elements that could preferably receive more human attention. So, the notion is that if an element of teaching could be done through DT during preparation for lessons or after lessons the lesson could focus on the uniquely human qualities that Deleuze would define as thinking and ‘entelechy’. The following introduction to Deleuze and the presentation of selected terms and concepts all revolve around the idea of reimagining ‘densification’ through a focus on what is unique for a ‘real’ lecturer and how can that ‘reality’ be augmented in a pedagogical design.

6.1 INTRODUCTION TO PHILOSOPHICAL INSPIRATION

The philosophy of Deleuze and the philosophy of Deleuze and Guattari is described by Foucault as ‘Philosophical Theatre’. Foucault did so in his article ‘Theatrum Philosophicum’ (written in 1970) (Foucault, 1977) to describe the style of Deleuze’s two main philosophies ‘Difference and Repetition’ (1968) and ‘The Logic of Sense’ (1969) as dramatized rhetoric, where philosophers discuss each other’s philosophies in a ‘Deleuzian theatre’. The ‘Philosophical Theatre’ was Deleuze’s mode of dialogue with philosophy. He would rather discuss philosophy with an eclectic selection of ancient and recent philosophers through his own staging of a dialogue in writing than attend to actual dialogue with his fellow philosophers.

‘...for the most part he [Deleuze] minimized his attendance at academic conferences and colloquia, insisting that the activity of thought took place primarily in writing, and not in dialogue and discussion.’ (D. Smith & Protevi, 2015)

This somewhat odd practice of non-practice is contrasted in his ideas on ‘vitalism’ and the entelechy of humans. Or maybe it is a consequence of thinking that ‘thought is creation’ and that thought starts in the mind of the thinker (Deleuze, 1994 p: 147). Nonetheless, Deleuze’s concepts are created on the basis of virtual ‘dialogue’ between philosophical texts.

Deleuze uses his knowledge of philosophical history to orchestrate a ‘drama’ of philosophy, where the ‘morale’ of the drama becomes Deleuze’s philosophy. In his ‘philosophical theatre’ Deleuze juggles the notions of an eclectic, but limited selection of philosophers and develops an extensive nomenclature to describe the concepts that the selected philosophers inspired him (and Guattari) to create. So, Deleuze is driven by his experience with philosophy in relation to his experiences as a human being in a secular life.

What drives Guattari, on the other hand, is a revolt against structuralist psychology. While Deleuze is a philosopher by education, Guattari is a psychologist who studied under Jacques Lacan. Deleuze and Guattari find common ground in shared interest in emancipation from restricting structures and a strong focus on ‘positive difference’, ‘l’elan vital’, the creative, life developing power of humans.

It is difficult to talk about Deleuze (and Guattari) without using their extensive nomenclature, however, the nomenclature seems excluding to those who haven’t spent time studying it. The nomenclature is in other words problematic in general scholarly discussions, papers, and articles. The main problem with the nomenclature is that the terms do not mean what the

reader might immediately think. For instance, a 'Body without Organs' is not a biological 'body' or an 'organ'. And 'without' does not refer to the lack of something. The 'Body without Organs' it is the multiplicity of potentials of a capable mind. An 'Abstract Machine' is not abstract nor mechanic, it is, on the other hand, the capacity to create abstracts on the basis of knowledge and experience (get ideas). So, as these two brief examples suggest, it requires substantial knowledge of Deleuze and Guattari's nomenclature to understand and utilise it. Hence, it is not directly applicable to general articles on the application of DT in education, however, it is deemed possible to let one's research be inspired by Deleuze and Guattari without using their nomenclature to a full extent.

So, in order to prepare the reader of this thesis for the line of thinking in the studies (Chapters 7 and 8), a selection of key terms will be introduced along with a general introduction to Deleuze and Guattari's philosophy along with a discussion of why Deleuze and Guattari are relevant in the discussion of application of DT in further education (see Appendix 6 for abridged version).

Deleuze may normally be associated with chaos theory, creativity, cinema-theory, assemblage-theory or organisation theory. These fields all contain elements that Deleuze directly addressed (chaosmos, Cinema I and II, rhizomes, planes and plateaus etc.). His application to education theory is rarer. He only wrote sporadically about education and learning. As an example the words (and derivate forms) 'education' and 'learning' only appear respectively nine and eleven times in the most commonly known book, 'A 1000 Plateaus – schizophrenia and Capitalism (1987)'.

However, that does not mean the philosophy is not about education and learning. It is just not directly addressing the theme of education and learning. In the book 'Educational Life-Forms' David R. Cole argues that Deleuze has the theme of education and learning present throughout his career (Cole, 2012 p: 1). Mainly because thinking and creating a positive difference is a learning process. In the book 'Deleuze and Education', the contributions revolve around notions of time, vitalism, immerse into learning, learning as a deontological event, and the virtuality of learning (Semetsky & Masny, 2013). So, the themes commonly taken up in the relation between Deleuze and education is themes of:

- The role of the learner
- Conflicts between arborescent teaching and rhizomatic learning
- Conflict between 'chronos' (measured) time and 'aionic' (experienced) time,
- A deontological turn towards centring 'life' in the middle of learning etc.

At a closer glance, there are thirty passages in 'Difference and Repetition' where Deleuze discusses 'learning' and in one of his very last writings 'What is Philosophy' he and Guattari's discuss 'pedagogy' in three passages. Learning is understood as an intricate part of thinking, which is a key interest of Deleuze, but pedagogy is a specific term from education, that is not of general interest to Deleuze's philosophy. When Deleuze uses the word 'pedagogy' he uses it as a term to describe the communicative agility of a concept:

'However, even in philosophy, concepts are only created as a function of problems which are thought to be badly understood or badly posed (pedagogy of the concept).' (Deleuze & Guattari, 1996 p: 16)

Or Deleuze and Guattari use the word 'pedagogy' to distinguish philanthropy from capitalism:

'If the three ages of the concept are the encyclopedia, pedagogy, and commercial professional training, only the second can safeguard us from falling from the heights of the first into the disaster of the third-an absolute disaster for thought whatever its benefits might be, of course, from the viewpoint of universal capitalism.' (Deleuze & Guattari, 1996 p: 12)

The virtual potential of a concept in relation to the concept's real actualisation and the fear of polluting the understanding of the concept of commercial interest. So, 'pedagogy' to Deleuze and Guattari is the process of making a 'concept' understandable and a process of actualizing a virtual potential of a 'concept' with others. Both with the sole focus on somebody's understanding and actualization of something in relation to the individual learner or group of learners.

The 'concept' could be understood as the theme of a lesson in an educational setting. In the field of Nursing, it could be specific nursing theories whereas in the field of Teaching it could be specific pedagogic theories.

The Deleuzian concepts of learning, pedagogy and education are interpreted as ethical and deontological, meaning that learning is a vitally necessary part of life. The focus is on learning for life and not on learning for teleological ends. This aspect of the philosophy is a double-edged sword in relation to further education in a Danish context, because on the one hand the policies advocate 'lifelong learning' and the importance of an educated population, on the other hand, the curricula are defined as teleological learning goals, that indicate a functionalist line of thinking, where it may be implicitly acknowledged that learning ends, when learning goals are achieved. The latter is in contrast to Deleuzian thinking. Deleuzian thinking is rhizomatic (relational network, see elaboration below), whereas curriculum may be understood as arborescent (hierarchical structure). This indicates that there is fundamental incommensurability between the educational programmes investigated in this thesis and Deleuzian philosophy. This is properly the case in many educational contexts which in turn leads to less dissemination of Deleuze and Guattari's thoughts in education.

Deleuze intended his philosophy to be concrete and practical, conversely his 'viral' connections to other philosophers makes it a challenge to navigate the reading process. The strategy for reading Deleuze deployed in this thesis became 'rhizomatic' which means that the introduction chapter, 'Rhizome', for 'A Thousand Plateaus' (Deleuze & Guattari, 1987 p: 6) has defined the strategy for reading Deleuze. That is; reading Deleuze as a network of connected 'plateaus' (chapters) that relate rhizomatically in an upward spiral towards an understanding of at least some of the concepts.

Deleuze in relation to DT

The motivation to apply Deleuze's concepts to the pedagogical designs presented in the articles, contrary to the notion that the concepts seem to contradict the curriculum, is that the concepts also may connect to the affordances of DT in networks as a vehicle for thinking and creativity.

The empowerment of the individual is a 'vitalistic' notion, and empowerment is in many cases one of the benefits of digital networks. The notion is that with a fruitful strategy, relevant literacies and set of technologies (the internet, computer, smartphone etc.) the individual person can learn. A much-used example in the literature on 'networked learning' is the character 'Tabby Lou' (Gee & Hayes, 2010 p: 86-90). The story of 'Tabby Lou' is the story of an elderly woman how acquired new, complex skills just through the means of the internet, networked learning and a desire to learn. The skill she learned was to create 3D content to the video-game SIMS, the way she learned it was to ask questions in online discussion fora, watching tutorials and practice. The reason why she did it was that it made her feel useful and wanted by her granddaughter, who was the one requesting her new skills. This mechanism of learning through desire and empowerment in digital networks is what I seek to use the Deleuzian concepts for.

So, Deleuze is used to inspire designs for development in the relations between actants (students, lecturer, directors, and DT) in educational situations and to reflect on the experiences from the articles. The main focus is on changing relations and not directly on changing students or lecturers or curriculum etc. The change in the relation between things will most likely change the emergence of the thing, however, it does not necessarily change the thing itself. This is important because in this thesis, changing education is not an act of pointing fingers at 'reactionary' lecturers, it must be an empathetic project of evoking what is already immanent in the actant (lecturer or student or DT etc.) to create 'positive difference' (Deleuze & Guattari, 1996).

In the book 'Educational Life-forms' David R. Cole describe the potential and pitfalls of using Deleuze in education as follows:

'This book [Educational Life-forms] is designed to be a practical and effective means to change education. The use of the philosophy of Deleuze could lead one into metaphysical speculation about what exactly he was talking about at any given point in his career. Whilst this speculation would not be without its pleasures, it does sidetrack the point and focus of this book. One needs to engage with Deleuze's oeuvre and the fecund and emergent secondary literature in the field of Deleuze studies, whilst being strong and single minded with respect to Deleuze and education. This book takes from Deleuze what is necessary for the purpose of making changes happen in education.' (Cole, 2012 p: 11)

The case in this thesis is similar. The study of Deleuze leads to many trajectories that are not directly relevant to the thesis, on the other hand, if you do not follow the trajectories the understanding of the concepts become even more fragmented than they already are. So, it is a balancing act of presenting just enough Deleuzian background to make the concepts stand out

and not so much that it turns into a ‘Deleuze study’. In this thesis, Deleuze is used to inspire designs for change.

Deleuze presents himself as an (transcendental) empiricist (Fieser & Dowden, 1995-; Nielsen, Mischa Sloth Carlsen Karsten Gam & Rasmussen, 2001) and in some respects also as a materialist (Deleuze & Guattari, 1987; D. Smith & Protevi, 2015). Empiricism is defined as an epistemology that looks only at what is experienced and does not take any metaphysical reality outside of the experience into account. Materialism is, in a philosophical context, the notion that only what can be sensed through the human senses is material.

‘I have always felt that I am an empiricist, that is, a pluralist. But what does this equivalence between empiricism and pluralism mean? It derives from the two characteristics by which Whitehead defined empiricism: the abstract does not explain, but must itself be explained; and the aim is not to rediscover the eternal or the universal, but to find the conditions under which something new is produced (creativity).’ (Deleuze & Parnet, 2007 p: xii)

The quote delineates Deleuze’s research focus as a quest to ‘find conditions under which something new is produced’. The quest to condition development possibilities through the creation of hybrid forms of what already exists is what inspired the pedagogical designs presented in the articles in this thesis.

6.1.1 A DIFFERENT VIEW ON LEARNING - THE PROBLEMATIC FIELD

The process of reimagining the notion of ‘densification’ takes the point of departure in a Deleuze-inspired reimagining of learning. This section describes Deleuze’s version of how learning can be understood. Deleuze is primarily describing the process of learning as a process of combining thinking and doing. He is not focusing on simple training that ‘only’ requires repetition of basic movement until the muzzle-memory takes over, he is also addressing learning as constructing ‘difference’. So, the Deleuzian idea of learning is interpreted to be a process of both repeating something until it is not ‘different’ anymore, which may resemble ‘Behaviourism’ and ‘Cognitivism’ and combining knowledge, experience and new ideas in thoughtful collaborating with others, which may resemble ‘Social Constructivism’. The aim in Deleuzian pedagogy is to think and create, hence the process may require the student to desire learning and the teacher to understand the student’s needs in the learning process (Carlin & Wallin, 2015 p: 90-91; Semetsky & Masny, 2013 p: 112-130)

Deleuze deploys two philosophical concepts; ‘the transcendental field’ and ‘the problematic field’. ‘The transcendental field’ is the place where experience is individuated and connected to the learner's prior knowledge and experience in an unconscious process of connecting the ‘virtual’ and the ‘actual’. Deleuze describes the notion of ‘the transcendental field’ in ‘The Logic of Sense’ as follows:

‘We then define the transcendental field by a pure immediate consciousness with neither object nor self, as a movement that neither begins nor ends.’ (Deleuze, 2001 p: 26)

‘The transcendental field’ is understood as the contrasting state of being conscious and immediate at the same time. In that sense, it is a philosophical description of ‘learning’ while doing. The transcendental field’ is the portal between ‘actual’ world ‘virtual’ mind. Deleuze scholar John Protevi describe the relation between ‘the transcendental field’ and ‘the problematic field’ as follows:

‘The differential transcendental field of Deleuze is populated by Ideas and singularities, that is, by problematic fields and thresholds.’ (Protevi, 2010 p: 38)

‘The transcendental field’ is populated by ‘problematic fields’. ‘The transcendental field’ is interpreted as the individuated process of learning, whereas the ‘problematic field’ refers to the situation where the actual experience and individual meets in a practice.

In ‘Difference and Repetition’ Deleuze use Heidegger’s example of learning to swim as an example of a ‘problematic field’, he says:

‘To learn to swim is to conjugate the distinctive points of our bodies with the singular points of the objective Idea in order to form a problematic field.’ (Deleuze, 1994 p: 165)

The ‘problematic field’ refers to anything in the situation that affects the learner’s susceptibility to acquiring a new skill, competency or knowledge. In the case of learning to swim the ‘problematic field’ consists of; water, arms, legs and a brain (and temperature, weather, lighting, visibility in water etc.). The water is a simple substance that becomes complex in certain geographical context (rip tide etc.), arms and legs differ in size and dexterity and the brain of the learner takes more or less energy to develop new synaptic connections. So, the ‘problematic field’ is never just the ‘essence’ of the parts that constitute the situation. In Deleuzian thinking, a lesson can be interpreted to represent the essence of something, while not addressing the actual event of the ‘problematic field’ of something.

Virtual and actual problematic fields

This notion seems to apply to lessons at UCN, presumably because the ‘problematic field’ should be the core of the periods of the internship, hence, not necessarily the focal point in the lesson. However, the ‘problematic field’ that emerges in the periods of internship (in schools, at the hospital etc.) is often different from the ‘problematic field’ that the lessons could address. The ‘problematic field’ that could be addressed in the lesson is theoretical and mediated, nonetheless real and relevant. I call it a ‘virtual problematic field’. This is accompanied by the ‘actual problematic field’ in the internship is practical and immediate and often detached from the ‘virtual problematic field’, as evaluations of the internship show at Teacher Education. Deleuze does not separate the ‘problematic field’ in an actual and a virtual ‘problematic field’. On the contrary, he says that the ‘problematic field’ is where the virtual and the actual intersects.

However, I interpret Deleuze’s own philosophy as an example of what I call a ‘virtual problematic field’, that is, an intersection of thoughts that does not directly involve an artefact. The intersection of thoughts brings experience and knowledge of philosophy together in a ‘virtual problematic field’. I interpret the situation in a lesson at UCN to share similar

traits if the focus in the lesson is on dialogue and discussion. Deleuze establishes his own 'virtual problematic field' by discussing different philosophers and he engages in asynchronous dialogue with a selection of philosophers, that is, he thinks with the philosophers he uses and develops new ideas 'with' them. The articles supporting this thesis seek to develop a 'virtual problematic field' in the lesson that facilitates discussion and dialogue instead of the presentation of content. The distinction between 'actual' and 'virtual' 'problematic field' resembles the distinction between theory and practice, however, the intention with the distinction between an 'actual' and a 'virtual' 'problematic field' is to acknowledge that each 'problematic field' is a discipline in its own right. The 'virtual problematic field' is real and relevant just as the 'actual problematic field' is.

The 'problematic field' is the individual entirety of the 'event'.

'The movement of the swimmer does not resemble that of the wave, in particular, the movements of the swimming instructor which we reproduce on the sand bear no relation to the movements of the wave, which we learn to deal with only by grasping the former in practice as signs. That is why it is so difficult to say how someone learns: there is an innate or acquired practical familiarity with signs, which means that there is something amorous - but also something fatal - about all education. We learn nothing from those who say: 'Do as I do'. Our only teachers are those who tell us to 'do with me', and are able to emit signs to be developed in heterogeneity rather than propose gestures for us to reproduce. In other words, there is no ideo-motivity, only sensory-motivity.' (Deleuze, 1994 p: 23)

Deleuze pinpoints the pivotal problem of education, or at least of instruction. That is the problem of reproduction of information in the conviction that information turns to knowledge in the minds of the students through sensing and thinking. Deleuze suggests that teaching should be a joint effort or experiment towards the student's (and the lecturer's) understanding of the topic at a higher, deeper level.

Deleuze also suggests that the relation between the act of learning and the content of learning are addressed. Deleuze formulates, what appears to be a focus on the feedback from 'problematic field' instead of a focus on the relation between mediated content and action. In 'Difference and Repetition' Deleuze writes:

'Learning takes place not in the relation between a representation and an action (reproduction of the Same) but in the relation between a sign and a response (encounter with the Other).' (Deleuze, 1994 p: 22)

In this line of thinking, it is in the encounter with the 'Other' that difference occurs and difference means the opportunity to expand, develop and learn. 'Response' refers to the mechanisms that make the difference visible or otherwise detectable through sense etc. It could be a lecturer's feedback on a hand-in, or it could be a reply in an online discussion or it could be a response in a dialogue etc. In Deleuzian thought, a response could be from any actant, human or non-human, so it also includes the way the water moves when a swimmer is learning how to swim or the way wood reacts to a chisel and it could be the way a computer system responds to input from a user. When Deleuze refers to 'reproduction of the Same' he

refers to what memory does in a learning process and when he refers to ‘encounter with the Other’ Deleuze refers to how thinking and memory collaborate to utilise difference to ‘learn’.

Deleuze’s conviction that it is in the encounter between heterogeneous actants (the Other) that learning occur and not in the act of reproducing the lecturer’s knowledge (the Same). The lecturer’s knowledge should be a scaffold for a joint effort of understanding new relations between what is relevant and known already.

Deleuze uses the metaphor of a ‘rhizomatic assemblage’ to describe the situation where the innate and the acquired intersect. The relations and connections in a rhizome allow the formation of assemblages to be guided by actual ‘desire’.

In education this is difficult because we are obligated to include different types of students in a course, also uninspired, underachievers that do not really want to learn. The rhizomatic assemblage relies on the engagement of the students, which is why rhizomatic assemblages work brilliantly outside of education (twitter, facebook, online discussion fora, YouTube, social bookmarking etc.).

Those, who engage might benefit, however, there are no gatekeepers, no control mechanisms, to ensure that all engage or even participate, as critiques will also say (Mackness, Bell, & Funes, 2016). The service providers do, however, have a commercial interest in creating activity, because the activity may lead to user data and user data is, allegedly, ‘the product’ that service provider can sell and live off.

So, one of the most difficult elements in making Deleuze-inspired pedagogical designs is to create a design that supports student engagement. A way of creating a ‘pedagogy for the concepts’, Deleuze suggests that we understand the ‘problematic fields’ of the topic. The process of identifying ‘problematic fields’ is closely related to the process of defining analytic categories or the process of developing Kantian ‘Schemata’ for understanding the thing in question. This notion of establishing and developing analytical categories to be able to teach and learn in a rhizomatic assemblage is elaborated in the article ‘When Innovative Instructional Designs are too Innovative – Lack of Schema’ (Kjærgaard & Wahl, 2015).

Identifying and understanding the ‘problematic field’ is a matter of interpreting the ‘signs’ of the ‘problematic field’. Interpretation is the complex act of thinking with one’s experience, knowledge, and senses.

‘Everything that teaches us something emits signs; every act of learning is an interpretation of signs or hieroglyphs. Proust’s work is based not on the exposition of memory, but on the apprenticeship in signs.’ (Deleuze, 2000, p. 4)

Deleuze, through Proust, goes as far as to claim that learning is an ‘apprenticeship in signs’. In this context a sign is more than a letter or number, it is any mediated discourse. This notion puts literacies on the agenda as crucial competencies in learning. The notion of the learning as an ‘apprenticeship in signs’ may be related the development of typologies for different literacies that are needed in education today. Dustin C. Summey, for instance, characterises 13 different literacies (Summey, 2013), others talk about 21st-century skills (Trilling & Fadel,

2009b), and they all address novel notions of what should be learned and to a certain extent also how. They represent identifications of ‘problematic fields’ or analytic categories for the scope of what education should be.

The identification of the ‘problematic field’ is part of making relations between actants in the learning situation. These relations help establish a sense of ‘chaosmos’ instead of ‘chaos’. Deleuze scholar Inna Semetsky cite another Deleuze scholar, Claire Colebrook, and put it this way:

‘Colebrook’s analysis of Deleuze’s ontology and his positing the relations as external to their terms ensure, that learning is a task that thought must actively perform in order to intuit the powers that compose relations.’ (Semetsky, 2008 p: xi, xii)

So, based on that, learning, to Deleuze, is about building relations, understanding and engaging in mediated discourses (signs) and thinking in a practice.

In some respects, Deleuze is connected to the pragmatism of Dewey and Peirce (Semetsky, 2006 p: XX). In that sense, learning is interpreted as a ‘fold’ of doing, doing as a ‘fold’ of learning. However, since Deleuze believes that the virtual and the actual are equally real the activity of ‘doing’ also includes the process of thinking.

6.1.2 FREEING POTENTIAL - VITALISM AND EDUCATION

In this section, the notion of ‘vitalism’ is introduced and related to the pedagogical designs in the articles. The notion of ‘Vitalism’ is deemed important the pedagogical designs because the aim of the pedagogical designs is to reimagine the notions of ‘densification’ and ‘quality’ in a lesson at UCN. ‘Vitalism’ stresses that conditions for thinking and creating are key to develop the human forces that separate humans from other animals and inanimate objects. This is interpreted as an important agenda to address in a debate of ‘Big Data’, ‘Learning Analytics’ and ‘human vs. non-human agents’ and ‘Technological Singularity’ (Siemens & Long, 2011; Vinge, 1993; Vinge, 2008).

The assumption in this thesis is that it is becoming more and more important to identify the particular affordances of humans that separate the affordances of humans from the possibilities in digital systems. The idea is to use computer systems for what they do better than most humans and to give humans the tasks the most computer systems do not do so well. For instance, computer systems can calculate test results, generate statics, correct misspellings, document progression, share and present information, and relate data sources to generate suggestions etc. Conversely, humans in simultaneous conversation and collaboration can think and develop together and understand empathetic relations. Therefore the articles in the ‘Past Research’ section (Chapter 7) of this thesis seek to isolate elements of teaching that could be done outside of lesson time through DT and elements that may require simultaneous and physically present interaction between lecturer and students in order to achieve knowledge of how feasible that distinction is in practice.

Vitalism

‘Vitalism’ is the philosophical theory that organic life cannot be fully understood on the basis of biology, physics and chemistry alone (Parr, 2010 p: 184). To describe the special character of organic life vitalists use the Aristotelean word ‘entelechy’. ‘Entelechy’ means the process of making something real or bringing something to life. It also means the process of freeing something’s potential.

In this context vitalism means the creative force of humans. Deleuze was inspired by Henri Bergson and his philosophy of *‘l’élán vital’* (the vital force or impulse of life). It refers to the immanent evolutionary powers of all organisms. Bergson uses the notion of ‘élán vital’ to describe how humans can be creative and develop new ideas (Bergson, 1983).

Deleuze’s philosophical focus was on the deontological and, by that, the ethical notion of the thinking, creative human being. Deleuze was keen to address the ‘positive difference’ that would take the focus away from an oppressive ‘them’ to a more creative ‘us’.

The point being, that the ‘vitalistic’ agenda preaches a specific outlook on life that focuses on the individual’s development of possibilities in life. It does not necessarily contrast developing community, however, the community is not the focal point. The ‘rhizome’ for instance would be contested by other outlooks on life and being ‘creative’ is presumably not in everybody’s interest.

Vitalism also entails the problematic notion of enlightenment through ‘destruction of masters’, that is when the individual human becomes the vital force in his/her life – his/her own creator so to speak (Parr, 2010 p: 5). The notion is problematic in an educational context because the role of the lecturer is nested in the assumption that the lecturer masters the subject. This notion is contrasted by the notion that if the student is presented with well-defined learning objectives and resources, then the student do not necessarily need the presence of a lecturer. This leads to what Parr refers to as ‘Self-mastery’ in his explanation of Deleuzian concepts:

‘...the fold can also be understood as the name for one’s relation to oneself (or, the effect of the self on the self). The Greeks were the first to discover, and deploy, this technique of folding, or of ‘self mastery’. They invented subjectivation taken to mean the self- production of one’s subjectivity.’ (Parr, 2010 p: 107)

‘Self-mastery’ is described by Deleuze as the ‘folding’ of oneself onto ones ‘self’. That could also be taken as a metaphor for the process of learning; to ‘fold’ new experience onto one’s existing knowledge by thinking through the new relations that the existing and the new enables. The notion of doing away with masters is a way of empowering individual through ways of thinking. In that sense, it resembles Kurt Lewin’s initial ideas behind ‘action research’ (see Chapter 4).

The process of doing away with masters may also resemble the development of web-based IT-systems that enable individuals to carry out tasks on their own that would have demanded interference from several ‘gatekeepers’ (or helpers) in the past. This includes; doing taxes,

buying a house, selling a car, reporting water, electricity, heat to the authorities, enrolling a child in school, applying for a job, finding information, listening to music, watching movies, lending books (without the help from a librarian) communication with everybody from friends to politicians etc. The list of things that an average individual can do on his/her own merely by using a computer on the internet with the right literacies and strategy is growing. On one end of the continuum, it may entail vitalistic 'empowerment' on the other end it may entail 'estrangement'.

In Denmark it seems as if DT has done away with; counsel clerks, petrol station assistants, cashiers, bank clerks, librarians etc. Instead, we have digital systems that we can operate ourselves, which in turn means that while doing away with masters, we have introduced another master/slave relation, which is the relation between humans and DT. Those who have the technological literacy to understand and operate the it-systems that the surrounding authorities implement will properly feel empowered, while those who haven't technological literacy may not.

Deleuze's philosophy is often referred to as a philosophy of life (Cole, 2012 p: 13; D. W. Smith & Somers-Hall, 2012 p: 239) also by Deleuze himself (Deleuze, 1997 p: 143), however the seemingly philanthropic approach to thinking as an emancipatory life force is also problematic because it entails that the individual has to be his/her own guide.

This notion indicates that an educational context the Deleuzian concepts needs a 'safety net' that will secure that students do not get estranged by the focus on 'vitalistic' empowerment. This means that the 'Deleuzian Suggestions for Development' (Chapter 7) is a plateau for attending to the development of every students' competency to 'fold' the outside in:

'As for Deleuze's use of Foucault and Leibniz, the fold names the relationship – one entailing domination – of oneself to (and 'over') one's 'self'. Indeed, one's subjectivity for Deleuze is a kind of Nietzschean mastery over the swarm of one's being. This can be configured as a question of ownership, or of folding. To 'have' is to fold that which is outside inside.' (Parr, 2010 p: 107-108)

The quote describes the process of taking in something new and assimilating it to what is already known (Kant: a priori, experience, a posteriori). This line of thinking makes experience important, and furthermore, it may make the experiment an important practice for learning. Deleuze believes that enlightenment through experience and thinking can emancipate humans from 'tutelage' (religion and structuralist thought), Parr explains it the following way:

'Enlightenment is, defined dutifully, freedom from imposed tutelage – the destruction of masters. Deleuze's destruction of mastery is an eternal, rather than perpetual, paradox. Rather than defining thought and liberation against another system, with a continual creation and subsequent destruction, the challenge of Deleuze's thought is to create a system that contains its own aleatory or paradoxical elements, elements that are both inside and outside, ordering and disordering.' (Parr, 2010 p: 5)

So, vitalism is the theory of, for instance, what sets humans apart from computers. What develops thinking is the interaction between experience, sensing, thinking and also a deconstruction of knowledge when experiences or sensing contradicts existing knowledge.

Deleuze describes the spiral relation between; life, knowledge, thought and life as follows:

'For rational knowledge sets the same limits to life as reasonable life sets to thought; life is subject to knowledge and at the same time thought is subject to life.' (Deleuze, 2006a p: 101)

This is interpreted as a feedback channel from life to life through knowledge and thought. This feedback mechanism is likely to be reproduced in computer systems creating an immanent 'fold' of algorithms. A 'fold' that may bring the deep learning algorithms that already operate in computer systems a step closer to thinking and learning (Bengio, 2009).

So, vitalism is, in that sense, contested by DT which makes it even more important to keep on trying to understand how humans learn and think. The dystopian for providence is that human intelligence will be hamstrung because computers gain a more advanced intelligence (Carr, 2008; Carr, 2011; Selwyn, 2011).

The notion is that if the principals of 'vitalism' are put into a community then a double focus on the individual and the community is possible. So, the articles present pedagogic designs that are focusing on the individual student's relations in a community.

6.1.3 SYLLABUS AS A MAP – 'THE RHIZOME'

This section introduces the metaphor of the 'rhizome' and discusses its relevance in pedagogical designs. The 'rhizome' is a metaphor for Deleuze's 'image of thought'. It offers another 'image of thought' that suggests that thoughts do not follow structures, rules or hierarchies and that 'images of thought' or understandings of thinking ought not to be presented as structures or hierarchies (Deleuze & Guattari, 1987 p: 16)

The 'rhizome' may be a contested metaphor (Mackness et al., 2016) that both describes a map of productive relations and an exclusive 'survival of the fittest' selection of relations. The 'rhizomatic network' is not ethical, it is a 'natural' mechanism that facilitates relations that create 'plateaus of intensity', much like the way in which Web 2.0/Social media may work. The rhizome does not register attempts of connection that do not succeed, which resembles what happens when users do not use a hashtag on twitter or when users do not 'like' or share other user's content on facebook, then the 'tweets' and the 'posts' go unnoticed as if they didn't exist.

This indicates that, if applied to higher education, it needs careful consideration. In the pedagogical designs these considerations include thinking up structures that are both 'arborescent' and 'rhizomatic'.

So, the pedagogical designs have an 'arborescent' backbone accompanied by rhizomatic strands of activities.

Introduction to the ‘Rhizome’

Deleuze and Guattari use two different metaphors to describe two contrasting multiplicities. The Deleuzean meaning of the term ‘multiplicity’ is that there are more geo-historical trajectories at play in a given event. The notion of multiplicity resembles Bhaskar’s notion of multiple causalities (see Chapter 3). Both the multiplicity and the multiple causalities entail the basic conviction that an effect may not be caused by only one causal mechanism.

The metaphoric use of the biological term ‘rhizome’ is an analytical technique used to put focus on productive relations in open networks instead of closed hierarchies. The ‘rhizome’ is a network of multiple growths. That is the key feature of the ‘rhizome’ in educational contexts. ‘Growth’ can come from more sources than one, in higher education that indicates that knowledge can come from other sources than the lecturer and the appointed learning material. ‘Growth’ means contribution, participation and engagement from the students and the chosen Web 2.0 tools facilitate ‘multiple points of growth’.

Rhizome as an image of collaboration

So, basically, the rhizome provides an image of collaboration where all participants can contribute and share, but also an image of collaboration that rests on a ‘natural selection’ of input that is problematic in an educational context. So, the rhizome entails the paradox of also needing as a structure for an ‘unnatural selection’ that intercepts the students that get left behind.

Deleuze contrasts the ‘rhizome’ with ‘arborescence’. ‘Arborescence’ is a tree-like hierarchy with one point of growth and a teleological progression from ‘means to ends’:

‘It is odd how the tree has dominated Western reality and all of Western thought, from botany to biology and anatomy, but also gnosiology, theology, ontology, all of philosophy.’ (Deleuze & Guattari, 1987 p: 18)

It is the aim of this thesis to address the specific logic that the ‘tree’ metaphor maintains in lessons of one point of growth (the lecturer) when the ‘growth’ may start amongst the students instead.

In the rhizomatic syllabus, the topic may be presented as a map. In the map (see figure 37) the students have to make informed choices. The example below (figure 37) shows a syllabus that is formed like a map (created in Prezi, used in English teaching at Teacher Education). The students have a compulsory set of tasks, however, the routes to solving the tasks are multiple and the students (in groups) have to decide how to solve the tasks:

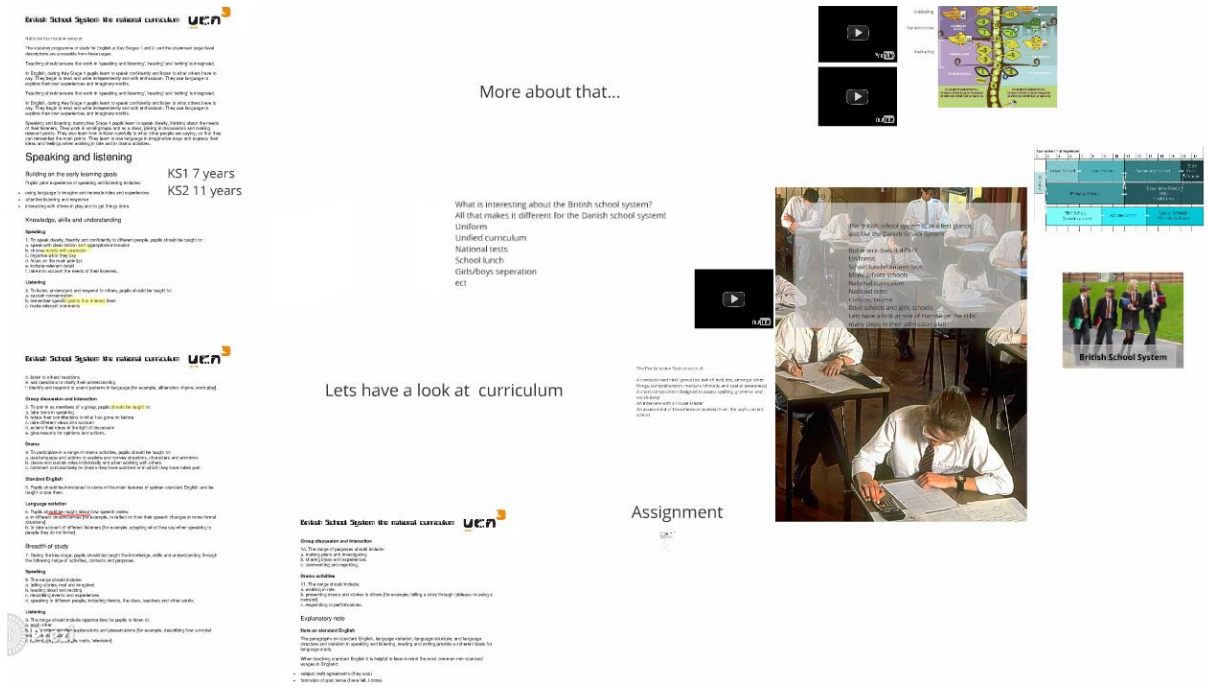


Figure 23 Example of a syllabus that presents a map of possibilities

As a contrast to the rhizomatic syllabus, a syllabus may be like a recipe that the students have to follow in order to pass the course (see Chapter 5.3.5, figures 24-26).

Deleuze and Guattari put it this way:

'Processes are becomings and aren't to be judged by some final result but by the way they proceed and their power to continue, as with animal becomings, or nonsubjective individuations. That's why we contrasted rhizomes with trees - trees, or rather arborescent processes, being temporary limits that block rhizomes and their transformations for a while.' (Deleuze, 1997 p: 146)

A hierarchy may not be productive – it may instead be restrictive according to Deleuze and Guattari. The basic understanding of the rhizome is that it seeks to connect productive nodes in a network disregarding the nature of the nodes.

So, in that sense, the rhizome is eclectic, fragmented and ahierarchical. In a learning context, that means that we may not be able to predict which mechanisms and relations will be productive. Deleuze describes how the rhizome operates as a constantly engaging exchange mechanism:

'A rhizome ceaselessly establishes connections between semiotic chains, organizations of power, and circumstances relative to the arts, sciences, and social struggles.' (Deleuze & Guattari, 1987 p: 7)

The rhizome is an open structure of exchange mechanisms but it is also an analytical category for analysing what actually happens in real exchanges if the nodes or agents in the rhizomatic

network are free to act. In nature, the rhizome describes the character of the roots (creeping rootstalk) of certain, very robust plants (E.g. Ginger, Bamboo, Bunch grass etc.). The actual plant can be cut off and the roots may be ruptured, but the rhizome will find new connections and a new plant will germinate. The only thing stopping the plant may be ‘unnatural’ interaction from the herbicide. That analogy translates to a robust pedagogic design, where the students can learn even if the lecturer is absent (cut off the plant) or if the normal procedures of the lesson change (rupture the roots).

The rhizome negates the possibility of dichotomies or dualisms or even simple dialectics by focusing on relations and connections between agents. There are no ‘good or bad’ but only productive or unproductive relations, according to Deleuze.

‘There is a rupture in the rhizome whenever segmentary lines explode into a line of flight, but the line of flight is part of the rhizome. These lines always tie back to one another. That is why one can never posit a dualism or a dichotomy, even in the rudimentary form of the good and the bad.’ (Deleuze & Guattari, 1987)

In an educational context, this means that learning is a product of productive relations and connections and that teaching may provide possibilities for connections and relations instead of hierarchical routes of linear progression. Teaching may then be to provide supervision on how to engage in productive relations.

‘Always follow the rhizome by rupture; lengthen, prolong, and relay the line of flight [...] The rhizome is an anti-genealogy.’ (Deleuze & Guattari, 1987 p: 11)

This notion of ‘anti-genealogy’ suggests an eclectic selection based on where things are, what they are and if they are relevant and open for engagement (Deleuze & Guattari, 1987 p: 164, 165). The map of intensities makes up the rhizome and in this thesis, it is opposed by a traditional, linear syllabus addressed in the articles ‘Qualifying the Quantified Self...’ and ‘Rhizomatic Digital Habitat...’ (Kjærgaard & Sorensen, 2014b; Kjærgaard & Sorensen, 2014c). Deleuze and Guattari put it this way:

‘The rhizome is altogether different, a map and not a tracing. Make a map, not a tracing [...] The map is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification.’ (Deleuze & Guattari, 1987 p: 12)

The rhizome is made up of plateaus of intensity. That is, the places where exchange and connection occur:

‘A plateau is always in the middle, not at the beginning or the end. A rhizome is made of plateaus.’ (Deleuze & Guattari, 1987 p: 21)

The aim of rhizomatic teaching is to provide circumstance and content for making plateaus possible. This is addressed in the articles; Rhizomatic Digital Habitat, Qualifying the Quantified self, Photographic Learning Stream, Deep Learning in online discussion fora, Utilising DT for dialogue and evaluation – new scholastic methods and in action.

The aim is to make a syllabus that is not a linear singularity but a map of multiple possible routes and resources, which forces the students to make informed choices, when they decide on which route to take.

Considerations

The ‘rhizome’ may be a compelling metaphor putting the student in the centre of the learning process as an active actor in the shared process of achieving a shared learning objective in a community. However, it lends itself to a specific type of learner that, like Tabby Lou (see page 137), has a desire to learn. This notion relates to Deleuze’s conviction that ‘desire’ is a driving force that shouldn’t be interpreted negatively but rather be understood as a positive point of departure for creativity (Deleuze, 2004). But, the ‘rhizomatic’ relations does not seem to consider the less-driven learners. Based on experiences from an educational programme designed along the lines of Deleuze’s concepts educational researcher Jenny Mackness concludes that the ‘tree-like’ structure was a necessary condition for the ‘rhizome’ and that the necessity of the arborescent hierarchy wasn’t recognised:

‘Lack of recognition of the necessary condition of the tree was perhaps the most significant element of the paradox of the rhizome evident in the Rhizo14 MOOC.’ (Mackness et al., 2016 p: 88)

This experience indicates that the 'arborescent' hierarchy precedes the possibility of the ‘rhizomatic’ ahierarchical relations.

In this thesis, this notion is used to interpret the difference between ‘arborescence’ and ‘rhizome’ as a ‘folding’ of a structure upon a structure in the process of achieving a stated of ‘rhizome’, where the individual learner can relate plateaus and co-students and lecturers in a map of productive relations.

6.1.4 COLLABORATION AND DIALOGUE AS A ‘PLATEAU OF INTENSITY’

This section presents the notion of the ‘plateau of intensity’. It is utilised in the pedagogic designs in the articles to describe the situation where ‘quality’ in a lesson is understood as an intense exchange of thoughts.

According to Deleuze, the rhizome consists of intense nodes or points of connectivity. These points of connectivity are called ‘plateaus’. The term ‘plateau’ is Old French for ‘flat object’. However, the term ‘plateau’ has a contrasting meaning in psychology, where it means a stale developmental or a learning standstill. Deleuze uses the term in the geological sense and the fact that it contrasts the psychological use of the term is properly not incidental since both Deleuze and Guattari sought to contrast psychology altogether. Deleuze is inspired by Bateson’s description of platonic events that build on an energy that resembles sexual energy.

‘Gregory Bateson uses the word "plateau" to designate something very special: a continuous, self-vibrating region of intensities whose development avoids any orientation toward a culmination point or external end.’ (Deleuze & Guattari, 1987 p: 21-22)

It describes an intense sense of sharing, exchanging and of becoming a unity by being together. The 'plateau of intensity' shares features with the 'community of practice' (Wenger, 1998) in the sense that it also describes the ideal situation of collaboration. It represents an un-negotiated productive habit.

The plateau may be constituted by a multitude of connections made up of human or non-human agents. An example could be a facebook group about classic cars, where people connect to other people in the search for technical help. However, people also connect to machines while helping others in the facebook group because the helpful reply might be a link, photograph, graph, document etc. There are no singularities (universals) other than the means of communication and the ability to connect. Everything else in the facebook group is made from vitalistic multiplicities.

'We call a "plateau" any multiplicity connected to other multiplicities by superficial underground stems in such a way as to form or extend a rhizome.' (Deleuze & Guattari, 1987 p: 22)

These vitalistic multiplicities (people, databases, networks, clubs etc.) are connected rhizomatically in an ahierarchical network. If you feel that the activity in the facebook group is productive you stay and participate and engage and learn together - if not you properly leave. The individual person has the agency to make a choice - consciously or not. This relates to education in the sense that students will connect, exchange, share and engage if teaching produces a plateau this claim will be further elaborated in Chapter 7. If the plateau is, in fact, a plateau then it will be intense and people and machines will connect the problem are that the plateau is relying on multiple mechanisms and structures in order for it to come to life. No one agent, mechanism or structure can produce a plateau. So, a lecturer with his/her syllabus can't control the occurrence of a plateau, if it occurs, it is depending on the student's individual desire to take part.

The syllabus may then act as a stepping stone upon which the students can stand while they decide which stepping stone they might be able to reach next. The stepping stones are a pedagogical collection of resources and possible connections that act as a plateau for learning. Bateson calls the stepping stones a continuous region of intensity constituted in such a way that you can achieve progression.

'Gregory Bateson uses the term plateau for continuous regions of intensity constituted in such a way that they do not allow themselves to be interrupted by any external termination, any more than they allow themselves to build toward a climax; examples are certain sexual, or aggressive, processes in Balinese culture. A plateau is a piece of immanence. Every BwO is made up of plateaus. Every BwO is itself a plateau in communication with other plateaus on the plane of consistency.' (Deleuze & Guattari, 1987 p: 158)

The idea of using the metaphor of the plateau as an idealistic representation of learning together holds a paradox. The paradox is that a plateau is not easily orchestrated especially within the arborescent confinements of the programmes in further education investigated in this thesis. A plateau is not dictated it appears under the right circumstances with the right

agents. A ‘flash mob’, e.g., is an example of a plateau, it only happens if people show up and act the ‘flash-mob’. A successful ‘flash mob’ relies on a great idea (the activity), a great setting, an appropriate time and the will and desire of the people. If the idea, setting, time etc. is great is determined by the people, and only conditioned, not determined, by the organisers. That means that something as simple as a ‘flash-mob’ relies on at least four independent multiplicities. If we apply this analogy to education issues of concern arise:

- 1) Teaching becomes reliant on the student's engagement. If the students do not engage then the entire lesson may collapse.
- 2) Teaching becomes unpredictable. The lecturer cannot plan every minute detail of a lesson.
- 3) The role of the lecturer changes from being in the centre, to being in the periphery of activities.
- 4) The role of the student changes from being a receiver or participant, to being engaged in the creation of the plateau for learning.
- 5) The individual student has to centre him/herself in the plateau for learning. There is no periphery, there is no sitting on the back row.

This means that the concept of teaching and learning has to strive for conditions that open the students’ minds to the notion of having multiple roles and multiple purposes in a lesson.

In a practice of teaching at UCN, this seems demanding, when ‘quality’ in a lesson is defined by ‘student satisfaction’, ‘effectiveness’ and ‘efficiency’ (see page 15-16). I assume that there is a conflict between the students’ sense of ‘effectiveness’ and the slightly therapeutic process of realising the daunting task of centring oneself in the learning process.

6.1.5 MULTIPLE ROLES AND POSSIBILITIES – ‘BODY WITHOUT ORGANS’

This section introduces the notion of the ‘Body without Organs’ (BwO). It describes the lecturer and the students as ‘multiplicities’ with more possible connections, roles, possibilities, and potentials. In many respects, the BwO reminds of the French cartoon series ‘Barbarpapa’ by Annette Tison and Uren Taylor (1970). That is, a creature that can think, and express thoughts while also take on any shape and practical function. ‘Barbarpapa’ is an extreme example of a BwO that can achieve any plateau (states of being). It is also an example of fictional entelechy, Barbarpapa is empowered to create anything with just himself as resource, and by that the BwO of Barbarpapa may resemble the story of Tabby Lou (see Chapter 6.1)



Figure 24 Barbapapa and Barbarmama (CC licence) Body without Organs (BwO)

The term 'body without organs' (BwO) stems from the French playwright, Antonin Artaud. He used the term to describe a substrate that does not have a shape or a content. In a Deleuzian context, it means to use your immanent competencies and entelechy to be in a state of becoming instead of congealing in a fixed position. When a person becomes a BwO that person will be in a constant movement, build on exploring positive differences on the basis of what he/she feels, senses knows and thinks, according to Deleuze.

'A BwO is made in such a way that it can be occupied, populated only by intensities. Only intensities pass and circulate. Still, the BwO is not a scene, a place, or even a support upon which something comes to pass. It has nothing to do with phantasy, there is nothing to interpret. The BwO causes intensities to pass; it produces and distributes them in a spatium that is itself intensive, lacking extension.' (Deleuze & Guattari, 1987 p: 153)

The BwO describes a state of positive development based on reflection and the intensity of the 'positive difference'. The 'positive difference' is described as a non-negating, non-contrasting, anti-dichotomy difference that springs from retroductive and abductive reasoning. It raises the CR question; 'if this is it (the actual), then how did it emerge (the virtual)' and 'how can it be recreated on the basis of our understanding of its virtual being'. So, if a researcher wants to become a BwO he/she has to take what is immanently him/her and develop another nomenclature to describe the object of research as a different actualization of the virtual being of the object.

'Instead of slotting everything into polarised fields of the norm and its antithesis, Deleuze and Guattari encourage us to remove the poles of organisation but maintain a mode of articulation. They advise that in seeking to make ourselves a BwO, we need to maintain a mode of expression, but rid language of the central role it has in arbitrating truth and reality against madness and the pre- symbolic real. Relocating desire away from a dichotomous linguistic trajectory, Deleuze and Guattari present it as being contextualised by the field of immanence offered by the BwO rather than by the conclusive field of language.' (Parr, 2010 p: 39)

Becoming a BwO means to utilise knowledge, experience, senses and thinking to work around dualisms, dichotomies, and structures to form new productive relations and connections. The notion of the BwO is not a goal that you achieve it is a principal for thinking that one will be forever acquiring. The BwO is an important notion in this thesis because it describes the situation of being a learner in more ‘realities’ of the same context. That is, a virtual and an actual and a practical reality of the context. The virtual reality may be understood as what happens in the online discussion forum (or Social Media), the actual reality may be understood as what happens in the lesson and the practical reality is the experience of ‘the practice’ that the programme aims at.

6.1.6 LET THE THEME ORGANISE THE ACTIVITIES - THE SELF-ORGANISING CHAOSMOS

This section introduces the notion of a ‘Self-Organising Chaosmos’. It describes the situation where relations between chaotic entities form meaningful hybrids. It is used to address the elements in a pedagogic design that the students need to map the possible routes of learning in a rhizomatic syllabus.

It is the belief in the articles, that if the ‘problematic field’ is identified, then the definition of the ‘problematic field’ can organise the chaotic unconnected elements and let the elements that help understand the problematic field stand out.

One of the main interests in the articles is to design pedagogies that advocate agency amongst students. That is, to create situations where the students may centre themselves in their learning process and engage in learning without a functionalist agenda of passing exams. So, it requires a situation where self-organisation is demanded, fruitful and possible. In order to create such a situation, the majority of the studies done in this thesis take the point of departure in Deleuze’s concept of ‘Self-Organising Chaosmos’. The ‘Chaosmos’ is a compound of the words ‘Chaos’ and ‘Cosmos’. ‘Chaos’ is not understood negatively and ‘Cosmos’ is not positive, ‘chaos’ it is defined as an absence of connections between determinations (Young, 2013 p: 59). Deleuze and Guattari put it this way:

‘In fact, chaos is characterized less by the absence of determinations than by the infinite speed with which they take shape and vanish. This is not a movement from one determination to the other but, on the contrary, the impossibility of a connection between them, since one does not appear without the other having already disappeared, and one appears as disappearance when the other disappears as outline.’ (Deleuze & Guattari, 1996 p: 42)

This quote describes the feeling of not being able to cling on to a phenomenon long enough to identify or understand it. It might be a description of how a novice internet users experience the lack of control of the organisation of the internet. Or how students get lost in the LMS, or how Twitter seems disorganised to many. Chaos is not understood as sensory overload, or disorganisation, or too much of something, chaos understood as a lack of relations between things or phenomena. According to this line of thinking, the task in teaching is to make relations that do not make the academic subject or practice congeal, or fixate phenomenon to specific determinations, but to make relations that are alloplastic and dynamic. An example of an alloplastic and dynamic relation is the relation between web-content and #hashtags (search

phrase). A #hashtag merely makes a possible relation between a search word and content. In the wake of making the relation comes a possible network of content build on the #hashtag. That is, if the users start using the #hashtag, the #hashtag becomes a plateau of intensity, a chaosmos, for that specific topic. An example could be #dkpol because #dkpol is used to share political debate and create a relation between different political opinions, experience, and science. Deleuze and Guattari describe ‘chaosmos’ as the ‘in-between’ state where relations form:

‘The milieus are open to chaos, which threatens them with exhaustion or intrusion. Rhythm is the milieus’ answer to chaos. What chaos and rhythm have in common is the in-between—between two milieus, rhythm-chaos or the chaosmos: "Between night and day, between that which is constructed and that which grows naturally, between mutations from the inorganic to the organic, from plant to animal, from animal to humankind, yet without this series constituting a progression ..." In this in-between, chaos becomes rhythm, not inexorably, but it has a chance to.’ (Deleuze & Guattari, 1987 p: 313)

Normally, chaos may be an undesired situation, where things are out of control. But in a Deleuzean sense chaos represents the possible forming of other relations between things. To embrace the in-between state of things is to accept that ‘becoming’ is a sustainable condition and that ‘being’ is the unstable condition that is prone to be chaotic at any point in time. Deleuze—researcher Eugene Holland puts it this way:

‘Being is merely a momentary, subsidiary, largely illusory suspension (or ‘contraction’) of becoming, according to this view becoming is always primary and fundamental.’ (Holland, 2013 p: 18)

In relation to this thesis and the suggestions for development that the thesis brings about, this notion of ‘being in the chaosmos’ of acquiring (becoming) but not achieving (being) is very important. The suggestions for development in this thesis all address the emphasis on ‘becoming’. It might sound simple, however in a utilitarian curriculum and educational policy it may create resistance, as the articles and papers will show. The resistance may be generated in the relations between the cases in the articles and the educational surroundings and between the students’ expectations and what they are presented with.

The two Deleuzean terms ‘being’ and ‘becoming’ are understood as ‘folds’ of the same matter. They are related dialectically. In laymen’s terms ‘becoming’ would refer to a ‘process’ and ‘being’ would refer to a ‘product’.

So, it is not a dualistic relation between the ‘being’ and ‘becoming’. It is a shift in focus from understanding ‘being’ as the concrete state and ‘becoming’ as the volatile condition, to understanding ‘becoming’ as the real circumstance and ‘being’ as a temporary construction. What Deleuze says is, that ‘being’ is a necessary social-construction (e.g. a learning objective), however, it is passing and inconstant. So, in higher education, this could be interpreted to mean that we maintain a false representation of something because we design education around the notion of ‘beings’ (subjects, roles (lecturer/student), places, hand-ins, timetables, curricula, exams, tests etc.).

In this context, it has inspired the notion that a pedagogical design could articulate ‘becoming’ as the main focal point that is to focus on the academic communication in the lesson (and during preparation) produced mainly by the students (Student response systems, online discussion forum, Twitter). These academic utterances present a progression that is not congealed in a static text presumably helping the students to focus on continuously ‘becoming’ more competent.

Deleuze may say, that we could de-territorialise (reform, but maintain core) and re-territorialise (hybrid relations from same core) elements of teaching and let them form a rhizome of relations in a plateau of intensity:

‘Each of these becomings brings about the deterritorialization of one term and the reterritorialization of the other; the two becomings interlink and form relays in a circulation of intensities pushing the deterritorialization ever further.’ (Deleuze & Guattari, 1987)

It may require a change in study habits and in the general understanding of the concept of a lesson. Other researchers have been successful in reimagining the lesson and the course, however, they stress the importance in changing the mindset of the students. One of these researchers is Dave Cormier, he conducts the Deleuze-inspired course ‘Rhizome as curriculum’. In the introduction to the course ‘Rhizome as curriculum 2015’ (Cormier, 2015) (Rhizo15) Jenny Mackness quotes Dave Cormier for saying:

‘Try to forget everything you know about ‘traditional education’ and imagine that you are going to camp for 6 weeks.’ (Mackness et al., 2016 p: 79)

The quote insinuates that participating in the course will demand a substantial amount of de-territorialisation and re-territorialisation of the students’ study habits. The course is designed as a rhizome and the syllabus presents a map of possibilities that rely on the students to re-territorialise in as self-organizing chaosmos. The relation between the rhizome and that pedagogic design is elaborated in the article ‘Designing for Dialogue and Digitality in Higher and Continuing Education’ (Sorensen & Kjærgaard, 2016).

6.2 GETTING NEW IDEAS AND CHANGING PRACTICE

This section describes an attempt to use the philosophical concepts as a foundation for getting new ideas and changing practice.

Deleuze is often referred to as a ‘philosopher of difference’, which means that he is investigating the difference between ‘repeating’ the known and ‘creating’ novelty. Both Deleuze and Bhaskar insist that the key to creating novelty is in changing and rethinking the relation between actants rather than in changing the actant him/her/itself.

Deleuze believes that an idea is generated through interaction between the virtual and the actual. The virtual being the process of bringing experience, senses, knowledge together with active thinking. This process is either individual in the mind of somebody or it is stratified into mediated means of enunciation if it is a shared process of collaboration with others. The mediational means in this context are; Language, diagrams, doodling, drawings, gesticulation.

Deleuze believes that novelty comes from actualisation of intensities always being part virtual and part actual. That means that the concept that the idea enunciates must be carried within the actualisation. Or as Deleuze-researcher John David Ebert put it:

‘...anything that comes into being carries with it the virtual ghost of its morphogenetic double.’ (Ebert, 2015 t: 11:48).

That means that the ideas behind a concept of a hybrid pedagogy should preferably be carried with it into the actualization of the concept. For instance, a ‘community of practice’ may only be a ‘community of practice’ if it stratifies the ideological concept into the practice of learning. If the concepts of; shared repertoire, mutual engagement and joint enterprise are not supported by the circumstance then it may just be group-work and that is not a novelty, that is a repetition of habits.

Novelty is closely related to ‘becoming’, whereas ‘being’ is closely related to ‘repetition’. Deleuze describes novelty as ‘actualisation of the virtual’ (O’Sullivan & Zepke, 2008 p: 215). Deleuze emphasises the active process of thinking as the most prominent feature of creativity:

‘To think is to create – there is no other creation – but to create is first of all to engender “thinking” in thought.’ (Deleuze, 1994 p: 147)

This notion is interpreted to mean that it is equally plausible that an experience leads to thinking or that thinking leads to an experiment. The incidental action can lead to great thoughts. However, Deleuze insists that it is in the process of thinking that the creativity happens and not in the incidental activity leading up to the thinking process.

In Deleuze’s book on Nietzsche he adds that concepts have the potential to be ethical and freed of moralism:

‘Thinking would then mean discovering, inventing, new possibilities of life.’ (Deleuze, 2006b p: 101)

The ideal creative process may be ethical (knowledge) thinking freed from moral (dogmas), according to Deleuze. In the context of designing pedagogies for teaching this means that the design process is a process of thinking up concepts that take ethical considerations. Ethical consideration is interpreted to imply that the pedagogical design is inclusive, supportive and challenging at the same time. Deleuzian morality refers to what people should do, whereas ethics is what people can do (Young, 2013 p: 111). So the circumstance for creativity is when thinking up concepts allow for ‘élan vital’ and entelechy to create ‘positive difference’.

6.3 SUMMING UP PHILOSOPHICAL INSPIRATION

The Deleuzian philosophy and selected concepts have inspired the pedagogical designs in the article to focus on the vitalistic possibilities that digital technologies in networks can provide. The concepts are mainly used because they seem to identify the character of collaboration and sharing in online discussion fora, Social Media (Twitter) and online information sharing in general. The aforementioned services may centre the individual in a creative process and allow new ways of communicating and acquiring knowledge that potentially can change and

develop education in a more rhizomatic and ‘vitalistic’ direction, which is both challenging and supportive.

It represents a complex situation because the lesson at UCN holds at least three parallel tracks:

- The communication and activity in the classroom
- The lecturer’s use of DT to present and organise content
- The students’ use of their own DT

So, the isolated focus on the ‘vitalistic’ potential in working in digital networks does not directly apply to a lesson at UCN. This indicates that the lesson as a concept and as a practice could benefit from reterritorialization if the alleged potential (from Ad. 5 in the Act on Teacher Education 2013) DT should be freed. Hence, the articles present a series of reimagined lesson designs that seek to be rhizomatic and ‘vitalistic’.

The focus on ‘vitalist’ conditions for learning is brought on by the notion that DT will be deployed in any contexts that can be digitalised and systematised to a level of automation. This, slightly dystopian, the notion is backed up by the quotes from the Teacher Education Act 2013 presented in Chapter 1, which insinuate that DT could perform some of the tasks that teachers at Teacher Education do today.

‘Vitalism’, the ‘Rhizome’, the ‘Body without Organs’ and the ‘Self-Organising Chaosmos’ may all represent an individualistic approach to life. It is a situation where individual students are placed in conditions that should open for productive collaboration if the individual students are open, capable, reflective, and knowledgeable. In that sense, it is interpreted as a situation for learning on the basis of a substantial body of knowledge and competencies and not a situation of getting acquainted with a new subject in new circumstances. This notion is taken under consideration in the pedagogical designs in the articles.

7 PAST RESEARCH – REFLECTIONS

This chapter presents reflections on the selected articles in this thesis. The portfolio of publications contains eleven publications (of which nine are peer-reviewed, see Appendix 1 for full list).

The selected articles for reflection in this chapter are the articles that are considered to contribute to answering the main research question of the thesis:

How can lecturers reimagine ‘densified’ lessons to focus on dialogue facilitated by digital technologies?

And the supporting ‘area of interest’:

How can Digital Technology facilitate and catalyse dialogue?

The political invention of the pedagogical notion of ‘densification’ (Ministry of Education, 2013b), which means ‘to achieve more learning objectives in fewer lessons’ (in Teacher Education) is interpreted as a significant part of the reason why PPT have such a dominating position in lessons at Teacher Education as presented in the ‘Immanent Critique’ (Chapter 6). The notion of ‘densification’ does only apply, formally, to Teacher Education, however, the dominating status of PPT in lessons also seemed to relate to other programmes (Nurse Education and Occupational Therapy in particular). The claims put forth in the Teacher Education Act 2013 (Ad. 5) that DT can improve teaching and help allocate time for the lecturer to spend more time with the students, individually or in groups, also fuelled the designs and experiments presented in the articles.

The claims in Ad. 5 appear to be unsubstantiated they are not elaborated or explained in the Teacher Education Act 2013 or in the supporting documents (Ministry of Education, 2013a; Ministry of Education, 2013b; Ministry of Education, 2015). However, they can be interpreted as the ministry’s understanding of what DT should contribute to in Teacher Education.

The intention with the articles was to experiment with pedagogic designs that reimagine the notion of ‘densification’ and attempt to explicate the claims in Ad. 5.

‘The Immanent Critique’ (Chapter 5) interprets the use of digital technologies in lessons as ‘monologic’, it claims that there is a pseudo-dialogue between the lecturer and the PPT slides, in which the students are spectators. ‘The Immanent Critique’ also suggests that the prevalent use of ‘bullets’ presenting theoretical headlines mainly maintains and sustains fragmented contractions of a whole, when the lesson is over.

Reflecting on modes of ‘densification’

The main idea behind the pedagogical designs in the articles is to suggest other modes of ‘densification’.

- Modes, which utilise DT to sustain the dialogue outside of the lesson.
- Modes, which suggest ways of utilising all four quarters of the study activity model (figure 1, page 6)
- Modes, which centre the student in his or her learning process. That is, to create a situation where the ‘legitimate peripheral participation’ is funnelled into the centre of the learning process as explicitly and quickly as possible.

The ‘densification’ process is accompanied by the ‘student activity model’ (presented in Chapter 1.1.1), which clarifies when and how the students should work in relation to a lesson or an entire course (UC Danmark, 2013). The ‘student activity model’ indicates that the students should initiate study related academic activities without the interference of the lecturer. These activities are deemed to be difficult to motivate, hence Article 1 presents a pedagogical design that attempts to utilise smartphones and social media to the extent the lesson activities into the private sphere of the students’ everyday life.

The articles also consider the ‘study activity model’ in the pedagogic designs presented in the articles. This entails that all pedagogical designs in the articles explore the possibilities of extending the study activity in the lessons further than the timescale and place of the lesson.

Philosophical concepts used in the design and in the analysis

The pedagogical designs presented in the articles are based on selected concepts from the philosophy of Gilles Deleuze and Felix Guattari. The choice of using Deleuze’s philosophy is discussed in Chapter 6, but the gist of the discussion is that the philosophical notions follow the lines of the functionality of the chosen Web 2.0 tools. The selection of concepts represent the Deleuzean ideas that appear to apply most to pedagogic designs with DT.

The articles investigate the possibilities of learning for ‘life’ and not only for passing tests and the possibilities for combining individual learning with learning in a community.

The philosophical concepts that inspired the pedagogical designs in the articles are explained in detail in Chapter 6 and they are described in a short schematic overview in Appendix 6.

7.1 ARTICLE 1 ‘UTILISING DIGITAL TECHNOLOGY FOR DIALOGUE AND EVALUATION – NEW SCHOLASTIC METHODS IN ACTION’

This chapter reflects on the article ‘Utilising Digital Technology for dialogue and evaluation – quasi-scholastic methods in action’. The chapter reflects on the most interesting findings from the article and utilises the findings to suggest further research. The article was published in the peer-reviewed journal CEPRA (Kjærgaard, 2016).

This article presents pedagogic designs that revolve around the Scholastic progression of a learning process and seeks to form hybrids between synchronous dialogues in a traditional lesson, video-based content and both asynchronous and approximated synchronous dialogues in ODF.

The quasi-scholastic progression utilised in this article is described as;

input/inspiration(*devisio textus*) <—> reflection/critique <—> reasoning towards meaning

The pedagogic designs are created to allow rhizomatic, multiple points of growth in the lesson and in the preparation for the lessons. That is, to allow participation in dialogue from many students in the lesson and in preparation for the lesson. Furthermore, the digital technologies in the pedagogic designs are intended to enable ‘plateaus of intensity’ in the lesson. The pedagogic designs seek to focus on the student’s possible ‘entelechy’, that is, to create time and space for the students to think, reflect and act.

7.1.1 DESCRIPTION CONTEXT

The pedagogical designs were designed and tested in Teacher Education (UCN). Partly in the course Danish (L-778B-15-1, 44 students), and partly in two similar courses Exp-IT (13-8, 15-10 and C21242a1). The Danish course utilised an ODF to facilitate the dialogue and it was taught by one of the lecturers, who also participated in the Action Research cycles and course development in the latter article (lecturer 1). The other courses utilised ‘Socrative’ as a Student Response System (SRS).

It was the intention with the article to answer the following research questions:

- How can DT catalyse and enhanced classroom dialogue?
- How can DT extent the dialogue to reach outside of the lesson and the classroom?

7.1.1.1 *Digital technologies for dialogue*

The courses utilised two different dialogic tools; one that requires the students to be in the same place at the same time and one that allows a difference in time and space.

The first tool is in the category ‘Student Response Systems’ (SRS). It enables the student to reply to both close-ended and open-ended questions with an online, digital device. In this context, the free SRS tool ‘Socrative’ was used.

Technically, the lesson becomes an ahierarchical rhizome of multiple points of growth, however, looking back on the lessons, the ‘text snippets’ were not all interpreted as ‘points of

growth' and the lesson installs a new hierarchy. A hierarchy that decides which 'text snippets' get chosen for further elaboration and analysis in the lesson. Some students produce 'text snippets' that appear less relevant or appropriate for debate, and thus less useful in the lesson. In hindsight, this may be because the students were expected to participate even though they might not have had relevant input. It appears as if Pareto's principal applies here. Pareto's principal refers to an alleged generic relation between cause and effect in the ratio 80/20 (80% of the effect came from 20% of the causes) (Hafner, 2001 p: 52-53). Applied to education Pareto's principal indicates that 20% of the students produce 80% of the content in a lesson. There are other 'ratios' of participation ratios are suggested in the literature, such as 1 hyper active, 9 active and 100 lurkers, however, the general notion is that far more students are in the periphery of the discussions than in the centre of the discussions.

If Pareto's principle represent a 'natural' distribution, then the idea that everybody must contribute to the dialogue in a lesson requires reconsideration. In hindsight, it may be unethical to force students to participate in dialogue that they may not be ready for.

In practice, the ethical consideration may be important but it does not necessarily disqualify using SRS for dialogue. The utterances in the SRS are anonymous by default and they can be discussed without addressing the identity of the contributor, however, in practice, the contributor often unveils him/herself to discuss the content of the utterance.

The quasi-scholastic element

The example below is taken from the course for in-service teachers on 'IT didactics and pedagogic IT consultant work' (C21242a1). In the example the in-service teachers (students) utter what they think will be their first and most important action when they return to their schools after the course.

- Two utterances are political (green encirclement), they address issues with the state of the network and the hardware at the schools.
- Three utterances are discussing the framework for defining the new role of it-consultant (red encirclement).
- Seven utterances make statements about how they anticipate the role of becoming a 'pedagogical IT consultant' (orange encirclement).

Figure 25 shows a list of utterances from a Socratic discussion. The utterances are:

- Vores første opgave bliver nok, at beskrive hvad kollegaerne kan bruge didaktisk it vejedere til.
- at påvirke "systemet" så teknikken bliver bedre, hurtigere og bedre repareret, når problemer opstår - at sikre at alle elever kan få adgang til de programmer, der skal bruges - at motivere kolleger til at tage kampen op med det teknologiske "uhyre"
- Første opgave og en opgave der bliver ved at være er at vise mulighederne med IT i undervisningen, og komme med eksempler på spændende app's og undervisningsportaler - at man så selv kan eksperimentere videre med tingene...
- Hjælpe kollegaer med it-spørgsmål - sparring
- Få IT-vejledningen sat i rammer og få defineret vores arbejdsopgaver.
- Vidensdeling og motivere kollegaer til at bruge IT
- Starte en proces, hvor IT bliver en større del af skoledagen - og sparke nyt liv på "lærerværelset" mht. IT i undervisningen.
- Hjælpe og vejlede kolleger med opstart af forløb i klasser. Være med til at finde en god løsning for matematik undervisningen i 3 klasse, hvor alle elever har computer og kun har bøger indtil jul, derefter tænkes digitale bøger, hvis vi kan finde en god løsning.
- At bevare interessen for kollegaerne, når nettet ikke virker, eller er for langsom.
- undervise kollegaer i mulige undervisningsmidler
- Min første opgave er at vejlede kollegaerne i, hvad jeg har lært her i denne uge. Desuden vil jeg lave 2 cafémøder med forældre, hvor de prøver nogle af de ting, vi laver med børnene.
- Målsætning for IT udvikling på skolen.

 The legend on the right defines the roles:

- Orange: The role of helper and supervisor on the use of IT in class
- Green: The role of political gate-keeper. Address problems and help fix them.
- Red: Define the role of the IT consultant

 Red arrows in the image point from these roles to specific utterances: Orange points to the first, second, fourth, fifth, sixth, seventh, eighth, ninth, and tenth utterances; Green points to the third, fourth, fifth, sixth, seventh, eighth, ninth, and tenth utterances; Red points to the first, second, fourth, fifth, sixth, seventh, eighth, ninth, and tenth utterances.

Figure 25 Example of utterances in Socratic

When reflecting on the fact that at least three different approaches to the discussion appear, it indicates that the discussion is multifaceted. The multifaceted element of the discussion is not determined by the SRS in the sense that the students' different opinions precede the SRS-activity, however, the SRS conditions the actual emergence of the utterances. This reflection leads me to think, that there presumably always are more opinions and understandings of a topic amongst the students, and in some cases, SRS-activities can condition the sharing of these different understandings in a mediated way that makes up for a safe environment for the utterances.

The experiences I got from doing the research also tells me that it is important to think the SRS-activity through beforehand. When reflecting on the preparation for the SRS activity three considerations protrude:

1. The lecturer should consider for what to use the SRS input
2. The lecturer should try to anticipate the possible SRS input
3. The lecturer should plan how the lesson can continue after the SRS input if the input suggests alternate topics than the syllabus

The shared 'third'

When reflecting on the benefits of using SRS it stands out that having the shared collection of utterances forms a shared and neutral 'third' that the lecturer and the students created together. The shared 'third' appears to be both as neutral and relevant as the students make it. It is understood as a 'safe' discourse for discussing the topics of the lesson.

However, by using SRS to create a shared 'third' the lecturer risks losing control and predictability of the lessons progression. The aim to stick to a linear syllabus becomes endangered by the rhizomatic nature of the shared 'third'. The shared 'third' becomes the 'plateau of intensity' that the lesson revolves around. In the courses, the article report from the SRS activity was related to a presentation of new content, and it made the lecturer deviate

from the syllabus, which in turn made it difficult for the lecturer to control the time and direction of the lesson.

The interaction between new academic content and dialogue was also a key ingredient behind the pedagogical design in the Danish course. However, in the Danish course, the interaction order was different. The students discussed the content at home during preparation in ODF before the lesson and the posts in the ODF created the shared 'third' the lesson revolved around. The lecturer (lecturer 1) explained afterwards that she was insecure about her role in the lesson, so she made a PPT just to have a 'safe habit' to fall back in, should the shared 'third' in the ODF not emerge. The shared third did emerge, so she didn't make use of the PPT.

The pedagogic design in all courses allowed for a change in the position/practice system in the lesson. DT became the catalyst for participation and the vehicle for dialogue and documentation of dialogue for later use (exam etc.). The students' devices (laptops and smartphones) contributed to the execution of the pedagogic design and conditioned the outcome of the lesson in the ODF threads. So, the students' DT achieved a more active role than the role described in Chapter 5 'The Immanent Critique'.

The notion of 'densification' gets another meaning when the quasi-scholastic progression is utilised. The dialogue becomes 'densified', or intense, while the presentation of academic content is moved to the preparation phase of the course.

7.1.2 CRITIQUE OF THE QUASI-SCHOLASTIC PEDAGOGY

The focus on dialogue entails another challenge that emerged in the Danish course, which is, the challenge of setting up the conditions for dialogue. A student expressed that the conditions for dialogue were not complex enough to demand an ODF for discussing and documenting the conversation. This notion is also found in the review of the research field of students' contributions to ODF done by Hew, Chung and Ling Ng (Hew, Cheung, & Ng, 2010 p: 574). They list reasons for low participation the reason that seems to apply to the pedagogic design in this article is list below:

- Students do not see the need for ODF
- Lack of peer and instructor response
- Lack of interest and resistance to openness
- Students experience difficulty in keeping up
- Students feel insecure about what to contribute with

Hew, Chung and Ling Ng also review studies that seek to overcome low participation by suggesting pedagogical means to achieve higher participation. Below is selection of these that are assessed as relevant to this article (Hew et al., 2010 p: 579):

- Direct reference to curriculum
- Mandatory participation and deadlines
- Clear expressions of instructors expatiations
- Use controversial topics

- Combine ‘high- and low-profile students’
- Ask open-ended questions that allow the students to express their point of view
- Assign roles, such as a ‘summariser’, who paraphrases the discussion

The broader perspective on the use of ODF above in combination with the experiences presented in this article suggests that lecturers may be aware of the following issues:

- In its ‘natural habitat’ questions in ODF only appear to get one of few correct answers.
 - The dialogue may be artificially kept alive by demands for participation which means that many students appear to participate mainly because they have to and not necessarily because they have novel thoughts on the topic.
- The conditions for dialogue appear to demand that the topic for dialogue represents something that the participants care about.
- The conditions for dialogue also appear to demand that the participants need knowledge of and experience with the topic to engage in the dialogue.
- The dialogue in ODF is limited to text in these cases, even though the ODF facilitate both audio and video and the task description does not dictate that the students use text.
 - When audio or video responses was suggested in the courses a student said, that replying to text post in audio or video was like answering in German when someone asked a question in French.
 - a. Formulating text appeared to be both times consuming and easily misinterpreted.

7.1.3 BENEFITS OF USING ODF AND SRS IN RELATION TO ‘THE IMMANENT CRITIQUE’

The benefits of ODF is that it lends itself well to prolonging the dialogue outside of the lesson. It creates a more ‘aionic’ (experienced) timescale than the ‘chronos’ (measured) timescale of a lesson that, according to ‘The Immanent Critique’ in Chapter 5, creates a focus on presenting information in PPT slides. The ODF becomes a practical tool for deploying more quarters of the ‘study activity model’ in the sense that the communication that was restricted to the time constraints of the lesson is now possible on other timescales, meaning that the students can study together with a quasi-presence of a lecturer/tutor on a less constraint timescale. However, the need for feedback on the posts and the alleged ‘approximated synchronicity’ in the ODF suggests, that either should the lecturer/tutor be online all the time or the ODF activity should be defined in a specific timeslot.

Another benefit, presumably the most important one, is that at the end of the course the ODF represents a collection of students’ thoughts on the topics from the curriculum, meaning that reading for exam may be richer than re-reading texts, notes and leafing through a collection of the lecturers PPT as suggested in ‘The Immanent Critique’.

7.2 ARTICLE 2 ‘RHIZOMATIC, DIGITAL HABITAT - A STUDY OF CONNECTED LEARNING AND TECHNOLOGY APPLICATION’

The chapter reflects on the most interesting findings from the article ‘Rhizomatic, digital habitat - A study of connected learning and technology application’ (Kjærgaard & Sorensen, 2014c) and utilises the findings to suggest further research.

7.2.1 DESCRIPTION OF CONTEXT

The article reports on a series (22) of English lessons at Teacher Education (UCN). The pedagogic design in the lessons was designed to utilise the students own digital devices in a more creative way than the baseline study showed (See Appendix 4, survey 1). The baseline study and the investigation in Chapter 5 showed that the students’ use their own digital devices for following the lecturers PPT as the lecturer presents the slides on the screen while taking notes in a local copy of the PPT file.

The baseline study also showed that many students (approx. 40%) use their online devices to explore other discourses than the academic discourse in the classroom. The ‘other’ discourses are mainly social media, web shopping, news and entertainment. The exploration of other discourses didn’t appear to be as big a problem as I expected. The lesson observations indicate; approx. 40% of the students explore other discourses with an interval of 13-15 minutes and that the duration of the explorations is approximately 4 minutes.

The intentions with the pedagogical design were to explore a more creative use of laptops in the lesson. This led to an experiment with Web 2.0 tools that allowed co-creation and sharing. The method was Action Research, the main Action Research cycles were carried out in the lessons as a part of the course.

The issues that the experiments were intended to address are:

- How can collaboration in Web 2.0 tools catalyse a reimagining of ‘densification’ in the direction of more student interaction and activity and less lecturer centred instruction and content presentation?
- How can pedagogical designs catalyse the students’ use of their laptop computers for learning purposes?
- How can co-creation in Web 2.0 create rhizomatic task solving?

7.2.2 THE PRACTICE OF THE PEDAGOGICAL DESIGN

The intention was to utilise the students’ own laptop computers and co-creation Web 2.0 tools to make the laptops a necessary part of the learning process and not just an assimilation of analogue practices as described in Chapter 5. The initial design was created as a part of a course for in-service teachers on digital learning material. It was then developed in practice with the input from the students at Teacher Education. The pedagogical design presented in the article is the latest development (2014) of the pedagogical design. The pedagogic design utilises the notions of ‘rhizomatic networks’ that allows for multiple points of ‘growth’ in the lesson, a ‘plateau of intensity’ and the ‘self-organising Chaosmos’ (see Chapter 6 for

elaborate definition). The final theoretical notion behind the design is Wenger's notion of a 'Community of Practice' (CoP) (Wenger, 1998).

The pedagogic design was intended to make 'living conditions' for the three core values from CoP; 'mutual engagement', 'joint enterprise' and 'shared repertoire' (Wenger, 1998 p: 72-73).

- The mutual engagement was conditioned by a shared responsibility to carry out parts of a larger assignment, that wouldn't be complete without the individual parts. Furthermore, the mutual engagement was catalysed by assignment of roles to the group members.
- Joint enterprise was conditioned by the formulation of the assignment
- The shared repertoire refers to a shared set of Web 2.0 tools for solving the tasks and a shared language for discussing the solving of the tasks.

These three core values were combined with the PIES from 'Collaborative Learning' (Kagan, 1989). The PIES are:

- Positive interdependence
- Individual accountability
- Equal Participation,
- Simultaneous Interaction

In retrospect, the pedagogical design was an attempt to create an alternative use of Cooperative Learning (CL) that combined the notion of CoP with the PIES. CoP focuses on 'shared repertoire', conversely, CL focuses on 'simultaneous interaction'. I wanted to combine a focus on 'shared repertoire' with a focus on 'simultaneous interaction'. The combination of the two notions also combined the philosophical concepts of a 'plateau of intensity' in a rhizomatic, 'self-organizing chaosmos'. The plateau should be reified in the simultaneous co-creation in the Web 2.0 tools leading to an academic product.

The co-creation processes reified in the Web 2.0 tools was intended to generate plateaus of intensity.

When reflecting on the pedagogical design today, the most important element appears to be, that the pedagogic design may be used as inspiration for the students' teacher training (internship) and in their future practice. The pedagogical design suggests to the students that teaching is conceivable as a 'deign' (a transitive object of knowledge) and not only as an 'intransitive' object that can not be understood fully. When reflecting on the article, the article also indicates that it may be important to develop explicit categories for understanding the ideas behind the practice. In this case, the categories are borrowed from CoP.

The intended CoP in the lessons may be visualised in the diagram below (figure 39). The orange encirclement marks the four students working in a group on a sub-theme. The green encirclement marks the other groups with each their sub-theme. Each editor has a 'transactional connection' to the corresponding editor in the other groups. The 'transactional

connection' is connecting the periphery of one group to the periphery of another group through the editor roles.

The 'transactional connections' help form a shared repertoire within the discourse of the Web 2.0 tools. For instance, the timeline tool, TikiToki, proved to be the most difficult for the editors to get to work, so the timeline editors used each other more than the other editor-groups as technical help to use TikiToki.

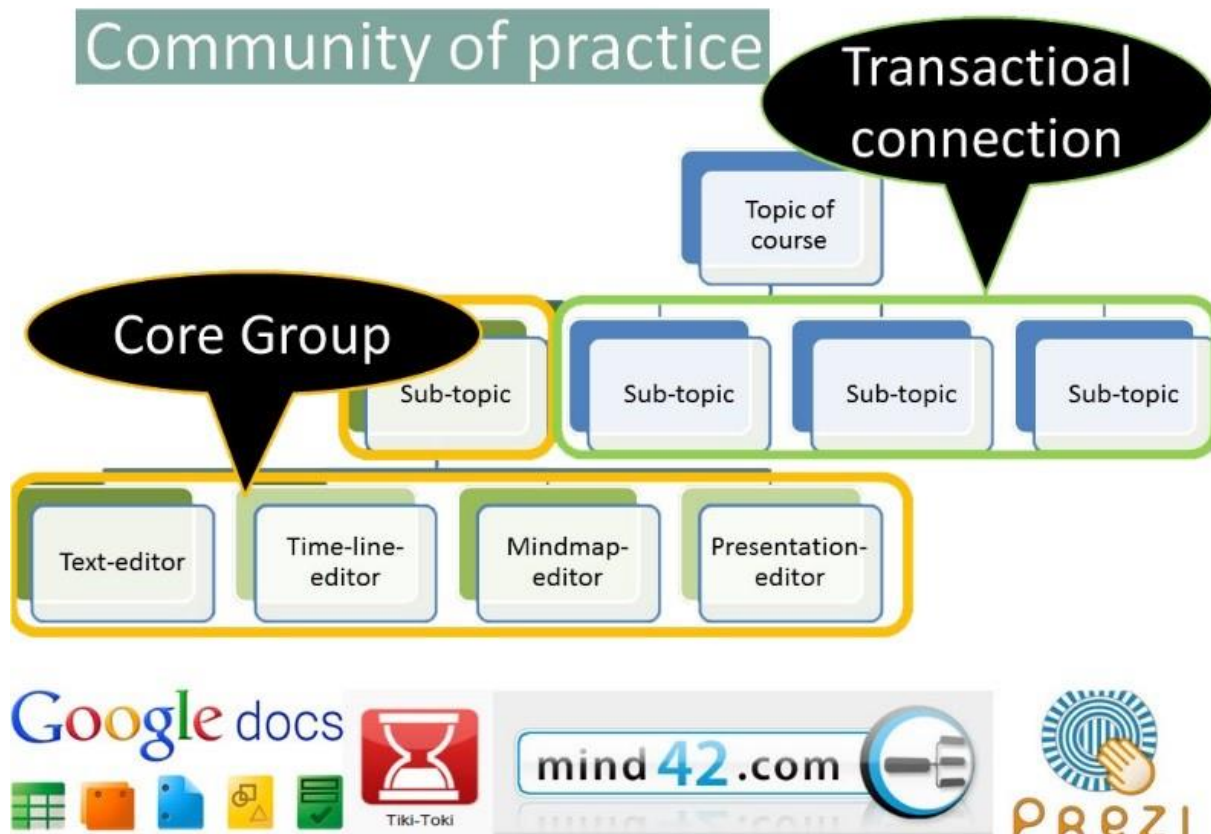


Figure 26 Schematic view of the collaboration in the CoP

The 'core group' has a subdivided task from the main assignment. Within that task, the group members have each their role. The roles are editor roles in one of the web 2.0 tools. Each group has an editor in each Web 2.0 tool, which means that the group members rely on each other and that the editors rely on each other, which were intended as an important factor in the formation of an actual CoP.

7.2.3 CO-CREATION IN WEB 2.0 AS CATALYST FOR THE COP

In hindsight, the pedagogical design had several implications. Hence, I believe it is important to note the following:

- The laptop computer became the centre of attention
- The Web 2.0 tools conditioned and determined the activities based on the actual functionality of the tools.
- The practical task of operating the Web 2.0 tool became a part of the lesson

- Students might show more interest in the Web 2.0 tools than in the academic subject

The pedagogic design was investigated in several academic topics; ‘The history of the Common Wealth’, ‘Schools in Britain’, ‘World English’ and ‘Poetry’.

In the case of ‘Poetry’, the first two lessons were lectures on the key features of poetry. These key features then created the framework for subdividing the main theme into sub-themes. Each group would then choose a sub-theme. Each group would also distribute the editor roles among the group members.

The first Prezi presentation was prepared by the lecturer and it also served as a collection of resources. The Prezi for the ‘Poetry’ theme looked like this:



Figure 27 Excerpt from the Prezi on poetry

Later on in the lessons, the Prezi-editors from each group would start building the presentation of their groups’ sub-theme. The presentation of each sub-theme was built simultaneously by all Prezi-editors. When the Prezi-editors were done building their part of the presentation the Prezi looked like this (from British History):

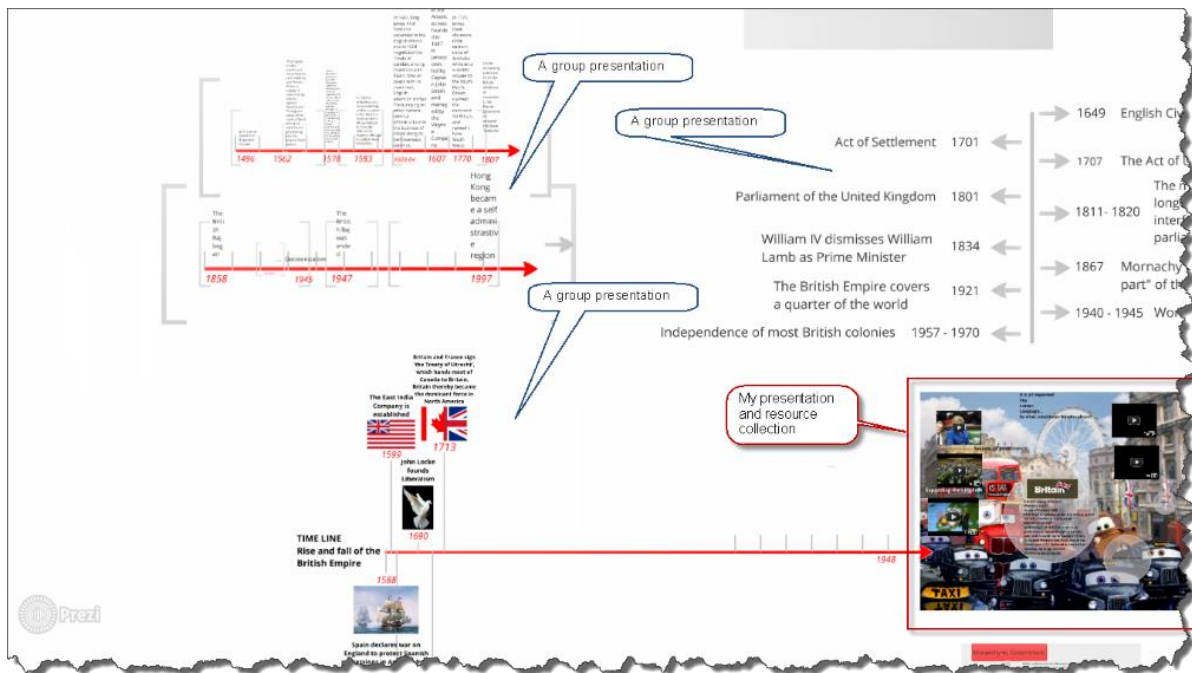


Figure 28 Excerpt from Prezi after Prezi-editors made their contributions

Each group would have a ‘Prezi-editor’, a ‘Google doc editor’, a ‘Mindmap editor’. The additional editors/Web 2.0 tools depended on the theme of the course.

When reflecting on the roles of editors it stands out as a very important trait of the pedagogical design. The fact, that the editors needed to familiarise themselves with a Web 2.0 tool and create content that the other group members could use for their part of the assignment, meant that the students had to develop technological literacy to make the Web 2.0 tool work.

7.2.4 CRITIQUE OF THE PEDAGOGICAL DESIGN

The pedagogic design presents a way of utilising the students own laptop computers and relevant Web 2.0 tools in English lessons at Teacher Education. The laptop computers got a new role in the position/practice system of the classroom. It became the catalyst, which made the pedagogical design possible. There were no PPT and no ‘lurking’ at the back row of a lecture. The students participated actively and there was a sense of engagement in the classroom, however, it is unclear if the participation was mainly in the techniques of the Web 2.0 tool or in the academic topic. This unknown state of participation is considered a real concern.

7.2.5 REFLECTING ON THE DOUBLE PURPOSE OF THE PEDAGOGICAL DESIGN

The pedagogical design had a double purpose; one being to learn about the academic topic another being learning to study in a Web 2.0 based pedagogical design. When reflecting on the double purpose it stands out that it is unclear if the double purpose compromises the students’ academic outcome of the course. This notion leads to the ethical consideration if it is reasonable to make pedagogical designs that might compromise the depth of academic learning.

In this article the pragmatic strength of the pedagogic design proved strong enough to actualize the concept presented in the pedagogical design, however, the ideological transfer was less strong. It appears as if the students understood their tasks as individual ‘pieces to a puzzle’. The ‘finished puzzle’ didn’t stick out as the main, joint effort that it was intended to, which in turn means that the pedagogical design was more pragmatic than philosophical. In Deleuzean terms, the virtual (ideas, thoughts) were detached from the actual (practice, acts). This notion indicates that Bhaskar’s notion that the ‘structural conditions’ precede the ‘social interaction’ applies to this context (see chapter 3 for elaborate description). In the context of the article, the pedagogical design was used in different English courses, however, only once in every course due to time constraints. The fact that the same group of students didn’t get to work with the pedagogical design iteratively, presumably explains why we mainly established ‘structural conditions’ and didn’t get to develop ‘social interactions’.

In short, the actualising of the pedagogical design in the course limited the potential of the virtual ideas due to structural conditions (new collaboration forms and student roles). I presume that a second iteration of the pedagogical design with the same group of students would have changed the focus of the course from a focus on the practicalities of getting the Web 2.0 tools to work, to a focus on the academic content.

7.3 ARTICLE 3 ‘OPENS SOURCE LEARNING STREAMS IN ONLINE DISCUSSIONS IN E-LEARNING’

This chapter reflects on the article ‘Opens Source Learning Streams in Online Discussions in e-learning’ (Kjærgaard & Sorensen, 2014a).

The inspiration behind the pedagogical design came from two metaphors used to describe the practice of reading and the practice of being online; ‘*ploughing through a book*’ and ‘*surfing the net*’. These were used as ideational starting point in the Action Research cycles (4 in total) leading to the actual design.

7.3.1 MIND OVER BODY

Reading books may be referred to as ‘ploughing’ through a book and a reader can be referred to as a ‘book worm’ (Cambridge Dictionary, 2016a; Cambridge Dictionary, 2016b). Both metaphors indicate a process of going deeply into the matter. A plough, for instance, goes deep into the soil to release nutrition from the layers of soil beneath. So when the metaphoric use the word ‘plough’ is applied to the process of reading it indicates that reading is potentially deep and ‘fortifying’. The process of deciphering the text and making sense of the text arguably happens mostly in the mind of the reader.

7.3.2 BODY OVER MIND

Being online can be referred to as ‘surfing the net’ and the internet user can be referred to as a ‘surfer’ (Macmillan Dictionary, 2016). This is a slightly ambiguous metaphor. The process of ‘surfing’ is described as the moment when a boat reaches a speed where it is lifted out of the water to sit right on the surface of the water with an added increase in speed. The most surfboard can only carry the weight of the surfer when the board is in rapid movement. Surfing is, in this understanding of the word, fast and superficial, however, the surfer is extremely engaged in the bodily act of surfing. Surfing could be interpreted to the combined action of muscle memory and mental focus. In that sense, it makes a ‘transcendental field’ of sensing the water, the movement of the board and immediate correction of movements in relation to the sensation of the water and the board.

When reflecting on the metaphors they could indicate a dichotomy between reading a book and being on the internet. The dichotomy could be expressed with binary oppositions:

- Deep/superficial
- Slow/fast
- Mind/body

It was the intention in the pedagogical design in this article to combine the engagement in the surface with the nourishment in the deep. Furthermore, it was the intention to slow down the processes of being online and share the ‘deep’ experiences of acquiring new knowledge.

7.3.3 DESCRIPTION OF CONTEXT

The context of this article was an Action Research project carried out at UCN spring of 2013-fall 2013. The project developed an e-learning course for in-service teachers (Course code

C10373a2). During the meetings in the Action Research cycles the involved lecturers (7 lecturers) and I discussed which elements of a traditional lesson were crucially important. These elements should preferably be maintained in the process of designing the e-learning course. The lecturers also discussed which element of a traditional lesson they didn't appreciate. After that, we deliberated a shared understanding of the essentials of a lesson and inexpedient elements of lessons.

Through a deliberation process (card-sorting) it became evident that academic dialogue with students was the most important element of a traditional lesson according to the lecturers in the Action Research group. Dialogue with students was regarded as the essence of a lesson. In the cards from the card-sorting 'dialogue' is represented by terms like Debate, face2face, dialogue, conversation.

On the other hand, the lecturers would like to do less PPT instruction. PPT were regarded as monologic and controlling.



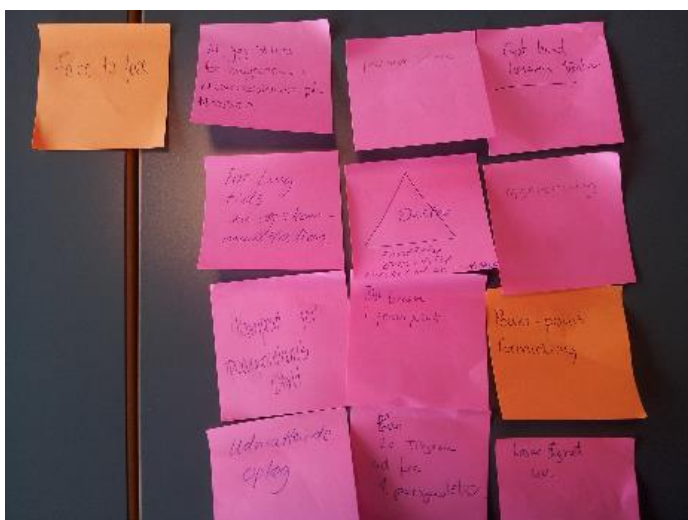
The teachers' 'Post-it' notes from the card sorting session. The question is; 'what is the most important element in a traditional lesson?'

18 notes in total

10 refer to the conversation between teacher and students.

5 notes refer to the relation between theory and practice

Figure 29 Card sorting: What to keep - dialogue



The teachers' 'Post-it' notes from the card sorting session. The question is; 'what would you like to have less of in a traditional lesson?'

13 notes in total

8 refer to monologic presentation facilitated by PowerPoint.

Figure 30 Card sorting: What to let go of - PPT

So, these two extremes; ‘no PPT instruction’ and ‘all dialogue’ were used as yardsticks for assessing the pedagogic design.

When reflecting on the process, I came to doubt whether the lecturers and I shared the same definition of ‘dialogue’. The individual lecturer’s understanding of the word ‘dialogue’ presumably varies, so any exchange of language could be interpreted as dialogue.

So, in reality, what the lecturers really appreciate is interaction with students and not necessarily ‘dialogue’ in the academic definition used in this thesis. So, a wish to develop a practice of less monologic PPT and more interaction with students was a more accurate description of the purpose of the pedagogical design. The philosophical consideration was to create a space for ‘entelechy’, that is a space for the students to think and act on the basis of their new knowledge.

Video-based content and online discussions

The two core components in the pedagogic design were video clips produced by the lecturers and online discussions in the LMS. The lecturers were taught how to make their own videos and they developed a rhetoric for designing assignments for ODF.

So, the aim with the pedagogic design is to take the dialogic conversation identified by the lecturers in traditional teaching and reorganise it to fit the structural conditions of e-learning. The syllabus would describe which texts to read and then on every Thursday at 5pm a new video would go online and the lecturer would start a new thread would in the ODF with the topics for discussion. Even though one of the benefits of e-learning is that the students can study on their own time, the students said that they would arrange their studies to be on Thursday afternoons.

7.3.4 REFLECTING ON FINDINGS

The students experienced a focus on their individual learning process that they hadn’t experienced in traditional teaching. The ‘e-lesson’ had no forward momentum in itself like a traditional lesson would have. The only progression was the instructions in the syllabus (read this, answer this etc.). The ‘e-lesson’ didn’t vehicle itself. So, the study experience is that the student is the driving force in her/his own learning process. There were no ‘nursing’ mechanisms, the pedagogic design relied on a heutagogic approach to learning, which proved to be slightly misjudged. The lecturers said that some students would call them to get ‘directions’ and to get confirmation that they were on the right track instead of asking in the ODB. They would ask question to the academic content, the tasks and to the techniques of the technologies deployed in the course

The students interpreted the fact that the videos could be watched several times as a stress relief. The fact that they could revisit the video-clip made them watch more consciously because they didn’t have to take everything in at once. They watched the videos between 2 and 6 times with an average of 3 times. Only the first viewing was done without skipping, during the next views the students skipped for specific content in relation to the tasks they should solve. So, the students watched the videos at full length once or twice and skipped

through it several times up to a maximum of 6 times. This practice indicates that the practice of using PPT described in Chapter 5 presumably could benefit from having a recording of the presentation of the PPT slides.

When reflecting on the aspirations of the ODF the aim was to generate dialogue between students, however, the students would primarily answer the questions in the tasks from the syllabus. The syllabus also suggested/demanded that the students should contribute to other students posts, however, this proved slightly difficult in practice. The reason for this was, presumably, that the academic content was theories on reading and literacy. So, the students were asked to discuss theories while still learning about them. It was, thus, ‘theory without practice’ meaning that the students could only contribute with what was in the theory texts and the video-clips, meaning that their collective body of discussion material was limited.

7.3.5 APPROXIMATED SYNCHRONICITY

In some cases, the students would discuss details in the theories with each other, this mainly happened after the lecturer had made herself known in the forum. The indication that the lecturer’s visibility triggered more posts from students led to the notion that a specific timescale for the e-lessons properly is a good idea.

This leads to the notion of ‘approximated synchronicity’. ‘Approximated synchronicity’ refers to the finding that a substantial part of the interaction in the ODF took place in a relatively short amount of time. The ‘approximated synchronicity’ of the interaction opened for a possible exchange in a short timescale that in turn created more activity in the ODF. The notion of ‘approximated synchronicity’ is, however, a problem when the students actively chose an e-learning course in order to study on their own time. If the ‘best practice’ of the course becomes an approximate synchronicity on Thursday afternoons then it becomes a disadvantage to the student, who are not able to study on Thursday afternoons. It became evident that it was difficult to participate in a forum thread after all the other students have posted their contributions. The students experienced that all the right answers were given and that made it difficult to participate outside of the de-facto timescale of the e-lesson.

7.3.6 CRITIQUE OF THE PEDAGOGICAL DESIGN

The possibility of an ‘aionic’ timescale that the video clips provided was corrupted by the slight stress factor of the approximated synchronicity of the ODF. The students were set free from one timescale and locked in by another timescale. This interpretation of the situation indicates a new problem in the relation between traditional teaching and e-learning. A problem that arises, when the design conditions are based on experiences with traditional teaching. In designs where e-learning pedagogies utilise synchronous mechanisms of exchange (twitter, ODF, cMOOCs etc.) to enhance the pedagogies then asynchronicity, which is interpreted as one of the founding principles of e-learning, loses its value.

The importance of ‘simultaneous interaction’ (inspired by CL) experienced in this article is sustained by experience from the latter article (Rhizomatic learning in a digital habitat). In the latter article, the possibility of simultaneous collaboration was assessed more important than the possibility to work on the project anytime, anywhere.

In hindsight, the most important findings were:

1. lecturer produced video clips opened for an 'aionic' timescale governed by the students. This allowed the students to focus on the content without the stress of having to decipher the content, take notes and understand the content at once.
2. ODF conversation that seeks to catalyse OSLS seemed to entail approximated synchronicity, which stood in opposition to the free timescale of the e-learning design.

The experience of the contradiction between 'aionic' time and approximated synchronicity leads to a hybrid design that seeks to bring 'aionic' timescales and approximated synchronicity together.

7.4 ARTICLE 4 ‘WHEN INNOVATIVE INSTRUCTIONAL DESIGNS ARE TOO INNOVATIVE – LACK OF SCHEMA’

This chapter reflects on the article ‘When Innovative Instructional Designs are too Innovative – Lack of Schema’ (Kjærgaard & Wahl, 2015).

The article presents a philosophical discussion of how lecturers and students may develop analytical categories for navigating in changing pedagogical practices.

The inspiration for the article was found in an action research study carried out by a research group at UCN (DUIT) Annette Pedersen, Annegrethe Nielsen, Niels Bech Lukassen and Christian Wahl (Niels Bech, Pedersen, Nielsen, Wahl, & Sorensen, 2015; Wahl, Pedersen, Nielsen, Lukassen, & Kjærgaard, 2015).

The issue that this article seeks to address is whether the explicit development of shared categories for understanding pedagogic designs may help the shared understanding of changing circumstances for teaching and learning. This issue relates to the ongoing development of a shared ‘learning design’ at UCN referred to as ‘Reflective Practice-Based Learning’ (University College North, 2015). So far, the definition of ‘Reflective Practice-Based Learning’ is open for interpretation (Pjengaard, 2016) and according to UCN, it is supposed to remain somewhat open, while a firmer definition is also developed. Reflecting on the relation between the conclusions in this article and the wish for openness in the definition of ‘Reflective Practice-Based Learning’ it indicates a potential clash. If the definition is too open then it may become difficult to distinguish ‘Reflective Practice-Based Learning’ from other ‘learning designs’ and if the definition is firm ‘Reflective Practice-Based Learning’ may dictate certain pedagogies on the programmes in UCN, both of which is inappropriate. In ‘The Larnaca declaration on learning design,’ the authors compare ‘learning designs’ to music notation meaning that a ‘learning design’ can be a ‘grammatology’ of teaching (Conole, 2012 p: 114; Dalziel et al., 2016).

Following that analogy, the notation has to be precise enough to convey the intentions of the musical piece and for the musical piece to be recognisable and at the same time the notation has to be open enough to make room for creative deployment of the notation (play music). What was learned from doing the action research cycles (described in (Wahl et al., 2015)) that this article elaborate on is that balancing between ‘too firm’ and ‘too open’ is a difficult and that it may require a shared vocabulary for articulating the intentions and borders of the concrete pedagogic design in the lesson, that rests upon but exceeds the ‘learning design’.

7.4.1 DESCRIPTION OF CONTEXT

The action research study developed and investigated a different pedagogic design applied to a course at Nurse Education. The purpose of the pedagogic design was to encourage the nurse students to engage in a non-core course by rearranging the lesson. The lessons in the course used to be, primarily, driven by PPT instruction, which both the lecturer and the students found demotivating, so the new pedagogic design attempted to revolve less around the lecturer’s PPTs and more around pedagogic activities. The Lecturer recorded her presentations in small video clips for the students to watch before the lessons and arranged

additional web-based content in the LMS for the students to familiarise themselves with in preparation for the lessons. The development process was a joint effort between group members in the aforementioned research group, however, the lecturer was alone in the practice of deploying the pedagogic design, which led to slight frustration on her part. The lecturer's reflections and the students' evaluations of the pedagogic design led to the philosophical discussion of how to develop analytical categories that could help form relations between the new elements in the design and the habits of the students from the prior lesson design.

7.4.2 DEVELOPING CATEGORIES TO BRING VIRTUAL IDEAS TO ACTUAL PRACTICE

The article inspired the development of categories for discussing pedagogic designs presented in chapter 8. Reflecting on the article now, the philosophical approach to understanding the possibility to make 'diagrams' and 'schema' that formulate the possible points of focus, helped us hone in on ways of simplifying the process of communicating the ideas. In hindsight, the article addresses the Deleuzian notions 'the pedagogy' of a concept and the 'consistency' of the concept (see Chapter 6.1.1), that is to acknowledge that teaching is not just teaching and in order to understand teaching as changing and changeable phenomenon explicit categories, practice and vocabulary may be needed.

The lecturer, who conducted the lessons expressed that a strong focus on the process of getting the students to empathise with the pedagogic design before actually starting the course proved to be very important. The students were presented with a reimagined notion of what a lesson is and of how they should prepare for a lesson without having empathised with the ideas behind the pedagogic design leading to frustration, according to the lecturer (Niels Bech et al., 2015; Wahl et al., 2015).

Reflecting on the connection between the action research cycles, mentioned above, in relation to the development of 'Reflective Practice-Based Learning' it appears to me as if we (the programmes in UCN) might benefit from agreeing on a simple set of benchmarks for designing and sharing pedagogical design that corresponds with the general 'notation' in the 'learning design'.

This thesis suggests a framework consisting of 4-5 benchmarks stitched together by DT of which dialogue, content and extended focus on activities in smaller study groups (see Chapter 8.5).

7.5 SUMMING UP THE REFLECTION ON THE ARTICLES

The experiments presented in the articles were designed to investigate ways of utilising the students' DT to find a different approach to the political notion of 'densification' and turn it into a pedagogical term.

The research questions were:

1. How can lecturers design 'densified' lessons that focus on dialogue facilitated by the use of digital technologies?

And the question leads to three areas of interest:

- a) How is DT utilised in a lesson in University College?
- b) How can DT facilitate and catalyse dialogue?
- c) What constitutes relevant affordances of DT in a lesson at University College?

The first question is nested in the students' and the lecturers' clear expression of the importance of dialogue in lessons. The pedagogical designs in all four articles present ways of setting up the conditions for dialogue assisted by DT.

The first question is also nested in the political notion 'densification'. The 'densification' process is assisted by an augmented focus on increasing the students' workload to match a 'normal' work week (37 hours in Denmark). The average teacher-student in Denmark (2010) works 31,1 hours a week on his/her studies according to the European report Eurostudent and a Danish report made by Damvad (C. P. B. Hansen, 2011; Ministry of Higher Education and Science, 2010). This indicates that the workload could be increased. However, the number of lessons of supervision sessions can't be increased. This means that the students have to increase the workload outside of the lesson and supervision time. Hence, the pedagogical designs focus on extending the possibility for dialogue further than the lesson.

In the articles, the notion of denseness was displaced from the lecturer to the student. In 'The Immanent Critique' the 'densification' affected the denseness in lecturers' presentations. That is the amount of time spent presenting PPT slides and amount of 'headlines' in bullets on the slides. Lecturer 22 said; 'I have never used PPT so extensively, since the reform of the Teacher Education in 2013'.

7.6 CONCLUDING COMMENTS TO THE REFLECTIONS ON THE ARTICLES

Based on the reflections it is deemed possible to reimagine the notion of 'densification' by the means of DT as suggested in Teacher Education Act, Add 5. However, it seems to be a more individuated and complex affair than first assumed. Therefore I suggest a focus on the 'problematic field' of the context, be it virtual or actual.

Suggested steps in the reimagining process:

- The first step would be to define and identify the ‘problematic field’ in a given context and analyse how that ‘problematic field’ could become the focal point of the lessons.
 - What is the most important interaction between lecturer and students and between peers in relation to the learning objectives in the curriculum and the assessment criteria defined for the exam?
 - E.g. in English lessons the ‘problematic field’ could be defined as a conversation in English about curricular subjects. The conversation then becomes the element to isolate and spend lesson time on. This means that the content of the conversation must be learned before the lesson.
- The next step would be to determine which other elements of the curriculum to reimagine in a digital context.
 - Could instructions and presentations be re-semiotised to video
 - E.g. in an English lesson most of the content could be presented in video clips before the lesson.
 - Could the activities in the lesson be carried out during preparation
 - E.g. in an English lesson the initial clarifying debate on the topic could be had in an ODF before the lesson.
- The last step would be to organise the lesson to accommodate to the ‘problematic field’ and by that also to establish shared categories for conveying the intentional ideas and suggested practices.

In hindsight, the three steps listed above represent the overall aim in all the articles: to hone in on what necessitates physical and simultaneous togetherness and what could be done in other ways. In the case of this thesis, these ‘other ways’ are focusing on what activities and forms of organisation digital technologies could catalyse, but the assumption is that the ‘other ways’ might as well be ‘analogue’.

PART 3

8 FRAMEWORK FOR DEVELOPING LEARNING DESIGNS AT UCN

It is the purpose this chapter to present a framework that may inform the further development of UCNs learning design, ‘Reflective Practice-based Learning’ (University College North, 2015) and that may inform the development of different uses of DT in lessons. This chapter presents ways of developing ‘The Full Circle of PPT’ in a more dialogic direction. The chapter also seeks to explore the immediate possibilities for changing the organisation the lessons from classes of 25-40 students to smaller communities of 7-10 students and a lecturer. It is important to note that the experiments inspiring this chapter are in accordance with curriculum, policies, economic situation and the general organisation of UCN.

The empiric data for this chapter is the entire thesis, the past research and two additional surveys conducted at Teacher Education with the main purpose of qualifying the framework (see Appendix 4, surveys 5 and 6).

The framework is constituted by the claims and notions in the strategic and political documents regarding University Colleges in Denmark in general and UCN in particular. The documents include (Ministry of Higher Education and Science, 2010; Ministry of Higher Education and Science, 2013a; Ministry of Higher Education and Science, 2013b; Ministry of Higher Education and Science, 2015b; University College North, 2015);

- UCNs ‘Development Contract’ implies that the framework should include:
 - Increases in quality of teaching through increased use of DT
 - Increased student activity
- The Teacher Education Act 2013 and supporting documents implies that the framework should include:
 - A reimagining of the term ‘densification’
 - The notion of achieving more situations where smaller groups of students and lecturers are together, partially, through the use of DT
 - Increasing quality of teaching by the use of digital learning materials
- UCNs learning design; ‘Reflective Practice-based Learning’ presents a series of desired ways of learning at UCN that the framework should include:
 - Learning a theory close to the practice that the theory informs
 - Reflecting on the processes that may lead to learning
 - The object of learning is based on how it can be used in practice.
 - The process of learning is deemed more important than the product
 - The students should preferably be creative (University College North, 2015)

This echoes the four core anchorage points presented in chapter 1.1.1:

- Digital Technology

- ‘Densification’
- Study Activity
- Dialogue

These four formal anchorage points are combined with the selected Deleuzian concepts presented in chapter 4 and an attempt to design ‘pedagogic hybrids’ that uses the dialogic focus in the pedagogy of Scholastics.

The formal purpose of this chapter is to address the first research question in this thesis:

How can lecturers reimagine ‘densified’ lessons to focus on dialogue facilitated by digital technologies?

The suggestions for development also encompass one of the three areas of interest that:

- b) How can Digital Technology facilitate dialogue?

Designing the framework also entails the use of empiric data to get knowledge of what students and lecturers think is important in a framework for a ‘learning design’.

8.1 THE STUDENTS’ ASSESSMENT OF THE VALUE OF DIALOGUE IN A LESSON

This section presents the results of the student survey on the students view on dialogue in lessons. The population consists of 220 replies of approximately 1000 possible respondents from Teacher Education, UCN. When asked to name one element of teaching at Teacher Education that the student values higher than any other, the students express the following (full text in Appendix 4, survey 6):

‘It is important to me that the teacher remembers to let us, the students, discuss and converse occasionally – I value that highly and, for the most, I learn most from that.’ (translated from Danish)

‘Det er vigtigt for mig at læreren husker at lade os studenterende samtale indimellem - det sætter jeg stor pris på og lærer jeg som regel også mest af.’ (Original student response)

Another student, also from Teacher Education, goes into detail describing the circumstance for the dialogue. The student addresses group work as the ‘event’ where he/she feels a positive sense of responsibility for his/her own learning.

‘Group work is very important to me it makes me feel that I’m responsible/reason for my own learning.’ (translated from Danish).

‘Gruppe arbejdet, er meget vigtigt for mig, det gør at jeg føler jeg er skyld i min egen læring.’ (original student response).

Lastly, a student from Teacher Education addresses the importance of having a dialogue with peers.

'It is important for me to have academic dialogue with my peers.' (translated from Danish)

'Det er vigtigt for mig at have faglig dialog med mine medstuderende.' (original student response)

Many of the student statements express similar experiences, which is that they regard dialogue as a very important part of their learning process. They value lessons that leave time for different kinds of dialogue.

- 1) Dialogue within the timescale of the actual lesson with the lecturer
- 2) Dialogue within the timescale of the actual lesson with peers and lecturers in group work adjoining a lesson
- 3) Academic dialogue with peers outside the timescale of the lesson.

So, they value a relevant academic theme to talk about and relevant conversation partners in the lesson. This notion becomes the first cornerstone in the framework.

8.2 THE LECTURERS' ASSESSMENT OF THE VALUE OF DIALOGUE IN A LESSON

This section presents the results of the student survey on the students view on dialogue in lessons. The population consists of 38 replies of approximately 90 possible respondents from Teacher Education, UCN. When the lecturers are asked the same questions they respond very similarly:

'Academic dialogue and the joy of the subject itself.' (translated from Danish)

'Faglig dialog og glæde for faget selv.' (original lecturer response)

Another lecturer puts it this way:

'It is important to me to have an academic dialogue with my students.' (translated from Danish)

'Det er vigtigt for mig at have faglig dialog med mine studerende.' (original lecturer response)

The importance of the academic subject is more protruding amongst the lecturers than amongst students. The students are more concerned with the actual circumstance for dialogue. This difference is essential because the slight displacement towards the academic subject amongst lecturers and the clear displacement towards dialogue amongst students may reveal a discrepancy in the 'interest' of the lecturers and the 'desire' of the students. The notion of the importance of academic content becomes the second cornerstone in the framework.

8.3 DEFINING DIALOGUE

This section introduces a definition of 'dialogue'. The definition presented here is the definition used throughout the thesis.

Dialogue is, in this thesis, defined as ‘thinking together through language’ (Greek: dia-logos - through speech/reasoning (Oxford Dictionaries, 2015a)).

Deleuze uses the word ‘dialogue’ as a descriptor of an exchange of thoughts. Deleuze opposes the expression of ‘thought’ in conversation to ‘antidialogue’. ‘Antidialogue’ is if the actants bear ‘*an interiority of the concept as a means of control*’ (Deleuze & Guattari, 1987 p: 378). The ‘interiority’ of the concept is an ‘impersonal’ intervention that controls thought according to Deleuze. Deleuze quotes a passage from German poet/playwright Kleist’s ‘*The Gradual Formation of Ideas in Speech*’, where he defines the ‘antidialogue’ as the relay exchange of utterances that happen so swiftly that either one of the actants have time to think. The relay function of conversation is a power relation indicating that the actants bear an ‘interiority of the concept’ (fundamentalism of the concept) and not an ‘exteriority of a concept’ (openness). The aim of ‘antidialogue’ is not to develop, it is to impose, according to Deleuze (Deleuze & Guattari, 1987 p: 378). In that sense, some uses of PPT may be seen as a tool for ‘antidialogue’, if the bullets on the slides pass by so quickly that there is no time to think or reflect.

It is not evident if the lecturers and students who responded to the survey (Appendix 4, Quantitative statements 5 and 6) interpret the word dialogue the same way as it is intended in the survey questions. Therefore, it seems important to define what meaning of ‘Dialogue’ is intended in this context.

This chapter uses five interrelated terms that describe types of conversation in specific contexts and for specific purposes, these are; antidialogue, debate, discussion, dialogue and deliberation (Deleuze & Guattari, 1987; Gadamer, 1983; Littleton & Howe, 2010; Rockwell, 2003)

	Antidialogue	Debate	Discussion	Dialogue	Deliberation
Aim	Power	To win the right to conclude	To bring forth multiple arguments and talk them through in order to find the best solution or to agree in disagreement	To raise questions and to think together. To listen without passing judgment. To find consensus	To critically analyse topic and possibilities in order to come up with a common solution.
Arena	Politics Siblings	Politics	Politics, development, organisations, lecturers, students	Development, education, private life	Politics, organisations, Scholastics
Actors	lecturers students Leaders	Politicians + anchor lecturers students Leaders	Participants and maybe a chair and a rapporteur lecturers students Leaders	Participants + facilitator to create rhetorical framework lecturers, students	Participants + facilitator lecturers, students

Table 14 Typology of conversation

The type of conversation that is strived for in the framework is ‘dialogue’ as defined above. It may be an idealistic approach to educational conversation, because as the investigation in Chapter 5 indicated, the students may be looking for comprehensible answers and not always

intriguing questions. The notion that students can ‘think together’ indicates a deontological approach to learning, where thinking and sharing knowledge may be understood as an ethical obligation. This notion is further developed in the chapter ‘Can you think with me’ by Tartas et.al. in the book ‘Educational Dialogue’ edited by Littleton and Howe (Littleton & Howe, 2010 p: 64).

In that context, exams and tests appear to be ‘contractions’ that an arborescent external interest designs for impersonal purposes. The idealistic aim of the dialogue may instead be rhizomatic connections to vitalistic entelechy amongst students. Put boldly, the desire to learn may be the desire to life, according to Deleuze, and desire in itself becomes desirable, so desire is both the process and the product (Colebrook, 2001 p: 135).

So, in a Deleuzean sense, the desire of the student may not be to get admitted to University College, it is not to pass exams, it is not to get a job afterwards but it is to become continuously more aware of how to become a greater teacher, nurse, occupational therapist etc. For this turn towards the future practice of the students to be possible in today’s organisation of the programmes, it may be necessary to address the student’s role in the theoretical part of the education. A teacher student has 18 weeks of internship during a 4 year programme, which means that the theoretical part of teacher education is considerably more extensive than the practical part. Hence, the wishes in UCNs ‘learning design’ to develop practice-based learning is contested by the formal distribution of lessons and periods of internship. The framework seeks to support other ways of addressing the actual ‘problematic field’ of the Deleuzean idea of ‘becoming’ in relation to ‘becoming teacher’.

8.3.1 THE DEONTOLOGICAL TURN – LEARNING FOR LIFE

The articles supporting this thesis are attempts to experiment with ‘deontological pedagogies’. The deontological approach is brought on by a belief that society may continue to get more and more complex and the need for different types of education will continue to increase (Gee, 2013; Postman, 2011; Vinge, 2008). However, the articles (see Chapter 7) also carry the paradoxical believe that teleological, functionalistic education both may have outlived itself and still contains necessary traits at the same time. Which indicates that an important task for the framework is to balance; rigour, academic content, organisation, exams etc. with student agency, creativity, independence, networked learning (authority with independence) etc.

Deleuze researcher Michael Hardt put it this way in his book ‘Gilles Deleuze - an apprenticeship in philosophy’:

‘Perhaps the most important single tenet of liberal democratic theory is that the ends of society be indeterminate, and thus that the movement of society remain open to the will of its constituent members. The priority of right over good is thought to insure that the freedom of society’s development is not constricted or closed by an externally determined telos. This political refusal of teleology leads directly to a philosophical refusal of ontology, because ontology itself is presumed to carry with it a transcendental determination of the good. Deontology, then, is the only philosophical position that can support a democratic society open to a multiplicity of ends.’ (Hardt, 1995 p: 120)

Such claims may be idealistic, however, it could be understood as a countermovement to appears to an educational system directed by teleological logics, and not necessarily by deontological, democratic views (Hill, 2012; Schmidt, 2016). The deontological view on education would be to understand education seen as a constant process of edification and not as a ‘means to an end’, as formal education might do today, according to Hill and Schmidt.

In a Deleuzean understanding of learning the ‘act of learning’ and the ‘content of learning’ are equally real and important. As discussed in Chapter 6, Deleuze uses Heidegger’s example of ‘the swimmer’ to exemplify his understanding of what is important in a learning process, which in layman’s terms is; ‘*do not separate swimming from water*’. The virtual concept of swimming and the actual movement forwards in water is an assemblage of the actual and virtual in a reality that includes both the content of learning and the act of learning. This notion may be traceable back through the history of pedagogy (Comenius, Dewey etc.) and it has derived a series of allegories and proverbs like the infamous misquotation of Benjamin Franklin; ‘*tell me and I will forget, teach me and I may remember and involve me and I will learn*’, which in fact is a rewriting of an old Chinese proverb by the ancient Chinese philosopher Xunzi (Knoblock, 1994). What Franklin addresses through Xunzi is a progression from a simple instruction to a complex community of involving practice. It may not be a matter of involvement being better than instruction it is a matter of making a rhizomatic assemblage of ‘telling’, ‘teaching’ and ‘involving’ that interrelate in connection to the progression for the student.

Danish philosopher Søren Kierkegaard also addressed the role of the teacher and the needs of the student in his poetics; ‘*Views on my Authorship: A straight forward message. Report to the history*’. Kierkegaard writes that the teacher should understand the level of knowledge and experience and the needs and abilities of the student before he/she engages in teaching. The teacher should also be interested in how and what the student learns from the lessons. Kierkegaard writes:

‘To be a teacher is not to say: This is the way it is, nor is it to assign lessons and the like. No, to be a teacher is truly to be the learner. Instruction begins with this, that you, the teacher, learn from the learner, place yourself in what he has understood and how he has understood it, if you yourself have not understood it previously, or that you, if you have understood it, then let him examine you, as it were, so that he can be sure that you know your lesson. This is the introduction then the beginning can be made in another sense.’ (Kierkegaard, 1948; Kierkegaard, Hong, & Hong, 1998 p: 46)

The quote investigates what Deleuze calls the relation between the ‘Same’ and the ‘Other’ and instead of focusing on the students’ vitalistic entelechy, Kierkegaard stresses the importance of a ‘good’ teacher that understands the needs of the students. The quote from Kierkegaard also elaborates the Latin proverb:

‘Discendo docebis, docendo disces’ ‘By learning you will teach; by teaching you will learn’ (translated into English) (Littleton & Howe, 2010 p: 72)

The proverb means that both teacher and students learn and the student will teach after being taught because the students' new knowledge informs the conversations they engage in.

In the statements from the lecturers, a lecturer at Teachers Education put it this way:

'They [the students] need to experience the uniting contradiction between authority and independence.' (Translated into English)

'De har brug for at opleve den forenende modsætning mellem autoritet og selvstændighed.' (Original statement in Danish)

So, learning is seen as a complex assemblage of many factors that work in a dynamic relation that change as the learning process progresses. The experiences from making the studies in this thesis imply that there is a gap between the actual possibilities of evoking vitalism in students and theoretical notions of the powers of vitalism.

8.4 CLASS SIZE – CONDITIONS FOR DIALOGUE

In Teacher Education there is a normal class size of between 20 and 40 students. However, this number of students may be the least 'effective' according to the studies of how many students should be grouped together for learning (Glass & Smith, 1979; Monks & Schmidt, 2010; Schanzenbach, 2014). According to Glass and Smith, the pivot point is approximately 20 students in a class, an increase over 20 students may not impact the achievement much, according to Glass and Smith, however, a decrease below 20 students in a class may have a positive impact on learning. Glass and Smith state that subject, gender and age has an impact, however, it is not significant. So, they combine all results in the concluding diagram below (Glass & Smith, 1979 p: 11).

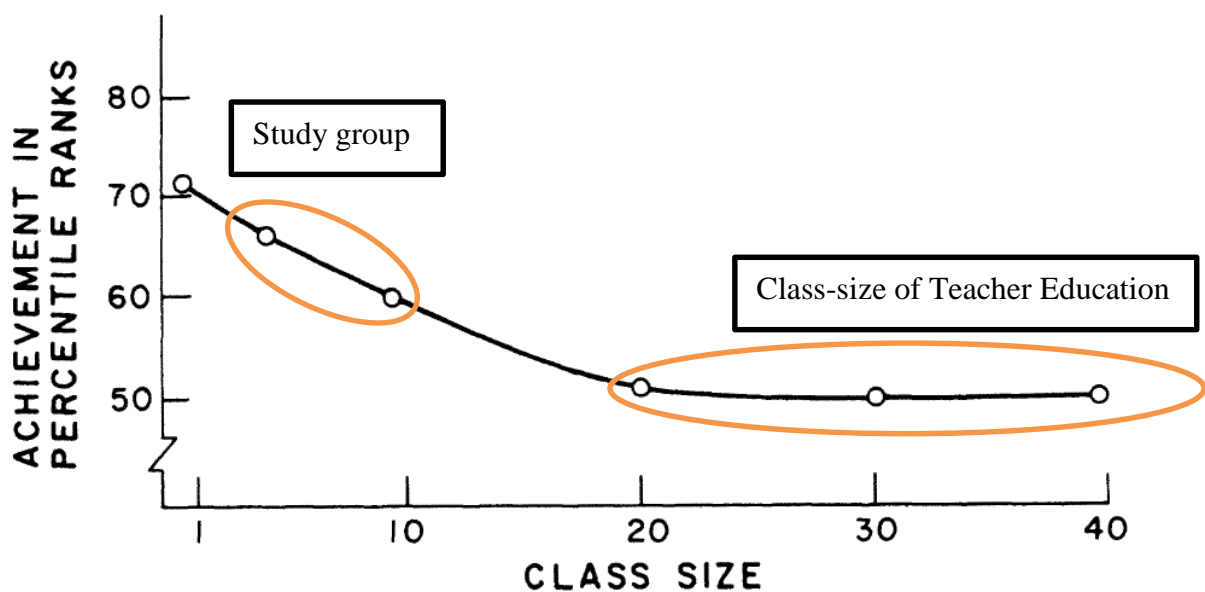


Figure 31 Glass and Smith relation between achievement and class size

Glass and Smiths quintessential curve for the relation between class-size and achievement is backed up by Monks and Schmidt (Monks & Schmidt, 2010). They did a review on the relation between class size and learning outcome in higher education: ‘The Impact of Class Size and Number of Students on Outcomes in Higher Education’. In their review they arrive at a similar conclusion as Glass and Smith did:

‘...grades drop dramatically with class size up to twenty students, and less steeply but nonetheless monotonically thereafter.’ (Monks & Schmidt, 2010 p: 11)

The number, 20, and the general accuracy of these studies may be debatable, however, in the practical reality of a lesson dialogue may become difficult simply due to time constraints in a classroom of 20 students. From that point of view the class size at Teacher Education is not ideal. It is the lowest number of students (20-25) in relation to the lowest achievement (50%) according to the class size studies. Fewer students would give better results, while more students may not give worse results (given that the students behave and do not need written feedback), according to Glass and Smiths research.

Therefore, the framework addresses the discussion of class-size at Teacher Education and suggests groups of 7-10 students and a lecturer in combination with larger scale content presentations and discussion, so the overall workload of the lecturers would not change.

When the teacher students are asked whether they would prefer more auditorium lectures, like at University, 81% of the students say that they dislike the idea. When the same population is asked whether they would prefer more time for discussion in study groups of 7-10 students 80% of the students say that they like that idea. Conversely, I suspect that university students would have answered similarly.

When it comes to the content of the lessons, only 16% of the students say that the lecturer’s presentation is the most important element in a lesson, while 53% say that dialogue is the most important element. 52% of the students like the idea of sustaining the dialogue via DT. Furthermore, 73% of the students think that the opportunity to include relevant DT in lessons is important (see Appendix 4, surveys 5 and 6 for more details).

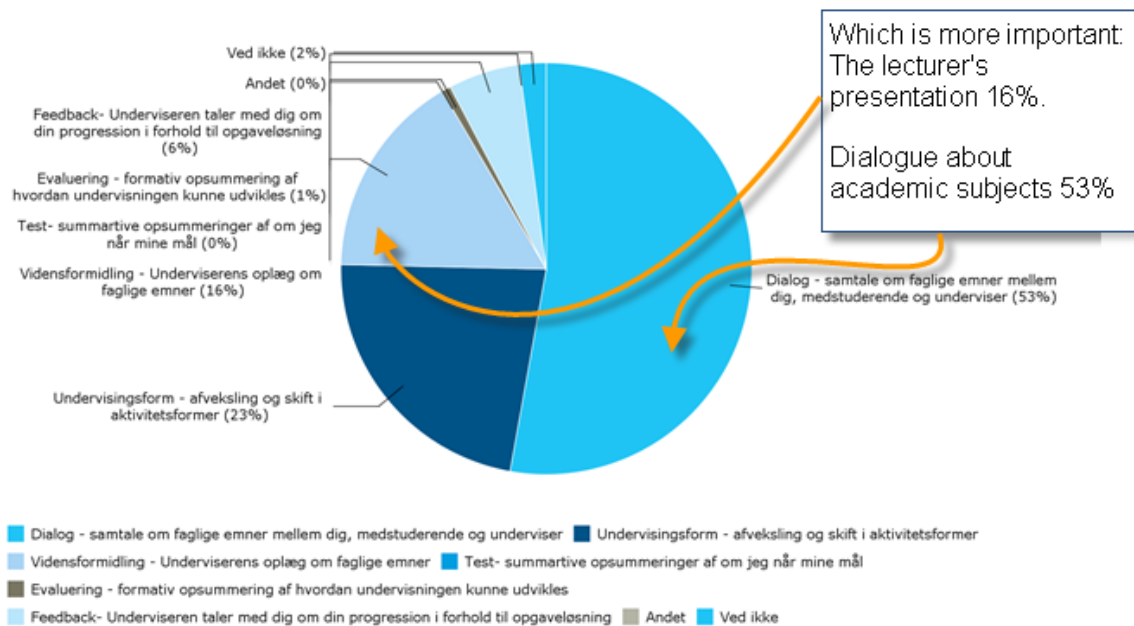


Figure 32 Survey 6, which is more important in a lesson?

In relation to that, 37% of the students in survey 6 state that the lecturer's presentation is important, but when asked to rank the importance (figure 32) of the lecturer's presentation only 16% maintain that the lecturer's presentation is the most important element in a lesson.

8.5 TOWARDS A FRAMEWORK FOR DEVELOPING LEARNING DESIGNS AT UCN

This leads to a framework (figure 33) that focuses on the lesson as the main event, where dialogue and academic activities in study groups take up most of the time. The main event of the lesson may be supported and 'stitched together' by DT in networks of learning that prepare a larger group of students for the dialogue and the activities in the lesson and make the smaller groups possible.

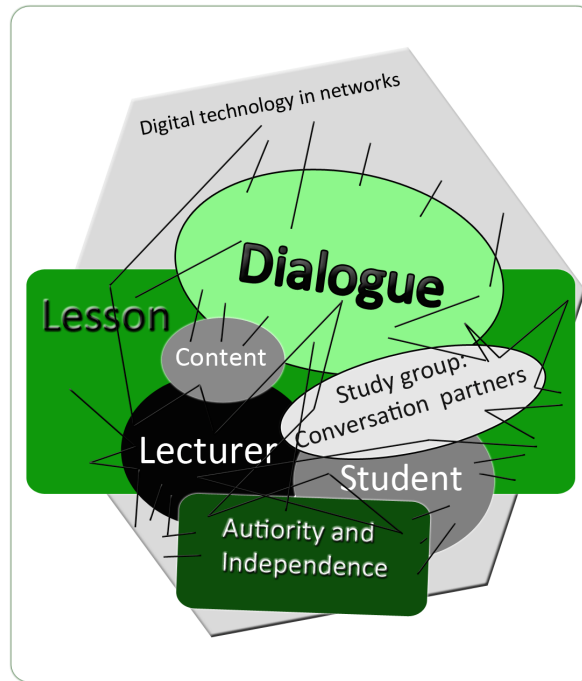


Figure 33 Framework for development 'stitched' together by DT

The framework suggests a map of relations between analytical categories that may direct the lesson design in the direction of more dialogue.

Questions lecturers may consider designing lessons that could change the use of DT:

- How can DT stitch together content and dialogue in and around the lesson?
 - How are the students' conditions for engaging in dialogue during preparation?
 - What determines the students' engagement in dialogue?
- How is the academic content mediated?
- How is the academic content discussed and used?
- How is the balance between 'authority' (lecturer centred) and 'independence'?
- Is increased work in smaller groups possible?

When DT becomes the 'seam' connecting the different elements (content, dialogue, activities etc.) of a pedagogic design, then DT becomes a necessary mechanisms in the structure of a course, a mechanisms that allows the communication and activities in the course to extend reimagine the lessons. Today at UCN, it seems as if the DT is brought into the lesson by both students and lecturers without actually considering what part DT could play in the pedagogic design, apart from presenting PPT, according to the investigation in Chapter 5. Hence, it may be suggested to consider the role of DT in the pedagogical design and in relation to that this thesis suggests to utilies DT as the seam stitching together preparation, content, dialogue, activities and lessons.

9 CONCLUSION

This chapter synthesises the concluding comments from the prior chapters and formulates a conclusion on the PhD thesis in its entirety. It is the purpose of this chapter to elaborate on the research questions and the adjoining areas of interest. The conclusions are made bearing in mind that the investigations all investigate different aspects of teaching and learning with DT, meaning that the conclusions are not general, pedagogical conclusions.

The main research question was:

How can lecturers design 'densified' lessons that focus on dialogue facilitated by the use of digital technologies?

And the two supporting areas of interest:

- a) How is DT used in a lesson at UCN, focus on Teacher Education?
- b) How can the use of DT facilitate dialogue?

The reason why answering the main research question is deemed important is that 'densification' and the decrease in number lessons at Teacher Education (from 1986-2007) seems to lead to an increase in PPT driven instruction during lessons, according to the data. PPT driven instruction is regarded an important issue for investigation for several reasons. One being that the lecturers in the investigations express a wish to use less PPT because they sense that PPT is determining the way they teach, conversely, it appears to be difficult to decrease the use of PPT because it seems like an inherent part of the general understanding of what teaching is at UCN. Another reason why the use of PPT is an important issue is the pedagogical concerns expressed in the literature on the use of PPT (Kangas, 2012; I. Parker, 2001; Reedy, 2008; Tufte, 2003) indicating that PPT is a visual tool for 'selling' a message and not a tool for thinking, reflection and learning. Which are some of the traits of UCNs learning design, 'reflective practice-based learning', indicating that the investigation of other uses of DT might be of general interest at UCN.

This is the conclusion of Chapter 5 and it is also an indication of how DT is used in a lesson at UCN (area of interest 'a'). The wish for more time for dialogue in the lessons, expressed by the teachers and students in the empiric data, seems to contrast the extensive use of, and dependence on, PPT presented in Chapter 5. The actual wish is presumably not only time for dialogue but also for pedagogic activities and presenting academic content. So, what is expressed in the empiric data may be a wish for more lessons in general and not 'densification' in any form, not even if the 'densification' allows more dialogue. So, reimagining 'densification' through a reimagining of the use of DT in a lesson in pedagogic designs that form hybrids between e-learning and 'traditional teaching' may not be what lecturers and students wish.

These issues were addressed in the articles 'When Innovative Instructional Designs are too Innovative' (article 4) and 'Encouraging Students to Learn non-core Subjects in Health Education' (Kjærgaard & Wahl, 2015; Wahl et al., 2015).

So, the finding that half of most lesson (according to the respondents) consists of PPT driven instruction indicates that the design of a lesson possibly could be reimagined within the framework of University College programmes. Conversely, the studies mentioned above and the investigations in this thesis indicate that it could be associated with considerable risk of alienating students if one lecturer fundamentally changes the structure of his/her lessons, while the rest of the programme remains unchanged. This suggests that changes towards re-mediated content that initiates the learning process before the lesson and more time for dialogue during lessons should be done cautiously, gradually and on a broader scale with a shared consensus of why and how the time for more dialogue was to be achieved. It is the aim of the 'Framework for developing learning designs' (Chapter 8) to contribute to both a local discussion at UCN and a general discussion of how higher education face the demands and challenges of the near future in the field of tension between the financial situation (DK), Big Data/learning analytics/Technological Singularity, changed student demographics and a constant demand for change and development.

Main conclusions from Part 1 'The Immanent Critique':

The use of PPT in lessons at Teacher Education (UCN) turned out to be the most overt practice of using DT amongst lecturers. The investigations in Chapter 5 utilised the methodology and analytical categories of Critical Realism to identify the mechanisms and structures that cause the observable practice of using PPT. The observable practice seems to be; lessons based on presenting academic content by the means of PPT and doing pedagogical activities in relation to the content.

The conclusion is that the lecturer's PPT seems to serve as the students' mechanism for sustaining the academic headlines into their note taking and exam preparation practice. Furthermore, the PPTs appear to be the lecturers' mechanism for structuring the lessons and for securing that all learning objectives from the curriculum are taught. This leads to the notion of 'The full circle of PowerPoint'.

These findings are interpreted to indicate that PPT represents the needs of both lecturers and students and, thus, become very important for most lecturers and students in order to do their jobs and pass exams.

The PPTs are subject to remediation into digitally shared video-clips, 'talking PPT' as lecturer 1 calls them, freeing time to be more in dialogue with smaller groups of students, as Act on Teacher Education 2013 Ad. 5 suggests (table 1, page 2).

Main conclusion from Part 2 'Past Research':

The past research was inspired by the philosophy of Deleuze, particularly the concepts from Deleuzian philosophy that hone in on attaining agency through thinking, reflecting and acting in practice (see Chapter 6). These concepts were deemed interesting because they appear to encompass many of the affordances of Web 2.0 tools and by that add a guiding, philosophical layer to the activities giving reason to why the activities were designed in a specific way.

Conclusion on using ODF in a hybrid of distance and presence learning (article 1)

The idea that web-tools, mainly used in distance- and e-learning, could contribute to the development of traditional teaching was tested and the conclusion is that tools such as ODF, SRS, social media, and co-creation tools (Prezi, Mindmeister, TikiToki and Google docs) can add new interaction possibilities to the traditional context of a lesson, interaction possibilities that may focus on the students learning process. However, the investigations also showed that even though an ODF would allow all student to participate in discussions (and make it visible if they did not), in practice it was difficult to engage all students in the discussions, the reason being that there would be a limited number of relevant answers to the tasks put forth by the lecturer in the ODF. Therefore, the students would post related responses and they would seek to be amongst the first to post answers, which entailed a state of ‘approximated synchronicity’. This seems to indicate that Pareto’s principal (80/20 rule) also applies to contribution to ODFs in educational contexts. This finding led to a redesign (article 1), designed by lecturer 1, of the use of ODF in a way that did not demand individual responses, the redesign was presented in the article ‘(Kjærgaard, 2016b). In the latter, the ODF served as a shared platform for discussions, content and the process of learning and it was the vehicle for documenting the overall progression of the class in the course. The main focus of the investigation in article 1 was to free the lecturer’s time in the lesson to discuss the academic content with the students and for that part it was a success, however, it seems most appropriate in contexts that are complex enough to need a discussion. That is, a context with a complex academic topic at a fairly advanced level, otherwise it is regarded more appropriate if the lecturer provides the relevant information, according to students.

Conclusion on using co-creation Web 2.0 tools in lessons (article 2)

Designing a course according to the philosophical principals of ‘the rhizome’ and the ‘plateau’ lead to the conclusion that co-creation in web 2.0 tools can facilitate a self-organising chaosmos in plateaus of co-created content if the circumstance and subject permit it. The assumption that co-creation web 2.0 tools would support rhizomatic relations between students that would allow decision-making at the discretion of the students was investigated in the paper ‘Rhizomatic Digital Habitat’ and the article ‘Rhizomes and plateaus: A study of digital communities of practice in University College’ (Kjærgaard & Sorensen, 2014c; Kjærgaard, 2016a). The students’ laptops became an active and necessary part of the lesson and the needs, which DT seeks to fulfil in this context, seem to be different from the needs that the students’ laptops fulfil during PPT instruction. The difference being that, during PPT instruction the students’ laptops appear to augment the lecturers PPT by reproducing the lecturer’s comments as notes in the slides. In the rhizomatic digital habitat, the students’ laptops become a part of the creative process of producing shared academic content.

Student paced (‘aionic’ timescale) understanding content (article 3)

The main conclusion from the action research project on developing e-learning courses based on lecturer produced video-clips that article 3 reports from was that the timescale of learning was freed from the ‘normal’ timescale of lessons, which led to an ‘aionic’ timescale that allowed the students to watch the presentations as many times as needed (data shows between

2 and 6 times) before venturing into the tasks of the course. The communication in the ODF became a series of openly posted ‘hand-ins’ instead of an academic discussion. The good experience from that was that all students could benefit from each other’s input, while the an unanticipated side-effect was that the students rushed to do the tasks to make their input appear more original than similar inputs in later forum posts. This led to a de facto repeal of the freedom from time and place that the e-learning course should provide.

The main conclusion on introducing analytical categories (schema) for communicating pedagogical designs (article 4)

The main conclusion was that the investigated cases (described in (Wahl et al., 2015)) showed that a new pedagogical design may need a scaffold of identified guideposts to aim for in order for the students to be able to navigate in the pedagogical design and to understand their position in the new practice of a lesson. This notion of the importance of guideposts, or analytical categories, for understanding a new position/practice system of teaching lead to the formulation of the framework for development suggest in chapter 8.

Main conclusions on Part 3 ‘Framework for developing learning designs at UCN’

Inspired by the findings in Parts 1 and 2 and by the discourses in the field described in Chapter 2 the main conclusions in Part 3 are:

The adoption of web-tools (Web 2.0 and LMS) from distance- and e-learning to traditional teaching appears difficult because traditional teaching seems to rely on being together at the same time in the same place, whereas the web-tools support interaction while not being together. However, the decrease in the number of lessons (Teacher Education from 1986-2007) and the introduction of ‘academic densification’ and the ‘Study Activity Model’ indicate that the time students and lecturers spend together in the classroom during lessons is only a fraction of the total workload of the students. This could indicate that the development of hybrid uses of distance- and e-learning tools in traditional teaching might be fruitful. In relation to the investigations that lead to the article ‘Utilising digital technology for dialogue and evaluation – a quasi-scholastic method in action’ (Kjærgaard, 2016b) it became evident that developing these hybrid uses lead to significant changes in the position/practice system in the lesson. The lecturer in the case described in the latter article did not have the sense of security that the PPT used to provide and the students could not take a passive position of listening and note taking. The position/practice system shifted in the sense that the lecturer found herself listening more to the students and the students were more explicit in the way they expressed their learning process. The role of DT shifted from being a presentation tool to being a documentation- and sharing-tool.

The framework seeks to reimagine the notion of ‘densification’ and ‘lesson quality’ (see Chapters 1.1.1 and 1.1.2) by taking it from a quantitative congestion of slides and learning objectives in lessons to a qualitative intensification of the lesson and by that also to answer the main research question of this thesis. The investigations that led to formulating the framework suggest that time for dialogue between lecturers and students and between peers are valued highly amongst both students and lecturers. The wish for dialogue could be

interpreted to mean that the students want to engage in dialogue, which entails that organisation in smaller groups would be preferable, however, the wish for dialogue could also mean that the students want to witness and listen in on dialogue during lessons, while not necessarily engaging actively in the dialogue. If the wish for dialogue is a wish for possibilities to engage in dialogue then the organisation of the dialogue might benefit from an organisation in smaller groups.

The research in the field of learning outcome in relation to the number of students in the class (Glass & Smith, 1979; Monks & Schmidt, 2010; Schanzenbach, 2014) indicates that there is little difference between the learning outcome in a class of 25 students and an auditorium of 200 students. It also indicates that groups of between 7-10 students could be ideal. At Teacher Education we have between 8 and 10 classes/year of 20-40 students, which according to the research within the field is the least effective. Based on that, it would seem fruitful to distribute the lecturer work in three categories;

- Transmission of information to larger groups (lecturing/video-clips),
- Conducting pedagogical activities (online or in class)
- Dialogue in smaller groups (deliberation of understandings)

These categories may entail different position/practice systems meaning that both students and lecturers would have different roles and obligations in the different categories. This brings about a critical issue, which is that neither students nor lecturers wish for auditorium lectures or video-clip based online lectures. They seem to wish for more time for dialogue within the lesson structure that they already know. So, offering a solution that presumably accommodates to the wishes of the students and lecturers whilst also making unwanted changes to the lesson structure and the position/practice system might be interpreted as a devious solution.

So, the conclusion to the main research question is that ‘densification’ can be reimagined catalysed by DT and that there are several ways of actualising the reimagined ‘densification’, however, the experiments in this thesis indicate that this might conflict with both lecturers and students understanding of what contributes to adding quality to a lesson.

The ‘positive difference’ difference between traditional teaching and e-learning may be the principal of enhancing physical presence by displacing elements that can be mediated through digital means to the timescale outside of the lesson’s limited timescale.

Reimagining ‘densification’ by introducing lecturer produced video-clips, Web 2.0 tools and online discussions seems to entail a substantial change in the ‘job description’ of both students and lecturers. The lecturers appear to become ‘pedagogues’ of a subject in the lesson and ‘professors’ of a subject between lessons, while the students become ‘agents of learning’ and not recipients of teaching.

This thesis’ wish to create ‘densification’ through intensification of the relation between students and lecturers is also an acknowledgement of what DT provides in the form of access

to information and networking at a distance and what a lecturer may provide in the form of academic and emphatic dialogue about the students' process of 'becoming'.

10 REFERENCES

References

- Adelman, C. (1993). Kurt lewin and the origins of action research. *Educational Action Research, 1*(1), 7-24.
- Allen, M., Bourhis, J., Burrell, N., & Mabry, E. (2002). Comparing student satisfaction with distance education to traditional classrooms in higher education: A meta-analysis. *The American Journal of Distance Education, 16*(2), 83-97.
- Ananiadou, K., & Rizza, C. (2010). ICT in initial teacher training: First findings and conclusions of an OECD study. *Conference Proceedings: L. Gomez Chova, D. Marta Belenguer, I. Candel Torres, IATED (Eds.), Proceedings of EDULEARN10 Conference, 5-7.*
- Anselm Strauss, & Juliet M. Corbin. (1997). *Grounded theory in practice* Sage.
- Archer, M. S. (1995). *Realist social theory: The morphogenetic approach* Cambridge university press.
- Archer, M., Bhaskar, R., Collier, A., Lawson, T., & Norrie, A. (2013). *Critical realism: Essential readings* Routledge.
- Arstorp, A. (2015a). *Teknologi i læreruddannelsen-en forestillet eller en realiseret praksis?* Institut for Uddannelse og Pædagogik, Aarhus Universitet.
- Arstorp, A. (2015b). *Teknologi på læreruddannelsen – en forestillet eller en realiseret praksis?* Aarhus University, Arts, (DPU) Department of Education,.

- Arstorp, A., Heiberg, T., Pagaard, D. M., & Skov, K. (2011). Interaktive tavler i undervisningen. [Interactive Whiteboards in teaching] *Ucc*,
- Aydin, S. (2012). A review of research on facebook as an educational environment. *Educational Technology Research and Development*, 60(6), 1093-1106.
- Ayers, D. F. (2011). A critical realist orientation to learner needs. *Adult Education Quarterly*, 61(4), 341-357.
- Barrett, A. M., Chawla-Duggan, R., Lowe, J., Nickel, J., & Ukpo, E. (2006). The concept of quality in education: A review of the “international” literature on the concept of quality in education. *England: EdQual*,
- Bartlett, D., & Payne, S. (1997). 13 grounded Theory—Its basis, rationale and procedures. *Understanding Social Research: Perspectives on Methodology and Practice*, 16, 173.
- Baugh, B. (1997). Making the difference: Deleuze's difference and derrida's différance. *Social Semiotics*, 7(2), 127-146. doi:10.1080/10350339709360376
- Bay, M. (2014). In Bay M. (Ed.), *Velkommen til computopia : Mennesker, magt og muligheder i en tempofyldt, teknologisk tidsalder* (1. udgave ed.) Kbh. : Gyldendal Business.
- Bell, P., Hoadley, C. M., & Linn, M. C. (2004). Design-based research in education. *Internet Environments for Science Education*, , 73-85.
- Bengio, Y. (2009). Learning deep architectures for AI. *Foundations and Trends® in Machine Learning*, 2(1), 1-127.

- Bennett, S., Bishop, A., Dalgarno, B., Waycott, J., & Kennedy, G. (2012). Implementing web 2.0 technologies in higher education: A collective case study. *Computers & Education*, 59(2), 524-534.
- Bergson, H. (1983). *Creative evolution* University Press of America.
- Bhaskar, R. (1979). The possibility of naturalism. *A Philosophical Critique of the Contemporary Human Sciences*. Brighton, UK: Harvester,
- Bhaskar, R. (1998). *The possibility of naturalism: A philosophical critique of the contemporary human sciences* Psychology Press.
- Bhaskar, R. (2008). *A realist theory of science* Taylor & Francis.
- Bhaskar, R. (2010). *Interdisciplinarity and climate change: Transforming knowledge and practice for our global future* Taylor & Francis.
- Biggs, J., & Tang, C. (2011). *Teaching for quality learning at university* McGraw-Hill International.
- Blaikie, N. (2009). *Designing social research* Polity.
- Blaschke, L. M. (2012). Heutagogy and lifelong learning: A review of heutagogical practice and self-determined learning. *The International Review of Research in Open and Distance Learning*, 13(1), 56-71.
- Buch-Hansen, H. (2005). *Kritisk realisme* Roskilde Universitetsforlag.
- Cambridge Dictionary. (2016a). Bookworm. Retrieved from <http://dictionary.cambridge.org/dictionary/english/bookworm>

Cambridge Dictionary. (2016b). Plough through sth. Retrieved from

<http://dictionary.cambridge.org/dictionary/english/plough-through-sth>

Capurro, R., & Hjørland, B. (2003). The concept of information. *Annual Review of Information Science and Technology*, 37(1), 343-411.

Carlin, M., & Wallin, J. (2015). *Deleuze and guattari, politics and education: For a people-yet-to-come* Bloomsbury Publishing USA.

Carlin, M., & Wallin, J. J. (2014). For a people-yet-to-come: Deleuze, guattari, politics and education. *Deleuze and Guattari, Politics and Education: For a People-Yet-to-Come*,

Carr, N. (2008). Is google making us stupid? *Yearbook of the National Society for the Study of Education*, 107(2), 89-94.

Carr, N. (2011). *The shallows: What the internet is doing to our brains* WW Norton & Company.

Celsi, R. L., & Wolfinbarger, M. (2002). Discontinuous classroom innovation: Waves of change for marketing education. *Journal of Marketing Education*, 24(1), 64-72.

Chong, C., & Yeo, K. (2015). An overview of grounded theory design in educational research. *Asian Social Science*, 11(12), p258.

Christensen, A. (2013,). Du husker mindre og læser dårligere på en skærm. *Forskning No*

Coghlan, D., & Brydon-Miller, M. (2014). *The SAGE encyclopedia of action research* Sage.

Cole, D. R. (2012). *Educational life-forms* Springer Science & Business Media.

Colebrook, C. (2001). *Gilles deleuze* Routledge.

- Collier, A. (1994). *Critical realism: An introduction to roy bhaskar's philosophy*.
- Conole, G. (2012). *Designing for learning in an open world* Springer Science & Business Media.
- Conole, G., & Alevizou, P. (2010). A literature review of the use of web 2.0 tools in higher education. *A Report Commissioned by the Higher Education Academy*,
- Cormier, D. (2008). Rhizomatic education: Community as curriculum. *Innovate: Journal of Online Education*, 4(5), 2.
- Cormier, D. (2015). In Cormier D. (Ed.), ***MAKING THE COMMUNITY THE CURRICULUM the e-book***. <http://davecormier.pressbooks.com/>: Pressbooks.
- Cormier, D. (September 2014). Rhizomatic learning. Retrieved from <https://www.mendeley.com/groups/2055423/rhizomatic-learning/>
- Corson, D. (1991). Bhaskar's critical realism and educational knowledge. *British Journal of Sociology of Education*, 12(2), 223-241.
- Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal*, 38(4), 813-834.
- Dalziel, J., Conole, G., Wills, S., Walker, S., Bennett, S., Dobozy, E., . . . Bower, M. (2016). The larnaca declaration on learning design. *Journal of Interactive Media in Education*, 2016(1)
- Danermark, B. (2002). *Explaining society: Critical realism in the social sciences* Psychology Press.

The digital path to future welfare e-government strategy 2011-2015, 1, (2011).

Danmark i arbejde udfordringer for dansk økonomi mod 2020, (2012).

Taxameter, (2001).

Deleuze, G. (1990). *Expressionism in philosophy: Spinoza*.

Deleuze, G. (1994). *Difference and repetition* Columbia University Press.

Deleuze, G. (1997). *Negotiations 1972-1990* Columbia University Press.

Deleuze, G. (2001). *Pure immanence* Zone New York.

Deleuze, G. (2004). *Anti-oedipus* A&C Black.

Deleuze, G. (2006a). *Nietzsche and philosophy* Columbia University Press.

Deleuze, G. (2006b). *Nietzsche and philosophy* Columbia University Press.

Deleuze, G., & Guattari, F. (1987). *1000 plateaus, capitalism and schizophrenia*.

Deleuze, G., & Guattari, F. (1994). *What is philosophy?* Columbia University Press.

Deleuze, G., & Guattari, F. (1996). *What is philosophy?* Columbia University Press.

Deleuze, G., & Parnet, C. (2007). *Dialogues II* Columbia University Press.

Ebert, J. D. (2015).

Gilles deleuze's difference & repetition discussed by john david ebert 2/2. Retrieved from

<https://www.youtube.com/watch?v=Fg73bstE4Xo>

- Elvemo, J., Greenwood, D., Martin, A., Matthews, L., Strubel, A., Thomas, L. u., & Whyte, W. F. (1997). Participation, action, and research in the classroom. *Studies in Continuing Education, 19*(1), 1-50.
- Enochsson, A., & Rizza, C. (2009). ICT in initial teacher training: Research review.
- Fabrice, H. (2010). *Learning our lesson review of quality teaching in higher education: Review of quality teaching in higher education* OECD Publishing.
- Fieser, J., & Dowden, B. (1995-). Gilles deleuze. *The Internet Encyclopedia of Philosophy*, , 9/12/2015. doi:(ISSN 2161-0002)
- Fisher, M., Goddu, M. K., & Keil, F. C. (2015). Searching for explanations: How the internet inflates estimates of internal knowledge.
- Flick, U. (2009). *An introduction to qualitative research* Sage.
- Foucault, M. (1977). 'Theatrum philosophicum', ed. donald F. bouchard, trans. donald F. bouchard and sherry simon. *Language, Counter-Memory, Practice: Selected Essays and Interviews*, , 165.
- Gadamer, H. (1983). *Dialogue and dialectic: Eight hermeneutical studies on plato* Yale University Press.
- Introduction to critical realism part one: Transcendental realism*. Gary Hawke (Director). (2014, May 8th).[Video/DVD] YouTube: YouTube.
- Gee, J. P. (2003). What video games have to teach us about learning and literacy. *Computers in Entertainment (CIE), 1*(1), 20-20.

- Gee, J. P. (2005). The new literacy studies: From 'socially situated' to the work. *Situated Literacies: Reading and Writing in Context*, 2, 177-194.
- Gee, J. P. (2013). *The anti-education era: Creating smarter students through digital learning* Macmillan.
- Gee, J. P., & Hayes, E. R. (2010). *Women and gaming: The sims and 21st century learning* Palgrave Macmillan.
- Glaser, B., & Strauss, A. (1967). Applying grounded theory. *The Discovery of Grounded Theory: Strategies of Qualitative Research*. Hawthorne, NY: Aldine Publishing Company, , 237-251.
- Glass, G. V., & Smith, M. L. (1979). Meta-analysis of research on class size and achievement. *Educational Evaluation and Policy Analysis*, 1(1), 2-16.
- Goodfellow, R., & Lea, M. R. (2013). *Literacy in the digital university: Learning as social practice in a digital world: Critical perspectives on learning, scholarship and technology* Routledge.
- Grunert, C., & Aisinger, P. (2011, June 21.). Undervisningen halveret på læreruddannelsen. *Undervisere*, 6
- Gynther, K., Kjærgaard, T., Slot, M. F., & Sørensen, B. H. (2014). It og nye medier i læreruddannelsen LU 13. *Lln*, 1(1)
- Regulations and curriculum doctoral school of the humanities aalborg university, (2016).
- Hansen, C. P. B. (2011). *Rapport om timetal i professionshøjskolesektoren*.
().Professionshøjskolernes Rektorkollegium.

- Hansen, P. G., & Hendricks, V. F. (2011). *Oplysningens blinde vinkler*.
- Hardt, M. (1995). *Gilles deleuze: An apprenticeship in philosophy* U of Minnesota Press.
- Harman, G. (2009). *Prince of networks: Bruno latour and metaphysics* Prahran, Vic.: Re. press, 2009.
- Hase, S., & Kenyon, C. (2000). From andragogy to heutagogy. *Ultibase Articles*, 5(3), 1-10.
- Hase, S., & Kenyon, C. (2003). Heutagogy and developing capable people and capable workplaces: Strategies for dealing with complexity.
- Hasse, C., Wallace, J., Brok, L. S., Jensen, U. G., Skov, H., Schrøder, V., . . . Dupret, K. (2015). *TEKU-modellen* U Press.
- Hendricks, V. F., & Hansen, P. G. (2014). In Hendricks V. F. (Ed.), *Infostorms : How to take information punches and save democracy / by vincent F. hendricks, pelle G. hansen* (Elektronisk udgave ed.) Cham : Springer International Publishing.
- Hendricks, V. F. (2010). Knowledge transmissibility and pluralistic ignorance: A first stab. *Metaphilosophy*, 41(3), 279-291. doi:10.1111/j.1467-9973.2010.01640.x
- Hill, R. (2012). *Whackademia: An insider's account of the troubled university* NewSouth.
- Holland, E. W. (2013). *Deleuze and guattari's' A thousand plateaus': A reader's guide* A&C Black.
- Huang, W. D., Hood, D. W., & Yoo, S. J. (2013). Gender divide and acceptance of collaborative web 2.0 applications for learning in higher education. *The Internet and Higher Education*, 16, 57-65.

- Huffman, W. H., & Huffman, A. H. (2012). Beyond basic study skills: The use of technology for success in college. *Computers in Human Behavior*, 28(2), 583-590.
- Hultman, K., & Lenz Taguchi, H. (2010). Challenging anthropocentric analysis of visual data: A relational materialist methodological approach to educational research. *International Journal of Qualitative Studies in Education*, 23(5), 525-542.
- Johnson, D. R. (2012). 'Technological change and professional control in the professoriate'. *Science, Technology & Human Values*, , 0162243911430236.
- Johnson, S. D., Aragon, S. R., Shaik, N., & Palma-Rivas, N. (2000). Comparative analysis of learner satisfaction and learning outcomes in online and face-to-face learning environments. *Journal of Interactive Learning Research*, 11(1), 29.
- Jordan, K. (2015). Massive open online course completion rates revisited: Assessment, length and attrition. *The International Review of Research in Open and Distributed Learning*, 16(3)
- Joseph, J., & Kennedy, S. (2000). The structure of the social. *Philosophy of the Social Sciences*, 30(4), 508-527.
- Kaidesoja, T. (2009a). The concept of social structure in roy bhaskar's critical realism. *JyväskyläStudies in Education, Psychology and Social Research 376, University of Jyväskylä*,
- Kaidesoja, T. (2009b). *Studies on ontological and methodological foundations of critical realism in the social sciences* University of Jyväskylä.

- Kangas, B. D. (2012). Not waving but drowning: A review of tuftes's "the cognitive style of PowerPoint". *International Journal of Teaching and Learning in Higher Education*, (3), 421-421-423.
- Kant, I., & Guyer, P. (1998). *Critique of pure reason* Cambridge University Press.
- Kemmis, S., & McTaggart, R. (1982). *The action research planner*. Victoria, Australia: Deakin University Press,
- Kierkegaard, S. (1948). *Views on my authorship: A straight forward message. report to the history* Wivel.
- Kierkegaard, S., Hong, H. V., & Hong, E. H. (1998). *The point of view* Princeton University Press.
- Kjærgaard, T. (2015a). Deep learning in an open source learning stream. In J. Porter (Ed.), *Deep learning* () NOVA SCIENCE PUBLISHERS, INCORPORATED.
- Kjærgaard, T. (2015b). In the open source learning stream.
- Kjærgaard, T. (2015c). Open source learning streams in social media in year 11 math teaching. *Expanding Learning Scenarios, EDEN*, Barcelona.
- Kjærgaard, T. (2016a). *Rhizomes and plateaus A study of digital communities of practice in university college*. Unpublished manuscript.
- Kjærgaard, T. (2016b). Utilising digital technology for dialogue and evaluation – a quasi-scholastic method in action. *CEPRA-Striben - Tidsskrift for Evaluering i Praksis*, (20)

- Kjærgaard, T. (2016c). Utilising digital technology for dialogue and evaluation – new scholastic methods and smartphones in action . *Cepra*, (Refleksiv Praksis Læring)
- Kjærgaard, T., & Sorensen, E. K. (2014a). Open source learning streams in online discussions in e-learning. *Ecel 2014*, ECEL Copenhagen.
- Kjærgaard, T., & Sorensen, E. K. (2014b). Qualifying the quantified self - A study of conscious learning. *Icel 2014*, ICEL Chile.
- Kjærgaard, T., & Sorensen, E. K. (2014c). Rhizomatic, digital habitat - A study of connected learning and technology application. *Icel 2014*, , *ICEL 2014(1)*
- Kjærgaard, T., & Wahl, C. (2015). When innovative instructional designs are too innovative: Lack of schema. *Innovations in Digital Learning for Inclusion, D4Learning/DUIT*, 1(1), 98.
- Knoblock, J. (1994). *Xunzi: A translation and study of the complete works* Stanford University Press.
- Kvale, S. (2008). *Doing interviews* Sage.
- Lange, T., Johannesen, K., & Henriksen, T. H. (2010). *Studerende på velfærdsuddannelserne på university college nordjylland en undersøgelse af rekruttering og optag.* (). Aalborg: Region Nordjylland.
- Larsen, M. C. (2013). An 'open source' networked identity: On young people's construction and co-construction of identity on social network sites. ***"Youth 2.0: Connecting, Sharing and Empowering? Affordances, Uses and Risks of Social Media"***, Antwerp, Belgium.

- Latour, B. (2005). Reassembling the social-an introduction to actor-network-theory.
Reassembling the Social-an Introduction to Actor-Network-Theory, by Bruno Latour, Pp.316.Foreword by Bruno Latour.Oxford University Press, Sep 2005.ISBN-10: 0199256047.ISBN-13: 9780199256044, 1
- Lee, F. (2012). Critical realism, grounded theory, and theory construction in heterodox economics.
- Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues*, 2(4), 34-46.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*,
- Littleton, K., & Howe, C. (2010). *Educational dialogues: Understanding and promoting productive interaction* Routledge.
- Louise Barriball, K., & While, A. (1994). Collecting data using a semi-structured interview: A discussion paper. *Journal of Advanced Nursing*, 19(2), 328-335.
- Mackness, J., Bell, F., & Funes, M. (2016). The rhizome: A problematic metaphor for teaching and learning in a mooc. *Australean Journal of Educational Technology*, 32(1), 78.
- Macmillan Dictionary. (2016). Surf the net. Retrieved from <http://www.macmillandictionary.com/us/dictionary/american/net-surfing?o=37981&l=dir&qsrc=990&qo=contentPageRelatedSearch&ad=SEO&ap=google.dk&an=SEO>
- Mangen, A. (2010). Lesing-på skjerm eller papir; er det så nøye, da?

- Mangen, A., & Velay, J. (2010). *Digitizing literacy: Reflections on the haptics of writing*
INTECH Open Access Publisher.
- Markauskaite, L., Freebody, P., & Irwin, J. (2010). *Methodological choice and design: Scholarship, policy and practice in social and educational research* Springer Science & Business Media.
- Martin, A., & Madigan, D. (2006). *Digital literacies for learning* Library Association Publishing.
- Mazzei, L. A., & McCoy, K. (2010). Thinking with deleuze in qualitative research.
International Journal of Qualitative Studies in Education, 23(5), 503-509.
- McLuhan, M. (1994). *Understanding media: The extensions of man* MIT press.
- Mingers, J. (2004). Real-izing information systems: Critical realism as an underpinning philosophy for information systems. *Information and Organization*, 14(2), 87-103.
- Ministry of Higher Education and Science. (2010). *Professionsbachelorer bruger 37 timer om ugen på deres studium, og det er de gennemgående godt tilfredse med.* (Analysis of Eurostudent data). Copenhagen, Denmark: Ministry of Higher Education and Science.
- Teachers education reform 2013, (2013a).
- Udvalget for forskning, innovation og videregående uddannelser 2012-13 FIV alm.del endeligt svar på spørgsmål 131, 131, (2013b).
- Senior lecturer programme, 990, (2015a).
- Teacher education act 2013, ActU.S.C. (2015b).

- Monks, J., & Schmidt, R. (2010). The impact of class size and number of students on outcomes in higher education.
- Morozov, E. (2012). *The net delusion: The dark side of internet freedom* PublicAffairs.
- Morton, T. (2011). Here comes everything: The promise of object-oriented ontology. *Qui Parle: Critical Humanities and Social Sciences*, 19(2), 163-190.
- Niels Bech, L., Pedersen, A., Nielsen, A., Wahl, C., & Sorensen, E. K. (2015). Digital education with IT: How to create motivational and inclusive education in blended learning environments using flipped learning: A study in nurse education. *13th European Conference on E-Learning*, 305-312.
- Nielsen, Mischa Sloth Carlsen Karsten Gam, & Rasmussen, K. S. (2001). *Fluglinier: Om deleuzes filosofi* Museum Tusculanum Press.
- Nissen, A. H. (2013). *Det man måler er man selv: Data, dimser og drømmen om et bedre liv* Gyldendal A/S.
- Nygaard, C. (2005). *Samfundsvidenskabelige analysemetoder* Samfundslitteratur.
- Nygaard, C. (2012). *Samfundsvidenskabelige analysemetoder*. (2. udgave). Frederiksberg C: Samfundslitteratur,
- OECD. (2015). *Oecd, PISA(Students, Computers and Learning: Making the Connection)*
doi:<http://dx.doi.org/10.1787/9789264239555-en>
- Oliver, C. (2012). Critical realist grounded theory: A new approach for social work research. *British Journal of Social Work*, 42(2), 371-387.

- Olsson, L. M. (2009). *Movement and experimentation in young children's learning: Deleuze and guattari in early childhood education* Routledge.
- O'reilly, T. (2007). What is web 2.0: Design patterns and business models for the next generation of software. *Communications & Strategies*, (1), 17.
- O'Sullivan, S., & Zepke, S. (2008). *Deleuze, guattari and the production of the new* Bloomsbury Publishing.
- Oxford Dictionaries. (2015a). Dialogue. Retrieved from <http://www.oxforddictionaries.com/definition/english/dialogue>
- Oxford Dictionaries. (2015b). Information. Retrieved from <http://www.oxforddictionaries.com/definition/english/information>
- Oxford Dictionaries. (2015c). Knowledge. Retrieved from <http://www.oxforddictionaries.com/definition/english/knowledge>
- Parker, I. (2001). Absolute PowerPoint. *The New Yorker*, 28, 76-87.
- Parker, J., Maor, D., & Herrington, J. (2013). Authentic online learning: Aligning learner needs, pedagogy and technology. *Issues in Educational Research*, 23(2)
- Parr, A. (2010). *The deleuze dictionary* Edinburgh University Press.
- Pedersen, M. S. (2003). IT i andetsprogsundervisningen. *Antologi om brugen af it i andetsprogsundervisningen* () Integrationsministeriet.
- Pjenggaard, S. (2016). Forord. *CEPRA-Striben*,

- Player-Koro, C. (2013). Hype, hope and ICT in teacher education: A bernsteinian perspective. *Learning, Media and Technology*, 38(1), 26-40.
- University college nordjyllands policy for ICT and learning UCN 2015, (2013).
- Politiken. (2006, March 12th). Lærere er usikre på computer. *Politiken*, pp. 4.
- Postman, N. (2011). *The end of education: Redefining the value of school* Vintage.
- Protevi, J. (2010). Preparing to learn from difference and repetition. *Journal of Philosophy: A Cross-Disciplinary Inquiry*,
- Qvortrup, L., Egelund, N., & Nordahl, T. (2016). *Læringsrapport 2015*. (Mapping No. 1). DK 9220, Aalborg: Laboratorium for forskningsbaseret skoleudvikling og pædagogisk praksis (LSP), Institut for Læring og Filosofi, Aalborg Universitet.
- Reedy, G. B. (2008). PowerPoint, interactive whiteboards, and the visual culture of technology in schools. *Technology, Pedagogy and Education*, 17(2), 143-162.
- Riggins, S. H. (1990). *Beyond goffman: Studies on communication, institution, and social interaction* Walter de Gruyter.
- Rockwell, G. (2003). *Defining dialogue: From socrates to the internet* Prometheus Books.
- Rogers, E. M. (2010). *Diffusion of innovations* Simon and Schuster.
- Røkenes, F. M., & Krumsvik, R. J. (2014). Development of student teachers' digital competence in teacher education-A literature review. *Nordic Journal of Digital Literacy*, (04), 250-280.

- Salomon, G. (1997). *Distributed cognitions: Psychological and educational considerations* Cambridge University Press.
- Savat, D., & Thompson, G. (2015). Education and the relation to the outside: A little real reality. *Deleuze Studies*, 9(3), 273-300.
- Sayer, A. (1992). *Method in social science: A realist approach* Psychology Press.
- Sayer, A. (2000). *Realism and social science* Sage.
- Schanzenbach, D. W. (2014). Does class size matter. *Policy Briefs, National Education Policy Center, School of Education, University of Colorado, Boulder*,
- Schmidt, J. R. (2016). *På sporet af magtspillet om dansk naturfagsundervisning neoliberal styring af folkeskolen og læreruddannelsen siden årtusindskiftet*
- Schwartz, T. A. (2014). Flipping the statistics classroom in nursing education. *The Journal of Nursing Education*, 53(4), 199-206. doi:10.3928/01484834-20140325-02 [doi]
- Scollon, R. (2002). *Mediated discourse: The nexus of practice* Routledge.
- Scollon, S. W. (2004). *Nexus analysis: Discourse and the emerging internet* Routledge.
- Scott, D. (2005). Critical realism and empirical research methods in education. *Journal of Philosophy of Education*, 39(4), 633-646.
- Scott, D. (2013). *Education, epistemology and critical realism* Routledge.
- Scott, D., & Usher, R. (2011). *Researching education: Data, methods and theory in educational enquiry* Bloomsbury Publishing.

- Sellers, W., & Gough, N. (2010). Sharing outsider thinking: Thinking (differently) with deleuze in educational philosophy and curriculum inquiry. *International Journal of Qualitative Studies in Education*, 23(5), 589-614.
- Selwyn, N. (2011). *Education and technology: Key issues and debates* A&C Black.
- Selwyn, N. (2014). *Degrees of digitization: Digital technology and the contemporary university: Degrees of digitization* Routledge.
- Semetsky, I. (2006). *Deleuze, education and becoming* Sense Publishers.
- Semetsky, I. (2008). Nomadic education: Variations on a theme by deleuze and guattari.
- Semetsky, I. (2009). Deleuze as a philosopher of education: Affective knowledge/effective learning. *European Legacy*, 14(4), 443-456.
- Semetsky, I., & Masny, D. (2013). *Deleuze and education* Edinburgh University Press.
- Shipway, B. (2011). In Shipway B. (Ed.), *A critical realist perspective of education* London : Routledge.
- Siemens, G. (2006). *Knowing knowledge* Lulu. com.
- Siemens, G., & Long, P. (2011). Penetrating the fog: Analytics in learning and education. *Educause Review*, 46(5), 30-32.
- Skinner, B. F. (1960). Teaching machines. *The Review of Economics and Statistics*, , 189-191.
- Teaching machine and programmed learning*. Skinner, B. F. (Director). (2011, 1958).[Video/DVD] University of California, Los Angeles:

- Smith, D. W., & Somers-Hall, H. (2012). *The cambridge companion to deleuze* Cambridge University Press.
- Smith, D., & Protevi, J. (2015). Gilles deleuze. *The Stanford Encyclopedia of Philosophy*, , Winter 2015.
- Sørensen, B. H. (2016). Elevernes egenproduktion og elevinddragelse, demonstrationsskoleprojekt. Retrieved from <http://demonstrationsskoleprojekt.aau-uc.dk/>
- Sørensen, B. H., Audon, L., & Levinsen, K. (2010). *Skole 2.0 Klim*.
- Sorensen, E. K., & Kjærgaard, T. (2016). Designing for dialogue and digitality in higher and continuing education. *Networked Learning 2016*, Lancaster.
- Spitzer, M. (2012). *Digitale demenz. München: Droemer*,
- St Pierre, E. A. (2004). Deleuzian concepts for education: The subject undone. *Educational Philosophy and Theory*, 36(3), 283-296.
- Stivale, C. J. (1980). Gilles deleuze & félix guattari: Schizoanalysis & literary discourse. *SubStance*, 9(4), 46-57. doi:10.2307/3684040
- Summey, D. C. (2013). *Developing digital literacies: A framework for professional learning* Corwin Press.
- Szarkowski, J., & Archer, M. (1988). *Winograd: Figments from the real world*
- The digital path to future welfare e-government strategy 2011-2015, 978-87-995008-3-3, (2011).

- Trilling, B., & Fadel, C. (2009a). *21st century skills: Learning for life in our times* John Wiley & Sons.
- Trilling, B., & Fadel, C. (2009b). *21st century skills: Learning for life in our times: Learning for life in our times* John Wiley & Sons.
- Tucker, B. (2012). The flipped classroom. *Education Next*, 12(1), 82-83.
- Tufte, E. R. (2003). *The cognitive style of PowerPoint* Graphics Press Cheshire, CT.
- Tyner, K. (2014). *Literacy in a digital world: Teaching and learning in the age of information* Routledge.
- Policy for learning and IT 2015, 1, (2013).
- Udviklingskontrakt mellem UCN og uddannelses- og forskningsministeren 2015-2017, (2015).
- UCN Teacher Education. (2012). *Curriculum 2012* [Studieordning 2012] (1st ed.). Aalborg: UCN Teacher Education.
- University College North. (2015). *Reflective practice-based learning, UCN's learning approach*. Aalborg: UCN.
- Study activity model, (2013).
- Valentín, A., Mateos, P. M., González-Tablas, M. M., Pérez, L., López, E., & García, I. (2013). Motivation and learning strategies in the use of ICTs among university students. *Computers & Education*, 61, 52-58.

- Vinge, V. (1993). The coming technological singularity: How to survive in the post-human era. *NASA.Lewis Research Center, Vision 21: Interdisciplinary Science and Engineering in the Era of Cyberspace*,
- Vinge, V. (2008). Signs of the singularity. *IEEE Spectrum*, 45(6), 76-82.
- Wahl, C., Pedersen, A., Nielsen, A., Lukassen, N. B., & Kjærgaard, T. (2015). Encouraging students to learn non-core subjects in health education. *European Conference on E-Learning*, 621.
- Watson, J. (2008). Schizoanalysis as metamodeling. *The Fibreculture Journal*, 12
- Wenger, E. (1998). *Communities of practice: Learning, meaning, and identity* Cambridge University Press.
- Winner, L. (2009). Information technology and educational amnesia. *Policy Futures in Education*, 7(6), 587-591.
- Young, E. B. (2013). *The deleuze and guattari dictionary* A&C Black.
- Zachry, M., & Thralls, C. (2004). An interview with edward R. tuft. *Technical Communication Quarterly*, 13(4), 447-462. doi:10.1207/s15427625tcq1304_5
- Zhao, S., Djonov, E., & van Leeuwen, T. (2014). Semiotic technology and practice: A multimodal social semiotic approach to PowerPoint. *Text & Talk*, 34(3), 349-375.



SUMMARY

Denne afhandling undersøger brugen af digitale teknologier i professionshøjskole undervisning med særligt fokus brugen af digitale teknologier i lektioner på Læreruddannelsen UCN. Undersøgelsen af brugen af digitale teknologier i lektioner tjener som afsæt for en serie af artikler, hvoraf fire er valgte til at understøtte afhandlingens forskningsspørgsmål. Til sidst samles undersøgelsens og artiklernes konklusioner i et forsøg på at lave en ramme til diskussion af udvikling af brugen af digitale teknologier i undervisningen i professionsuddannelser.

Afhandlingen antyder et paradoks mellem en ekstensiv brug af PowerPoint og et delt ønske mellem undervisere og studerende om mere tid til dialog og pædagogiske aktiviteter. Afhandlingen undersøger måder at udnytte digitale teknologier og digitale netværk til at udvikle undervisning fra en hierarkisk træstruktur i et LMS til et 'vejkort' i et læringsnetværk.