From blended learning
to learning onlife

- ICTs, time and access in higher education

Anders Norberg

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time
T. S. Eliot

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Abstract

In contemporary times of information abundance and experience of constant change, an increasing array of Information and Communication Technologies (ICTs) are being used for quality-, cost-, and access adaptions and enhancements in higher education. Words and concepts such as *e-learning, online education*, *digitalisation of education* or *virtual campus* indicate new alternatives to the traditional or possible directions of development toward a thorough change.

Blended Learning (BL) takes a slightly different approach by focusing on *the integration of ICTs* into the mainstream of higher education. The term has many meanings and is frequently used by practitioners, although not much by European researchers. This dissertation focusses on the properties and affordances of BL in creating new access possibilities for education in the geographic area of Northern Sweden.

The population in Northern Sweden is very unevenly distributed, and the differences in education attainment and levels vary considerably. *Decentralised education, distance-* and *online learning* have provided temporarily increased access, but many arrangements have been short-lived, specialised and have come in the form of courses rather than programmes, thereby not increasing any sustainable or broader-widened access. By 2010, distance education had increased over a number of years, while recent reports indicate that distance education provision has decreased. In the same time, the proportion of students who combined campus- and distance education had, in fact, increased. This can be viewed as a sign indicating that BL has had an impact on students, as well as that development toward increasing access may have halted.

The student groups on which this dissertation focusses are not the traditional students from an academic family background who dominate campus populations. Instead, the focus lies on the new learners, consisting of younger students without an academic family background and older students with the need to attain a higher-education diploma or to enhance their credentials in lifelong learning. These students can encounter problems with access, even while living in a university city, though more so for those living outside of the daily commuting distance to a campus.

The aim of this dissertation is to identify and generate new, alternative perspectives on access to higher education when it is enabled by the ongoing and more sustainable integration of ICTs into mainstream education, which is sometimes referred to as BL. A subsequent aim is to determine how such

perspectives can be understood and used for the development of sustainable and inclusive education.

Article 1 scrutinises the term and phenomenon of BL, its roots and present state of development. It also considers how it can make more sense for students' understanding of and involvement in their studies, as well as for course design, by setting time before place as a perspective.

Article 2 studies the differences between the North American and European usage of BL as a term, as well as in practice and research.

Article 3 designs and researches an intervention in which non-traditional students at Arvidsjaur learning centre studied an asynchronous, globally-accessible Massive Open Online Course (MOOC) in a synchronous form that was designed around social study circles. It is an application and further development of the time perspective that is studied in Article 1.

Article 4 studies a pilot project within a preparatory year for engineering studies at Luleå University of Technology. The article explores and further develops the time model, which guided the design of the pilot.

Article 5 focuses on four European regions that have addressed problems with the implementation of the Triple Helix regional development model. In this model, the state, universities, business and public sector organisations come together to set up local and regional development plans with adjusted models. The article addresses knowledge-based issues through a time and place perspective that gives universities an innovative role in regional development.

This research adopts a critical methodology. It departs from educational needs and the right of individuals to access education as rights-holders versus the means that universities have to act as society's duty-bearers. As the author of this dissertation, I am personally engaged in this perspective, as I have been working with increasing access to higher education for many years. My vantage point is not from within a university's central campus and its direct surroundings. Rather, I consider studying from the perspective of less favoured communities, with lower levels of education and more problematic access to higher education in Northern Sweden.

The adopted methods for the articles are mainly qualitative and include conceptual analyses, literature reviews, surveys and semi-structured interviews. Mixed methods are also applied in two of the papers. The empirical data have been analysed with the use of a qualitative content-analysis approach. In the theory and discussion sections of the synthesis, conceptual analysis has been used.

The theories that are adopted in the articles vary depending on their particular focus. Articles 3 & 4 draw on theory that informs design interventions, while Didaktik and Fach-Didaktik theory are used in article 2,

combined with Instructional Design theory. Glonacal theory informs the discussion in Article 3, while article 4 adopts Constructivist learning theory and Agile framework theory, toghether with the time model from article 1. Article 5 discusses Triple- and Quadruple-Helix theory. In chapter 7 in this synthesis, Barbara Adam's social theory of time (timescapes) is used for contextualising the results, and Luciano Floridi's Philosophy Information is used for discussion of ICTs in education in chapter 8.

In my conceptual work, I scrutinise the frequent understanding of ICTs in education in spatial terms, as place (distance learning), in which ICTs enable increased reach and access in a centre-periphery frame. I proceed to consider e-learning as a re-tooling of education and online learning as learning in a new alternative environment or space. I propose that these aspects, with their advantages and disadvantages, follow on to BL as well.

I continue by altering the perspective on ICTs in education, from place to time. This time perspective is contextualised as an important human dimension, drawing on Adam's social theory of time, and used for abstraction and deconstruction. However, space and time presuppose one another and must be reassembled into new space-times of education. As I argue, the time perspective can play a greater role than at present. Articles 3, 4 and 5 contribute to this re-assembly: a task which I continue to synthesise in the results section.

Based on the presented articles, the current study is still only a deconstruction and reconstruction of the vanishing present and forms the basis of a suggestion for alternative perspectives in designing accessible courses. In the discussion section of this dissertation, I use Floridi's Philosophy of Information to further discuss distance-, e-, and online-learning as well as their appearances in BL. Living in an ICT-integrated environment does not only change our work and practices but also our self-understanding as humans. How can, will, does or should education processes change in this new ICT-integrated environment? I revisit the BL approach and explore how Floridi's e-ducation concept can help to understand and reformulate questions in education.

Finally, I summarise and comment my results in light of the research questions and discuss ethical and political implications. As rights-bearers, individuals have the right to claim equal access to higher education from a society's education providers, at the best of the ability of the provider. The role and responsibilities of the universities as providers may have changed, when access can be increased by a design of the mainstream campus courses to also include students with time- and place obstacles. ICT-integrated approaches for education provision in higher education can become a more inclusive normality.

Abbreviations

BL	Blended Learning
DBR	Design Based Research
DL	Distance Learning
EL	E-learning
ICT(s)	Information and Communication Technology(-ies)
LMS	Learning Management System
MOOC	Massive Open Online Course
OL	Online Learning

Sammanfattning på svenska

Från blended learning till lärande onlife

Denna avhandling har som huvudfråga hur Informations- och Kommunikationsteknik (IKT) kan förbättra tillgängligheten till högre utbildning genom IKT:s integration med det vanliga utbudet av utbildning på campus, vilket vanligen kallas *blended learning* (BL). Denna fråga skiljer sig något från frågan om hur IKT kan användas för tillgänglighet i *distanslärande, e-lärande och online-lärande*, vilka tidigare mest använts på sidan om det vanliga utbudet på campus. Min andra forskningsfråga gäller om tid kan vara ett mera konstruktivt perspektiv än plats då det gäller att beskriva och designa IKT i lärande, och i så fall hur?

Fokus läggs på de områden i norra Sverige utanför universitetsstäderna som har gles eller ojämnt fördelad befolkning, långa avstånd, ofta låg utbildningsnivå, men också människor som gärna vill utbilda sig om de bara kunde hantera t ex tids- och rumhinder. Jag tänker i första hand på dem som inte flyttar till en universitetsstad direkt efter gymnasiet utan får utbildningsplaner senare i livet, och de som måste uppgradera sin utbildning för att uvecklas i arbetet eller byta arbete. Dessa grupper är också mycket värdefulla för det lokala samhällets kompetensförsörjning.

IKT används numera i nästan all utbildning på allt fler sätt, både av lärare och studenter. Allt oftare är detta ett led i en medveten strävan för att höja kvaliten, sänka kostnaderna eller öka flexibiliteten och tillgängligheten. BL ses vanligen som en blandning mellan klassrum och online-miljö, mellan muntlig och digital kommunikation, eller mellan gammal och ny teknik med klassrummet som nav. Detta tolkar jag som ett arv efter distans- e- och online-lärande-formerna.

I artikel 1 provar jag och mina medförfattare med hjälp av konceptuell analys ett tids- och processperspektiv istället för ett platsrelaterat perspektiv, för att förstå IKT-integration i en BL-kurs. Vi finner tidsperspektivet mycket användbart för att beskriva IKT-användning i en kurs, och för att designa nya utbildningslösningar. Istället för blandning mellan klassrums- och online-miljö, så får vi en spänning mellan två modaliteter, det synkrona studiearbetet, det som görs samtidigt i en lärandegrupp, t ex i klassrummet eller i videokonferens, och det asynkrona studiearbetet, att läsa och göra uppgifter när det passar. Detta perspektiv utgör också en abstraktion där klassrummet har blivit ett verktyg för synkron kommunikation; det viktiga är

då inte en plats att kommunicera på, utan kvaliteten på kommunikationen lärare-student, student-student och student-lärandestoff i kursen. Här använder jag konstruktivistisk lärandeteori tillsammans med tidsperspektivet. Jag undersöker sedan i artikel 2 mera om begreppet BL och undersöker dess status i Europa i jämförelse med Nordamerika och finner att europeiska forskare inte så ofta använder begreppet BL, vilket kan förklaras med olika forskningstraditioner kring undervisning och lärande, som europeisk *Didaktik* och nordamerikansk *Instructional Design*. Även europeisk universitetspersonal läser nordamerikansk litteratur, vilket kan förklara den frekventa användningen av termen i praktiska lärandesammanhang även i Europa. BL är också en inbjudande rubrik att göra sina egna experiment under.

Artikel 3 och 4 beskriver design, implementering och resultat av två design-experiment med tidsperspektivet som utgångspunkt. I artikel 3 kombineras en asynkron globalt tillgänglig Massive Open Online Course, MOOC-kurs, med en lokal grupp otraditionella studerande som träffas i klassisk studiecirkelform på lärcentrat en gång i veckan. Resultaten utvärderades genom examination och semistrukturerade intervjuer som analyserades. Studieresultaten blev goda, och deltagarna förklarade i intervjuerna att de hade haft stor hjälp av de synkrona mötena för att klara kursen. Den enkla kursdesignen fortsatte också sedan att användas i lärcentramiljön i Akademi Norr, då den också gav det lokala lärcentrat nya möjligheter. I artikel 4 designas en del av en fysikkurs i ett distansförsök för tekniska basåret. Nio studenter på basåret väljer detta försök som alternativ till de pågående vanliga studierna. En målsättning med designen var att förebygga att studenter nyttjar flexibiliteten i upplägget till att skjuta upp det som känns svårt till senare. Kursen designas med hjälp av tidsperspektivet i artikel 1, konstruktivistisk pedagogisk teori och agil projektmetodik från mjukvaru- och programmeringssektorn, där utprövade strategier för en jämn och hälsosam arbetstakt finns utvecklade. Studerandes upplevelser och erfarenheter samlades in genom semi-strukturerade intervjuer och analyserades genom kvalitativ innehållsanalys. Resultaten av det analyserade materialet visade att kursdesignen hade fungerat väl för att understödja en jämn arbetstakt. Den planlagda samtidigheten i studierna dag för dag verkar inbjuda till kommunikation och interaktion mellan studenter, även om de studerar rumsligt åtskilda från varandra.

Slutligen, i artikel 5 återvänder jag, och medförfattare från tre länder, till begreppet *plats*, som ju måste vara en del i all mänsklig aktivitet. Artikeln behandlar fyra regioner i Europa som inte har optimala förutsättningar för Triple-Helix-samverkan i kunskapsekonomin, t ex därför att det inte finns något universitet i närheten, eller att den offentliga sektorn eller näringslivet

i regionen är svagt utvecklade. En Quadruple-Helix-teori utformades och exemplifieras genom fyra regionala fallbeskrivningar, för norra Sverige Skellefteås byggande av en multi-institutionell campusplattform som lokal studiemiljö.

I denna kappa som inleder och omsluter de fem artiklarna går jag igenom syfte och forskningsfrågor (kap. 1), bakgrunder (kap. 2), blended-learning-begreppet (kap. 3), teorifrågor (kap. 4) och metodfrågor (kap. 5). Sedan sammanfattar jag tid som perspektiv på IKT i utbildning med hjälp av Adam's sociala tidsteori (kap. 6) och diskuterar IKT i utbildning kritiskt genom att använda Floridi's informationsfilosofi (kap. 7) för att diskutera nuvarande tänkande och framtida scenarier för IKTs integration i utbildning. Floridi's filosofi provocerar fram nya tankar på utbildning, i vad han kallar *e-ducation*, vilket sker i ett informationssamhälle där vi börjat uppfatta oss själva och världen på nya sätt. Detta hjälper mig också att formulera en annan typ av blended learning-problematik, med möjligheter och problem. När IKT-applikationer kan bearbeta information specialiserat och självständigt, blir frågan hur detta kan användas i utbildning och hur vi vill att arbetsfördelning mellan människa och maskin ska se ut.

Till sist sammanfattar jag och kommenterar mina resultat utifrån forskningsfrågorna och reflekterar över vidare forskning. Jag diskuterar också etiska och politiska frågor kring tillgänglighet till högre utbildning. Jag aktualiserar frågor som a) Har individens situation som rättighetsinnehavare till utbildning förändrats genom IKTs möjligheter? b) Har universitetens roll och uppdrag som den högre utbildningens utförare i samhället förändrats när IKT kan ge nya möjligheter att designa mera tillgänglig utbildning som normalitet?

Abstracts of included articles

Article 1:

Norberg, A., Dziuban, C. & Moskal P. (2011), *A Time-Based Blended Learning Model*.

Abstract: This is a conceptual paper that builds on the premise that ICT integration in education has become so commonplace that we are approaching a new normality in which ICTs are used in most courses. Despite this, there is great ambiguity in our understanding of the terms that are used. Thus, in this paper, we problematise elements in the contemporary use of the term *blended learning* (BL) and identify some conceptual problems with the use of BL definitions. The term *blended* needs specification, as no blending theory appears to be involved. Rather, the blending refers to combining, most commonly by traditional and digital approaches, implying a combination of places (as in online and distance learning) or a combination of the use of technology and traditional tools. Regarding learning, we propose that most of the literature refers to the organisation of teaching, rather than learning theory or students' own organisation of learning. We attempt to find another way by which to understand ICTs in a course, by outlining a time-based strategy for BL. In our model, the course design and delivery frame students' learning opportunities in synchronous and asynchronous modalities. It deconstructs the evolving components of BL to identify changes that are induced by digital technologies for enhancing teaching and learning environments. Blended learning may be traced back to early medieval times when printed material provided the first asynchronous learning opportunities. However, the digitalisation of contemporary learning environments results in a de-emphasis on teaching and learning places. When time becomes the primary organising construct for education in a technology-supported environment, blending possibilities emerge around five components: migration between modalities, support, location, learner empowerment and flow. This study enables the readers to conceptualise BL as a combination of modern media, communication modes, and times and spaces in a new kind of learning synthesis that takes the place of traditional classrooms and technology, and in which the teacher serves as a facilitator of a collective learning process. The major implication of this paper is that modern learning technologies have freed students and educators from the lock-in of classroom space as the primary component of BL, thereby emphasising learning rather than teaching in the planning process. As a result, this paper proposes a new

model of BL in which physical teaching environments give way to time. Time and synchronicity become the primary elements of the learning environments. Additionally, the authors suggest that the time-based model as an educational *new normal,* results in technologies that are enablers rather than disruptors of learning continuity.

My contribution in this paper has been the problem of identification, the main part of the concept analysis, the time model and the unpacking of its usefulness for describing ICT integration in courses. My coauthors undertook to pursue the main work in the introduction and background, in order frame the paper within current research and debates on BL. The discussion and conclusions were developed in close cooperation.

Article 2:

Norberg, A. & Jahnke, I. (2014) ***Are You Working in the Kitchen? – European Perspectives on Blended Learning.***

Abstract: As with other ICT-related terms, blended learning (BL) is used in daily conversations at universities in most countries. This book chapter explores and describes the different understandings and approaches to BL between North American and European practitioners and researchers. Though this question is under-researched, it is highly significant, as different understandings of the debate have direct implications for the construction of particular theoretical, methodological, pedagogical and technical approaches to the implementation of BL practices. Our approach to this core question is first to interpret it, clarify it and divide it into sub-questions: BL as a term in educational practice and BL as a research term. Secondly, we have designed the research on the basis of a mixed-methods approach that entailed the following: (i) systematic searches of the practical uses of the term BL on university websites; and (ii) an email survey designed for European experts on BL (researchers and project managers in the field of BL and ICT higher education). The aim of the survey was to review the definitions and understandings of the term, and the practice of BL, in order to establish the most dominant theoretical, pedagogical and technical approaches that are used. The subsequent aim is to systematically review and evaluate the differences in the use of BL-related terms and practices between North-America and Europe. Finally, we used the analysed materials from (i) and (ii) in order to launch web-forum discussions that proved fruitful for the generation of new questions for further research. The main findings of this research suggest that continental European (including Scandinavian) researchers and universities draw primarily on the theoretical roots of

Didaktik in their approach to both defining and operationalising ICTs in higher education, and the BL concept is not much used. In North American settings, the research and theories that inform BL approaches instead come from Instructional Design, and the possibilities it offers for the integration of ICTs in higher education. However, our research provides evidence suggesting that there are signs of convergence between the two approaches, as the North American literature is used increasingly within university settings in Europe, especially in relation to practical implementation issues. At the same time, the experienced *need for pedagogy* within instructional design contexts in North America can respond to what European researchers call Didaktik.

My contribution in this book chapter was first to cooperate with the co-author in researching the design and in choosing experts to survey, as well as the main part of data collection and the analysis of the empirical material. We cooperated on the analysis by interpreting the results in a way that created a tension between Instructional design and European Didaktik. The discussion and conclusions were elaborated together.

Article 3:

Norberg, A., Händel, Å. & Ödling, P. (2015) ***Using MOOCs at Learning Centers in Northern Sweden.***

Abstract: This paper describes the adjustment and use of globally-accessible Massive Open Online Courses (MOOCs) in addressing the needs of local learners at community learning centres in Northern Sweden. Building on the concept of a *time-blended learning design*, we examine access to learning from a critical perspective and place it against the theoretical discussion of Marginson and Rhoades' *glonacal agency heuristics*. The research for the article is based on a case-study design in which a learning centre located in Arvidsjaur in Northern Sweden became a pilot, as part of a larger Nordplus Horizontal Project 2014-2016. Three Nordic countries were involved in the broader project, thereby aiming to develop theoretically-informed models for the development and use of MOOCs in learning centres and organisations. We employed the Scandinavian *study circle* concept and used it to facilitate the studying of MOOCs, thereby forming *blended* and *glonacal* courses, and taking into account the significance of geographic and space limitations, as well as possibilities. The impetus for the research came from systematic reviews suggesting that, although the technical possibilities for Swedish universities to offer accessible education are steadily increasing, most universities do not

prioritise courses for off-campus students. The available web courses in asynchronous formats are also difficult to master for untraditional learners, leaving the local learning centres with limited possibilities. As a result, we developed a theoretically-informed design for using a MOOC course in a study circle form for students with unconventional educational backgrounds. We designed in-depth interviews with the participants of the case study, in order to understand their motivations for engaging in the study, their experiences and difficulties with the course, as well as its uses, the significance of the course for their future education and career plans, and the additional benefits that they acquired as a result of their participation. The material was analysed through content analysis. The findings suggested an overall high degree of satisfaction with the course, which developed (a) new study skills, (b) increased confidence for learners and the desire to engage in further similar activities, (c) new social competencies, and (d) improvement in the self-esteem of weak learners. Simultaneously, the findings highlight difficulties for the course designers in relation to (i) maintaining the balance between meeting academic goals and keeping weak learners in the course, and (ii) meeting the needs of diverse learners from very different age groups, language backgrounds and levels of education. Overall, the research points to the usefulness of the synchronous local study-circle design format as a way to utilise asynchronous MOOCs, with the case study showing a highly successful application of the blended design. In addition, the particular case study shows the new functions that local learning centres acquired, pointing to a promising future approach to blended adaptations of MOOCs to local education provisions.

My contribution in this paper was to set up the broader project and the course design that was used, as well as research design, data collection through interviews and the main work regarding the analysis and interpretation of the material. The analysis of MOOCs in both global and local settings and the background research, discussion and conclusion were done in cooperation.

Article 4:

Norberg, A., Stöckel, B. & Antti, M-L. (in review) ***Time Shifting and Agile Time Boxes in Course Design.***

   Abstract: The integration of Information and Communication Technologies (ICTs) into higher education courses is often called *blended learning* (BL), although texts on BL often relate to education design. Blended learning is usually understood as a place category: a combination of

traditional classroom-based sessions and Internet-enabled *distance learning* practices. In this paper, we develop an alternative understanding of ICT integration, constructed as time categories, in which ICTs are viewed primarily as process- and project- enhancing. Three such design frameworks are presented conceptually and then used together in a pilot case study on *flexible learning* at the preparatory level for entering engineering programs in a Physics department at a university in Northern Sweden. The frameworks draw on the following: a) Constructivist learning theory, b) time shift mechanisms between synchronous and asynchronous learning modes in the course process and c) agile framework mechanisms adapted from work process developments in the software industry that are used to enhance workflow. The data collection was based on in-depth interviews with students, analysed using thematic content analysis and interpreted through a constructivist learning theory approach. The findings suggest that the particular course design and the way in which it was implemented were effective, and we discuss the applicability and generalisability of the particular model, as well as its possible limitations. We suggest that the time-shift and agile modelling that forms the building blocks of the design are transferable to higher education courses in general. In particular, the elements of the design that were highlighted as useful by the participants and which have a grounding in the theoretical and research literature on learning, refer to the overview functions of work and to the segmentation possibilities of studying in time frames, as well as in regular synchronous and asynchronous shifts.

My contribution to this paper was firstly the theory-based design of the critical workflow sections in the course design that was implemented in relation to the time-based model of BL and to agile framework theory, as well as data collection and main work on analysis and interpretation. The background research, introduction, discussion and conclusion were pursued cooperatively.

Article 5:

Kolehmainen, J., Irvine, J., Stewart, L. Karacsonyi, Z., Szabó, T., Alarinta, J. & Norberg, A. (2016) ***Quadruple Helix, Innovation and the Knowledge-Based Development: Lessons from Remote, Rural and Less-Favoured Regions***.

Abstract This paper addresses the dynamics of a knowledge-based development of remote, rural and less-favoured regions, and is the product

of the EC Interreg IVC project UNICREDS 2010-2012. Many of the regional strategies and policies aimed at developing innovation emanate from policymakers in centrally located urban conurbations and are assumed to be universally applicable. Such policies and their assumptions have led to the development of the *Triple Helix Model* and its successors for economic development. They are based on the idea of universities, business, and public-sector organisations coming together to foster innovation and economic prosperity in a region. In many remote, rural and less-favoured localities, there may not be a university or other knowledge-intensive institution, which makes a difference for local development agendas. In many regions, the business community may also be scattered and insufficiently developed regarding innovation. Moreover, this kind of region may also have a weak public sector in enhancing innovativeness. In such regions, social and community groups may often play the dominant entrepreneurial role. The community may also play a significant role in remote, rural and less-favoured regions where the basic elements of the triple helix model are present. Within this context and having identified the problematic nature of the existing assumptions on the basis of which local innovations and policies are built, we develop the alternative *Quadruple Helix Model*. Innovation processes are becoming increasingly open to different stakeholders. In this paper, we examine and analyse four cases of knowledge-based development processes and policies in remote, rural and less-favoured regions. In our analysis, we use a *Double-Coin Model* of knowledge-based processes, which place the quadruple helix model at the very heart of knowledge-based regional development. Cases from four different European regions (in Finland, Hungary, Scotland and Sweden) are presented as illustrations of the proposed models. Our analytical point of departure is that the knowledge-based regional development should not be viewed as a set of traditional top-down policies but as a complex, place-based, multi-actor discovery process. Following this premise, we adopt a critical analytical perspective on the concept of knowledge-based development, and the role that technology can play in the development of local and peripheral economies. Throughout the four cases, we examine and evaluate the complex relationship between institutional and multi-institutional learning environments, as well as the context within which they operate: the geographic space, local infrastructures and capacities, and the use of technology to access non-traditional students. Our findings from all four case studies show that the quadruple helix approach can and has been applied to support the knowledge-based development and innovativeness of remote, rural and marginalised regions. More importantly, positive developments cannot take place without deliberative and decisive actions: regional development calls for actors and activity. The cases also pointed to

further questions and notions concerning the quadruple helix and regional development. We conclude with policy recommendations.

My contribution to this paper was to work with the first author on the background research and the literature review, as well as the further development of the Double-Coin Model that was elaborated earlier in the project by the first author. I was also responsible for the case study on the multi-institutional campus in Skellefteå. The introduction, discussion and policy recommendations were written in collaboration.

1. Introduction

This dissertation adopts a critical approach to researching the integration of Information and Communication Technologies (ICTs) into the mainstream of higher education. It builds on the premise that more uniform access to higher education over the whole of Northern Sweden (and beyond it) can be implemented with a more versatile use of ICTs, by addressing time and place concepts in education. Distance Learning (DL), E-Learning (EL) and Online Learning (OL) have emerged as *alternatives* to traditional educational practices, and have been accompanied by blended learning (BL) and similar concepts that *aim to integrate* ICTs into campus practices. I am, looking back, critical about these terms and some of the ways in which they have been used, though I can see new constructive possibilities if the existing perspectives on the uses and applications of ICTs are refreshed and discussed.

Through the published articles and this synthesis, I examine BL and the sustainable integration of ICTs in higher education as a possible new normality which can enable flexibility and access in new ways. I argue that some limiting understandings of ICTs can be overcome by bringing 'time' together with 'space' in new technology-enabled solutions. An outcome can be that BL can cover some of the needs behind DL and OL by using new EL technologies, as well as time modalities and places in creative ways.

Contemporary discussions, research terminology, conceptualisations and research agendas on ICTs in higher education run in many directions, and cover and combine many disciplines and perspectives. Furthermore, on the practical level, this occurs in a rather synchronised way over the globe and does so in pace with pervasive and global ICT trends. Simultaneously, in different parts of the world, the research that theorises, designs and supports these developments draws on different research contexts and traditions on which to build.

There is a possibility that more and different perspectives on the development of ICTs in education are feasible, useful and even necessary. Equality of opportunity to access education is, at least in policy, a cornerstone of democratic societies. Nevertheless, the demographics of higher education students are not representative of a country's citizens in any country, as is the case also in Sweden (SCB, 2014). In Sweden, all higher education is state funded, with no tuition fees for Swedish and EU citizens, thereby reinforcing the democratic and rights-related dimensions of access. However, this policy has some minor drawbacks that are directly related to the state support. Universities in Sweden have each at their disposal a maximum number of student places and cannot easily expand by recruiting

more students if they have already met the number for whom the enrolment will be paid. Separate arrangements for increased access outside central campuses can subsequently become less prioritised. Separate organisation of flexible forms of education for off-campus use is also considered as costly. However, a creative use of ICTs in mainstream education programs can be designed in more inclusive terms for students that face time- and place[2]-related obstacles. For this to become a reality, however, universities need to organise ICTs as an organic part of existing provisions and not as separately organised or add-on arrangements. This is the line of thought on which this dissertation draws, and on which the conceptual analysis, intervention experiments, research and discussions are built.

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[2] A comment concerning the of the terms *space* and *place* in this dissertation can be helpful. Space is mostly used for signifying impersonal general coordinates in three dimensions in which anything can *take place*. Place is somewhere in this space which has acquired a meaning for us in lived experience. We attach feelings and experiences to a place, but not to space – if we do, it becomes a place. Good examples of places can be home or school. In some cases any of these words can be used. In other cases they are part of expressions, which do not follow this distinction.

2. Aim and Research Questions

2.1 Aim

The aim of this thesis is to identify, understand and generate new, alternative perspectives on and models for access to higher education, enabled by the ongoing integration of ICTs into mainstream education. Hence, the aim of the research is mainly conceptual and uses empirical studies and literature reviews to inform and construct the conceptual dimension.

2.2 Research questions

The questions that have guided the research and discussion for this dissertation are the following:

1. How does blended learning, understood as the integration of ICTs in mainstream higher education offerings, affect access to education, especially in relation to time- and place-related obstacles to participation?

2. To what extent does *time* offer a different teaching-learning design perspective when compared to a *place* perspective?

2.3 Development from articles to discussion

In this collection of articles, the first begins with a heuristic alternative perspective on BL and ICTs in mainstream education, by presenting a time-based perspective on BL as a possible abstraction. Article 2 offers an examination of the concept BL and its relevance for educational research in Europe versus North America. Studies on time as a perspective in the use of ICTs in education are carried out in articles 3 and 4, which explore the time perspective in interventions and research, as an integral dimension of ICTs in education. Article 5 deals particularly with considerations of place in Triple Helix theory.

Chapter 3 in this synthesis presents two contextual backgrounds that frame the research: (1) The sociodemographic context of Northern Sweden in relation to education and (2) A review of the distance learning (DL), e-learning (EL) and online learning (OL) concepts, on which it is necessary to draw for the main section reviewing the concept of BL, which follows in chapter 4.

In the research design and implementation section of the synthesis (chapters 5 and 6), I describe the designed composition of my five research papers. In chapter 5, I explain my choice and use of theory, and in chapter 6, I explain my choice and use of methodology and methods, and discuss questions around the validity, reliability and credibility of the results, and my approach to research ethics, as adopted in the articles. In chapter 7, I synthesise my results on BL, and time and access to higher education with the help of Adam's social theory of time. In the discussion section, chapter 8, I use Luciano Floridi's Philosophy of Information to discuss contemporary concepts in ICTs and learning through a new dimension, followed by a discussion of my own results in this new light. A finishing chapter 9 with my concluding remarks, returns to the aim and the research questions and offers some final reflections.

2.4 An uncharted spot on the map?

In this research, *access* in BL setups, arrangements and solutions are approached as the uncharted spot that is found on the research knowledge map: to research, describe and report. However, the metaphor of human knowledge as a map with uncharted spots is viewed by Alvesson and Kärreman (2011, p. 23) as conceptually retired in social research. The map metaphor is overly influenced by positivism. Social research is not a project with a final goal in sight, working toward a future in which all knowledge gaps have been filled to render a complete map. However, metaphors can be useful despite their flaws. In the long-term, we may not at any time have a common final map, but we can continue to invest our efforts into interpreting and describing the world.

Karl Popper discussed research objects within different traditions as *clocks* or *clouds* (Popper, 1979), where clocks represented research objects with regular, orderly and highly predictable systems, while clouds represented highly irregular, disorderly or less predictable systems. The natural sciences once took as given that by pursuing research, in due time, all clouds will prove to be clocks, but have since modified that position. Social researchers have the important task of studying everyday events, which often appear as agreeing with common sense, as normal and clear, and problematise them to uncover new dimensions and complexities. Clocks become more cloud-like. In this dissertation, I scrutinise some commonly-used terms and concepts from the field of ICTs in education, from DL, EL and OL to BL, and attempt to show that they are not as clocklike as many practitioners may think. Subsequently, I attempt to make it possible to handle these cloud of ICTs and education in thought and action.

3. Contextual Frameworks

In this section of the synthesis, I provide two contexts for my research and reflection on the use of ICTs in education, which bring together my empirical and conceptual approaches. The purpose of these contexts is that they act as background frameworks for the research, and facilitate the positioning and understanding of the articles, and of my theoretical discussions and reflections. I examine the following:

1. **Sociodemographics and education in Northern Sweden**, in relation to the need for and the access to higher education in the region. This provides a spatial context for the research, given the challenging geography and demography of Northern Sweden. Exploring the spatial distribution of education provision at all educational levels helps to understand the strategies and aspirations of municipalities, the institutional dimensions and designs of universities for higher education provision, and the organisational questions of delivery and logistics. This spatial and sociodemographic approach brings issues of social justice to the fore, particularly in relation to who has access to which provision and how.

2. **Review of Distance-, E- and Online learning concepts** This contextual framework is analytical and conceptual, and concentrates on terms such as DL, EL and OL and their use in relation to time, space and access. It constitutes a background for reasoning about the further integration of ICTs into mainstream educational offerings (BL).

These two areas provide contextual frameworks, firstly for the ensuing chapter 4, which provides a literature review on BL, as well as a critique of the term and applications of the concepts of BL. I will revisit these two contextual frameworks in the discussion section in order to elaborate on further dimensions within which to frame my research.

3.1 Sociodemographics and education in Northern Sweden

3.1.1 Demography and education levels
Northern Sweden faces a number of structural challenges to the provision of higher education.[3] In comparison with other European countries, Sweden is sparsely populated as a whole, with an average of 20 inhabitants per km². In the two counties covering the upper North, Västerbotten and Norrbotten (with a total of 513,111 inhabitants), the population is mostly concentrated along a narrow coastal strip of the Bothnic Gulf, which leaves the inland and mountain regions very sparsely populated: the municipality of Arjeplog has an average of 0.23 inhabitants per km² (SCB, 2016).

The education levels for 2015 that are used here are percentages of individuals aged 25-64 who have *a total of 3 years of post-upper-secondary education or more*, but not necessarily an exam, or only university studies. The Swedish average for this group in 2015 (SCB, 2016) is 26% but ranged from 57% in Danderyd in the Stockholm area to 10-11%, as in Dorotea, located in Västerbotten.

The education level percentages in the two cities with a main university campus, Umeå and Luleå, are 38% and 30% respectively. In Skellefteå, with a commuting time of two hours to the Umeå or Luleå campuses, it is 21%. In general, the longer distance to a campus, the lower educational level with some variations (Holm, Karlsson, Strömgren & Westin, 2013, pp. 44-48; Lovén, Hammarlund & Nordin, 2016, pp. 25-37; SOU 2017:1, p. 118; Frenette, 2004). There are then naturally also considerable regional differences in present recruitment to higher education (UKÄ, 2014; 2015b), and it is explicable that "young people from metropolitan areas are more likely to study" (title of press release, UKÄ, 2015a).

3.1.2 Education as a centralising factor
It has commonly been assumed that there is a direct correlation between the growth of larger cities in a region relative to the depopulation of smaller communities around them. This correlation is not obvious today. Urbanisation has been taking place for a long time, and population pyramids now look very different in cities and rural communities and thereby birth rates in relation to death rates (SKL 2015, p. 8). Cities also attract more people from other regions and countries, moving into work and study.

An interim report from Landsbygdskommitten (SOU 2016, pp. 115-126), reports that municipalities with weak education access lack sufficient numbers of educated people to take the jobs that are available and that increasingly fewer jobs suit the people with lower education levels

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[3] The following does not discuss the university cities of Umeå, Luleå, Sundsvall, Östersund and their directly surrounding areas, where education access is less problematic, but rather the rest of Northern Sweden.

(Pettersson, 2011). If public services such as health and education in a region cannot find qualified people to hire, these services often become centralised and thereby not as directly available to the local population. Östh (2016), who studied the centralisation of state and regional jobs, found that education and health services centralise much more quickly than similar services in the private sector. Rather than stating the common idea that "services decline because people have moved away", it is more accurate to say that "people must move because services have moved". This further decreases the attraction of and the interest of businesses to move to or grow in less populated areas (SOU, 2016 p. 117, Företagarna, 2016). The given reason for centralisation is often effectiveness, but Östh (2016) argues that this development and strategy is not based on evidence, but on ignorance about conditions and possibilities in rural areas.

Higher education is a national system in Sweden and shows a similar pattern of centralisation, both in course provision for lifelong learning (Landell, 2015, pp. 16, 20, 22) and in off-campus infrastructure for higher education that is run by Swedish universities. The earlier university-driven branch campuses in the Swedish cities Boden, Vänersborg, Uddevalla, Sandviken, Örnsköldsvik and Härnösand are no longer run by the universities of which they once formed part, but as campus platforms or learning centres that are run by their municipalities, who regard them as inalienable.[4]

3.1.3 Locally driven learning environments

Local communities that lie far from a university campus suffer not only from low education levels but also from ongoing brain drain. The classic brain drain is considered to be normal, unavoidable and even positive: upper-secondary school graduates from a traditional family background leave for a university town. The local community has a number of options available to counterbalance this by taking measures to educate a part of the remaining potential students. These students can often only be attracted to education solutions that permit them to stay where they are living: DL or OL solutions, or possibly commuting to a campus whenever possible. Personal constraints that come with age, family, accommodation and economic liabilities prevent

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[4] An interesting case is the proposed closure of the Borlänge campus of Dalarna University, as a result of its centralisation to the campus in Falun. The minister of higher education, Helene Hellmark Knutsson, interfered in the university decision process and reported that the government had decided that Borlänge campus should be kept in operation, because "the state should not abandon people and communities" (http://www.dt.se/opinion/debatt/ministern-om-hogskolan-dalarna-manniskor-och-orter-ska-inte-overges-av-staten-hela-landet-ska-leva). The vice chancellors of the Swedish universities protested jointly and instantly, regarding this as an attack on university autonomy (http://www.dt.se/opinion/debatt/35-rektorer-ryter-regeringsbeslutet-om-hogskolan-dalarna-en-principfraga-med-langtgaende-konsekvenser). The minister replied that she did respect autonomy and academic freedom, but that education access and provision are a national, political responsibility. Borlänge campus is situated 22 km from the main campus of Dalarna University, in Falun: a short distance in comparison with the general conditions in Northern Sweden.

these groups from acting as free-moving students (SOU, 2016, pp. 250-252; Lundholm, Garvill, Malmberg & Westin, 2004).

The situation of community learning centres is described in the background section of article 3. Part of this research has been an active collaboration with Akademi Norr, an association of 13 municipalities with learning centres that serve DL students from their own and the surrounding communities. Most of these municipalities are situated outside of a reasonable daily commuting distance to a campus.[5]

With 72,000 inhabitants, Skellefteå is in a similar situation to that of smaller inland communities regarding the supply of competence. It has a work market in the IT and industry sectors with a considerable need for an educated workforce. A multi-institutional campus, *Campus Skellefteå*, was built and maintained by the municipality for hosting a branch unit of Luleå University of Technology and decentralised educations from Umeå University, while also providing general learning-centre and campus services. See article 5. Cities in Sweden with a similar situation and similar campus strategies are Boden, Örnsköldsvik, Härnösand, Västervik and Varberg.

A new hope for troubled communities and the potential second-chance students who live in them may be that modern higher education is nevertheless under transformation, enabled by ICTs, to become more accessible, inclusive, place-independent and flexible in time. Alternative and innovative understandings and models of what ICT can do are very welcome, in both education and society at large.

3.1.4 Off-campus education provision

The term *education logistics* is used here to relate to the organisation of activities and the instruments of an education provider to offer access to education to its target groups of potential students. The archetypal education provision forms that have been used in recent years in Northern Sweden are the following:

> a) *Conventional classroom-based education* on a central campus, not critically dependent on ICTs.
> b) *Decentralised education* - education in classrooms outside of the main campus and with travelling teachers.
> c) *Synchronous video-conference education* - taught from a video studio at a central campus, or recently also from classrooms with students, to a studio at a learning centre in the region or to homes and workplaces.

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[5] The total population of these 13 municipalities in Akademi Norr (www.akademinorr.se) constitutes about 1% of the Swedish population, but the area covers over 18.2% of Sweden's land area (based on calculation on data from SCB, Statistikdatabasen, 2016).

d) *Asynchronous web-based education* - flexible education with time frames but no specific times or places to attend.
e) Increasing *mixes and blends* of the above.

In this overview, (a-c) forms refer to an underlying centre-periphery model, in which the use of ICTs become more advanced the further away from a centre a student is located. However, the courses described in (d) are more place-independent and also attended by campus-based students or local working students. At the University of Central Florida, Dziuban and Moskal found that for most students, "a course is a course is a course" (2011, p. 236) and the most important issues affecting students' uptake of courses are convenience and the personal life puzzle. Students who live near a university campus, but have time obstacles during the day, can be as limited in their capacity to participate in (a) as the very remote students, due to time- rather than place-related obstacles.

Asynchronous education (d) seems at first glance to be suited to substitute both decentralised (b) and video-conferenced (c) education provisions. For some students, this form works well (Ericsson, 2006), but can be quite demanding for students with no previous higher-education experience (SOU 2017:1, p. 128). Study skills, study discipline, self-confidence, strong motivation, communication skills and courage to ask for help are important and can be more challenging for young or inexperienced students following asynchronous courses (Simpson, 2008, Duranton & Mason, 2012, Guri-Rosenblit, 2006, p. 165). The set of offerings in asynchronous education has also been rather narrow, with more short courses than programs. Asynchronous studies also often take the local learning centre out of the loop, so that it cannot effectively support local students.

3.1.5 Recent developments

In the last decade, the following developments in education provision in Northern Sweden can be noted:[6] Decentralised education (b), with teachers travelling to remote students in local classrooms, has almost disappeared in 2016. To some extent, this was expected since central campuses increased their use of ICTs. To have teachers travel to classroom-based students located two hours away is a rather resource-consuming practice, so education is instead centralised or runs in parallel campus- and distance- or online versions. A quite recent development is the parallel operation of distribution forms (a) and (c). Instead of a separate decentralised operation (b), there are synchronous broadcasts from a classroom with students at a central campus to a remote location, such as a video studio at a learning

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[6] This is my own account as a professional working actively with these questions; it can likely be supported from combining information from education catalogues, policy documents and statistical reports, which goes too far for this synthesis. No research publication has, as far as I know, covered these issues.

centre. These studio facilities for synchronous video conferencing have become less of necessity because broadcasting can now occur directly to homes and workplaces, or because it is available asynchronously online. The learning centres have thereby lost much of their social functions in hosting meetings. Article 3 presents a design and study attempting to regain traction for the learning centre as a meeting place.

A mixing of the education-distribution forms (b-d) is currently developing. Campus groups use Learning Management Systems (LMSs) and *flip the classroom* with recorded lectures, asynchronous courses use some synchronous components (which Art. 4 considers in more depth), and the global provision of asynchronous courses and local social arrangements can be combined (Art. 3). The use of lecture capture technology in the HyFlex model (Beatty, 2007), blended synchronous learning (Bower, Kenney, Dalgarno, Lee, & Kennedy, 2013) and the organisation of student options for access in a multi-access pattern (Irvine, Code & Richards, 2013) provide further examples.

The provision of education categorised as *distance education*, which includes both asynchronous and synchronous solutions, has overall diminished in Sweden since 2011 (Landell, 2015, p. 15; UKÄ 2015b, p. 30), partly due to new funding schemes. Universities now receive funding when a student completes courses and very little funding at the stage of student registration. In 2016, distance education provision was reported to have stabilised, though at a lower level than earlier periods (UKÄ, 2015b, p. 34). This, together with a situation of the universities' full use of state-funded student places, has led to a higher concentration of programmes on campuses, attracting primarily young people and conventional full-time students. It can, however, be the case that the parallel synchronous operations between campus classrooms and learning centres described above, are not listed as separate distance educations, and that student-made solutions of flexibility also increase (Norberg, 2012).

To summarise; Northern Sweden is characterised by long distances and a sparse population with lower levels of education than the national average, outside of the university cities. In a developing knowledge society, an increasing number of jobs, also in smaller communities, demand higher education, but these positions can be difficult to fill. Simultaneously, local potential students, including young as well as second-chance learners, can be recruited to education if it is possible to study close to home. ICT-enabled education has indeed provided increased access, but not on a broader and sustainable basis. The flexible education that is offered consists more often of stand-alone courses than programmes (Amneus, 2011, p. 13), often appears just once and cannot continue due to reasons such as lack of extra resources and the demand for filled classes.

3.1.6 Policy signals in early 2017

The first of the Swedish Government Official Reports in 2017 (SOU 2017:1), on January 4th, was the final report from Parlamentariska Landsbygds-kommitten (The parliamentary committee for rural issues). The report states that "access to higher education in the local area is an important factor for the development of business life and public sector" (p. 117). If a university campus is too far away from the place of living, many potential students will refrain from higher education (p. 118). An access dimension of higher education can become added to Swedish university law (p. 120), and universities can be given assignments to increase access in the whole country, by distance education and via local education centres. The report states that development of education access has been slowing down in recent years, as many universities have concentrated their actions around their central campuses. The universities have seen strategical reasons to do so, to strengthen research environments and reach economies of scale in education. The state, however, is responsible for education access in the whole country. Universities are proposed to increase the access to higher education, addressing especially areas with low educational levels and lack of educated workforce in municipalities far from central campuses. Universities can be demanded to report yearly on progress on these issues in their budget dialogue with the state. Nine proposed measures in the report (nr 31-39) addresses the national supply of competencies and skills over the whole country.

The term *decentralised education* seems to be taken back into active educational policy use (SOU 2017:1, p. 118-120). The report recommends the universities to work through educational centres close to citizens in regions far from university campuses. The government will, so is proposed, support the establishment of such centres where they are missing, and also provide basic funding for the work at educational centres. Working via educational centres is prioritised because of the better study results for students who get support at centres and campuses, in comparison with results of students in other distance- or online solutions. This difference is regarded as crucial (p. 128). The educated workforce who settles in defined regions with extra needs of competence will also be able to write off their study loans under more favourable conditions.

The background research for these proposals in the report (Lovén et al., 2016) suggests there is a realisation at the national and local levels about the importance of connecting local educational developments to national higher education infrastructure. In line with the current research, the report highlights the needs to connect local access to education to a moving workforce that has high skills and levels of competence.

3.2 Review of Distance-, E- and Online learning concepts

3.2.1 Introduction
In the following section, I will focus on the concepts of DL, EL and OL as frames of understanding, by drawing on particular assumptions about access in time and space. All three of these concepts are also a necessary background for reasoning about BL (Goodyear & Ellis, 2008, p. 142), and the following is not intended as general reviews of DL, EL and OL, but instead focussing on what these concepts are bringing into the BL concept.

Currently, DL, EL and OL are dependent on ICTs. With the usual risk of categorisation, DL is focused on access to education over geographical distances, EL emphasises ICTs as new tools for teaching and in learning processes, and OL adds a focus on new environments for learning by using ICTs and addressing the needs of DL.

3.2.2 Distance learning
DL is a concept with old roots and many ICTs before the digital age (Holmberg, 1995). Many definitions agree that the teachers' and students' different locations are the main characterising element of DL. However, there are considerable differences between asynchronous DL (both as correspondence studies and web-based asynchronous courses) and synchronous DL that is implemented through video conference. Kaufmann (1989), writes about three historical generations of DL (1989, p. 5), characterised by increasing levels of learner control. Moore and Kearsley (1996) take a longer media-related perspective and write about five generations of distance education, but Heydenrych and Prinsloo (2010) has shown that also this description has weaknesses.

Peters (1967) considers DL as an *industrialisation* of the education process in an assembly line, whereas Holmberg (1983) emphasises the importance of *didactic conversations* between the tutor and the remote individual student in both synchronous and asynchronous forms. Moore (1993) problematises distance as *transactional distance*: the cognitive space between instructors and learners in a DL situation, also dependent on factors other than geographical distance, such as structure, dialogue and learner autonomy. Garrison (1990) discusses DL based on *interactions and transactions* in three dimensions; between student-student, student-teacher and student-content, while Anderson (2003, 2008) emphasises the student-content dimension in his *Interaction Equivalency Theorem*, suggesting that if one of three types of interaction is on a high level, the other two could be on a lower level or even non-existent. Higher levels of the two other interaction types result in a better learning experience but are not as cost- and time-effective.

In practice, DL and especially synchronous DL is not necessarily flexible. Both time and place dimensions can be specified, but the place of the student is remote, and the perceived flexibility is consequently a new possibility to participate remotely. If an LMS is used alongside synchronous sessions, the setup is sometimes called OL instead. This is especially the case for recorded lectures and when both the place and time of participation become optional within given time frames.

Time demands for DL have often shown to be a not fully expected shock to learners (Leeds, 2014). If the time and place demands of a campus are absent, learners may imagine that remaining time demands are low. They are often in for a temporal culture shock when coming into a DL course (Leeds, 2014, p. 187).

For BL, the DL tradition contributes mainly with the idea that an increasing spatial separation between teacher and learners is possible. BL adopts this DL idea for constructing a more negotiable teaching and learning situation what concerns teacher and learner presence and interaction. The DL as a centre-periphery metaphor indicates that teaching has to be transported (Meyer, 2005), but in BL this can be negotiated. The idea is not commonly to create a half-distance education but to optimise learning, flexibility and economy.

3.2.3 E-learning

Research on EL is interested mainly in how new ICTs can contribute to learning. As ICTs can handle an abundance of information in many forms, the cognitive load on students can become heavy (Mayer & Moreno, 2003; Bradford, 2011). Cognitive load theory (Mayer & Moreno, 2003), based on working-memory research, is used for studying how different content can be accessed, presented, designed, chunked, sequenced, presented in multiple media forms and internally related in order to facilitate learning, and preferably deeper learning, when possible. On the learner side, there is a need for motivation, control and overview, personalisation and feeling of presence, and freedom of expression for deep learning (DeRouin, Fritzsche & Salas, 2004). Later, communication tools and platforms for interaction and collaboration became increasingly important, as more and better enabling ICTs became available.

Many existing learning theories have been developed and adapted to theorise and research EL, including behaviourism, social constructivism, constructionism, activity theory and cognitivism. Some models have also been influential, such as Lave and Wenger's *Situated Learning* and *Community of Practice* (1991) which emphasises that the ideal social context for learning is the the learner's context of application; a workplace, not a school setting. Laurillard's *conversational model* (2002) stresses the

importance of learning feedback loops between teacher and students. Salmon's *e-moderating model* (2004) is designed for fostering social interaction in EL. Garrison, Anderson and Archer's *Community of Inquiry model* (CoI) (1999) accentuates the combination of three forms of presence, namely *cognitive*, *social* and *teaching* presence, which together form the educational experience. The CoI model builds on Dewey (1915, reprint 2004) and Lave and Wenger (1991).

In its beginnings, EL was mainly associated with *delivering* structured *content* for personal learning *anytime and anyplace* (Henry, 2001). This accorded well with what the Internet could provide at the time and with its use before the arrival of social media. Access to and dissemination of content and information was later to be followed by more interactive functions such as forums and online collaboration. EL has been used in order to increase access in space and time, but the concept itself does not suggest or state this clearly, as is the case for DL and OL. Salmon states, in a more problematising way, the following:

> *E-learning is in a rather extraordinary position. It was bought as a 'tool' and now finds itself in the guise of a somewhat wobbly arrow of change. In practice, changing the way thousands of teachers teach, learners learn, innovation is promoted and sustainable change in traditional institutions is achieved across hundreds of different disciplines is a demanding endeavour that will not be achieved by learning technologies alone. It involves art, craft and science as well as technology* (Salmon, 2005, p.201).

In practice, EL is not primarily interested in places, times and access, but rather in use of ICTs for learning, which in turn can provide, among other effects, flexibility in space and time, as time and place become negotiable with the use of ICTs. E-learning does not prescribe an alternative place for learning, but rather provides the affordances that are to be evaluated and taken into use for course design in DL, OL and campus courses. From its beginnings, EL has also a root in older unconnected and standalone digital training applications such as Computer-Based Training, CBT. Since long, it uses the Internet as its platform, with rich and accessible material online and abundant communication and interaction possibilities.

For BL, the EL tradition contributes with an instrumental and technical emphasis primarily on learning enhancement but also for flexibility in space and time.

3.2.4 Online Learning

OL theory draws on EL theory but relates it to a study of the new shared *online environment* in which EL is practised, thereby also addressing some

of the place-related needs behind DL. New dimensions are however added by this new environment, namely questions about social presence (Tu, 2002), privacy, interaction, behaviour and ethics (Anderson & Simpson, 2007). It also raises questions about the design of an online learning environment, in relation to the Internet as a whole and to the traditional physical-social everyday environment in which we live, sometimes called In Real Life, IRL. For Carlen & Jobring (2005), the online learning environment forms a *community* for participants. This social participation with shared goals is an important aspect in understanding and developing OL (Jaldemark, Lindberg & Olofsson, 2005; Hrastinski, 2009).

According to Söderström, From, Lövqvist and Törnquist (2012), OL as a practice in Sweden is largely substituted DL by 2010. Online learning is generally seen as time- and place-independent and thereby very accessible, provided that the individual has access to appropriate IT equipment and communication. The flexibility can have limitations if it offers synchronous sessions at specific times, for which there can be good reasons: for instance, a mix of synchronous and asynchronous interactions are a good match in a learning process (Hrastinski, 2008; Sheail, 2015; Black, 2010). However, OL does not solve problems of a local place to study for the student. From a management perspective, this is considered to be easy to solve by students independently. This may not be the case; Rye and Støkken (2012) point to the student's local context as very crucial also in online education, and Raddon (2007) views both the place and time of the local online student as continuous negotiations between demands of education, work and family situation. Sheail and Ross argue that place in online learning should be made more visible (2016).

3.2.5 Summary

In surveying academics in 12 countries, Moore, Dickson-Dean and Galyen (2011) found that the terms DL, EL and OL often appeared to mean approximately the same for their respondents. An explanation may be that they are primarily viewed as ICT-enabled alternatives or competitors to traditional classroom teaching and learning, which draws attention from the differences between them.

DL, EL and OL are, as shown above, related differently to time, place and access, but the concepts are nested into one another. One aspect they have in common is that they are often are perceived as alternatives (Moore et al., 2011), disruptions or deviations from the ordinary events and practices in classroom and campuses (place, technology and alternative environment), which is currently often called face-to-face classroom (Meyer, 2003), not to be confused with anything remote, digital or online.

Allen and Seaman (2003) point out that the OL and DL concepts have continuously been troubled by widespread doubts:

> *One of the most frustrating factors facing the early advocates of online learning was the perception that the quality of these offerings would always be inferior to that of face-to-face instruction. Whether this was based on experience with earlier generation "correspondence courses," or a belief that the essence of teaching is the irreplaceable quality of face-to-face interaction was unclear. What was clear, however, was that the belief that online learning was of lower quality was widely held.* (Allen & Seaman, 2003, p.3).

The expressions *distance learning*, *e-learning* and *online learning* with various definitions and integrations with one another, are all representing ideas of what ICTs can do for education and how they modify education. The three concepts discussed here, DL, EL and OL, are the most visible on the Internet as well. In what follows, I present a statistical table that is based on a review of expressions found on the Internet with Google searches, in which the noun is a conventional education noun and the preceding modifier is ICT-related, as in "digital classroom", thereby indicating an ICT-related change of the traditional concept. A similar table is presented for integration expressions in chapter 4 (such as "blended", "hybrid", "seamless").

Table 3 shows the occurences of combined expressions with an old educational noun, like *learning, teaching, classroom, education, course and campus*, preceded by an ICT-related modifier as *digital, virtual, mobile, online, e-, cloud, distance, Internet, net, web and flexible*. These combined expressions were searched within citation marks, "digital learning" with Google search, on 2016-02-18. The inclusion criterion was >1,000 occurrences in all combinations, so some similar expressions were excluded.

Learning is the most attractive word to modify for all but two modifiers, which is interesting when it is apparent that a lot of what is behind does not primarily concern learning theory or adaption of practices from the student perspective. For a discussion of the increased recent use of the term learning, see Biesta, (2015, p. 62-64).

Table 1. Occurrences on the Internet: ICT and education expressions[7]

	LEARNING	TEACHING	CLASSROOM	EDUCATION	COURSE	CAMPUS
DIGITAL	3 230 000	237 000	438 000	514 000	171 000	262 000
VIRTUAL	2 130 000	64 300	685 000	362 000	207 000	617 000
MOBILE	1 600 000	50 300	165 000	334 000	61 600	150 000
ONLINE	20 200 000	4 940 000	515 000	13 500 000	14 100 000	477 000
E-	53 300 000	266 000	222 000	508 000	572 000	518 000
CLOUD	95 600	16 300	26 700	63 600	26 100	76 500
DISTANCE	22 100 000	347 000	5 810	12 700 000	447 000	8 690
INTERNET	334 000	63 200	34 500	366 000	192 000	45 300
NET	240 000	114000	58400	41000	399 000	182000
WEB	246 000	67 500	42 500	189 000	239 000	143 000
FLEXIBLE	586 000	99 000	32 000	86 300	306 000	4 130

4. Blended Learning: Conceptual Issues

4.1 Origins of the term

BL is a term that refers to a concept, a set of practices, but also a research field. It should be understood against the background of DL, EL and OL (Goodyear & Ellis, 2008, p. 142), in which ICTs enable education to be constructed and delivered in new ways, and are often aimed at new groups of students. Blended learning, on the other hand, uses ICTs for integration into that which is existing, mainstream or traditional.

The term BL has been used in higher education for at least 15 years, but Sharpe, Benfield and Francis (2006, p. 29) claim that it was established within the context of the UK Open University, already in the late 1980s, as a result of a combination of workplace-based and campus-based learning. Bonk and Graham (2006) write that BL is "part of the ongoing convergence of two archetypal learning environments" (p.5); the face-to-face classroom environment and the distributed distance environment. At the outset, these environments existed separately, were intended for different learners and used different methods. ICTs were not critical for the campus teaching operations, but necessary for the distance environment. The background to this convergence can be viewed from both archetypal environments. Campus teachers and students began to use more digital tools for effectiveness and smoothness when it was observed that students in the distance and online settings had good use of Internet content and communication, and also when ICTs were beginning to be commonly used in everyday life. The digital tools were no longer reserved for the non-campus students and for overcoming distances. Rather, the focus was on how to use the new technology within the mainstream environment for campus-based students: EL could contribute to the campus environment (Scagnoli, Buki & Johnson, 2007).

From within the research and practice groups operating on distance environments, disappointment was growing. Between 2001 and 2003, there had been a fast growth of EL offerings from both public and commercial, as well as old and new stakeholders at the beginning of the new millennium. The UK E-learning university is one example, with increasingly many other university consortia with similar provisions (Bates, 2005, p. 33-40). Courses failed to recruit or lost many of their students, often lifelong learners and second-chance learners, due to their (frequently) limited competence in using the technology. Guri-Rosenblit (2006) observed a paradox in that "second-chance and unprepared students are less qualified to use information and communication technologies for their purposes", despite them being the students that most strongly needed access to EL (2006, p. 165). In the early 2000s, there were calls for slowing down and even

temporarily reversing the all-too-fast EL tooling of distance courses and instead adding some face-to-face meetings again (Sharpe et al., 2006, p. 20). In the corporate sector, the hopes for savings and effectiveness gains in training with content-based asynchronous EL saw a similar turn-around (Finkelstein, 2006). Within this context, BL was viewed as a smoother introduction for a later transition to EL, especially in relation to corporate learning (Driscoll, 2002). A common term at this time was subsequently "blended e-learning" (Sharpe et al., 2006, part of title).

4.2 Definition questions

The term BL appears to have initially caught on without any great controversies, although it can appear as neither 'high-tech' or particularly 'academic'. In an earlier phase of the period in which BL discussions were new and aspirations for its applications were high, the conceptual articles that attempted to define BL were many, as expected. The ideas were dispersed, especially about what components should be considered to be *blended* (see table 2).

Garrison and Kanuka (2004) write that "at its simplest, BL is the thoughtful integration of classroom face-to-face learning experiences with online experiences" (p. 96). But, they also argue that BL faces considerable complexity: "...in its implementation with the challenge of virtually limitless design possibilities and applicability to so many contexts" (p. 96). The vast scope of options makes BL a challenge. Garrison and Kanuka (2004) issue a warning against merely adding new approaches or methods to traditional ones, and recommend teachers and course designers to carefully reflect and try out functional combinations of learning environments and technologies. There is much to gain, for example, from a "simultaneous, independent and collaborative learning experience", in which learners can be independent of space and time, yet remain together. They also find their known constructivist learning model, Communities of Inquiry (CoI), to be useful in classrooms as well as in online or blended settings (Garrison and Kanuka, 2004, p. 97; Garrison & Vaughan, 2008).

One of the most general and inclusive research definitions comes from Graham (2006): "Blended learning systems combine face-to-face instruction with computer-mediated instruction" (p. 5). It is noteworthy that Graham defines not BL, but *BL systems* in order to enable a frame for understanding this phenomenon more broadly. This also enables research on practises that are called BL, in addition to discussions of any inherent or ideal meanings of the term.

Table 2: Some occurring dimensions of BL[8]

The blend concerns	What is being blended?	Component A	Component B
Delivery	Instruction, content	Face-to-face education	Distance education
Technology	Tools for instruction and learning	Analogue tools	Digital and web-based tools
Chronology	Interventions, modalities	Synchronous	Asynchronous
Place I	Learning environment	Classroom	Online environment
Place II	Learning environment	Classroom-based	Practice-based
Roles	Groupings of learners	Multi-disciplinary group	Professional group
Pedagogy	Pedagogical approaches	(As a one-to-many approach)	(As a problem-based or peer-to-peer approach)
Focus	Aims	Content, knowledge	Skills
Direction	Actors directing learning	Instructor-directed	Autonomous or learner-directed

Salmon (2005) notes another critical difficulty in the concept of a 'blend': "To date, the differences and similarities between online, traditional distance and physical-based teaching have been little understood, leading to confused notions of the panacea of 'blend'" (p. 202). If one does not know clearly what one is blending, the result will continue to carry such uncertainties. Oliver and Trigwell (2005) raise a similar point about the problematic nature of technology and our understanding of its role in relation to all learning, rather than its electronic form exclusively:

> *As soon as a principled position is taken, the term 'e-learning' becomes problematic. From an activity theoretic perspective (Kuutti, 1996), for example, all activities involve a technology of some sort and there is no particular reason to distinguish between those with and without the 'e-' prefix. Equally, there is no definition of 'traditional' learning* (p. 19).

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[8] Developed in part after Sharpe, et al. 2006, p. 17.

4.3 BL as a pragmatic term

Sharpe et al. (2006) found three basic kinds of BL in their review of about 300 BL projects, reports and publications in the UK, specified as follows:

1. The *online provision of supplementary resources* besides traditionally managed courses.
2. *More transformative practices with radical course designs* making use of new technology to facilitate learning.
3. *Students' self-developed practices* when "taking a holistic view of the interaction of technology and their learning". This third type of BL is viewed as "both under reported and under-researched" (p. 2-3).

Their recommendation was clear, although unusual in its motivation and formulated as follows:

> *Use the term blended learning. Although difficult to define, the term 'blended learning' is finding acceptance among higher education staff. We suggest that the advantages of the term include its poor definition - which allows staff to negotiate their own meaning - the implication of the protection of face to face teaching, and the implication of designing for active learning* (p. 4).

Blended learning appears to have been an inviting and inclusive term. Many ideas were generated and developed together in teaching and learning practices. Laumakis, Graham and Dziuban (2009) understand the variety of BL interpretations combined with the unity, in future expectations, with boundary object theory, which they describe in the following quote:

> *Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use* (Star and Griesemer, 1989, p. 393).

According to Laumakis et al. (2009), BL could be such a boundary object, for instance in expressions such as "the net generation", which also accommodate a variation in meaning and simultaneously a degree of general unity. Similarly, Driscoll (2002) finds that "the point is that blended learning means different things to different people, which illustrates its widely untapped potential" (p. 1). Still, it is clear that the affordances with BL are considered in various ways: better learning (Means, Toyama, Murphy, Bakia & Jones, 2009), increased access and customizability (Mayadas & Picciano,

2007) and solving direct and defined problems in a specific education in crisis (Twigg, 2003).

4.4 Critique of the BL expression

The expression BL has been criticised, for example by Oliver and Trigwell (2005), who find that the term, despite its increasing popularity, is ill-defined, lacks clarity and is being used inconsistently (p. 24). There is no blending theory on which to build BL and *learning* is not something that can be *blended* in any meaningful sense. Most of what is written about BL is about teaching arrangements, rather than about learning. The authors suggest that "the word 'learning' (should) be rightfully returned to the learner" (p. 24) and propose using variation theory instead (Runesson, 2005), as a guide for how to choose and utilise ICTs and customise them so that they can be useful in enhancing student learning. It should, however, be noted that Oliver and Trigwell (2005) are not at all opposed to the use of ICTs in enhancing mainstream education. On the contrary, the question is rather whether referring to this as BL helps in understanding such an integration of ICT. Oliver and Trigwell (2005) also recommend that we imagine the *unblended* pedagogic situation and start conceptual work from there[9]. In imagining what is blended while not viewing *learning* or *teaching* in isolation either, Vygotsky's concept of *обучение* (*obuchenie)* (1980, pp. 79-90) as the teaching-learning activity can be useful. The direct translation of *obuchenie* to English has proved to be no easy task (Cole, 2009). Biesta (2015, pp. 62-64) scrutinises the increased use of the term *learning,* as a marketing-motivated "new language of learning", or *learnification* of education.

4.5 'Blended learning' - a research term?

The BL research field overlaps with other fields, such as Computer Supported Collaborative Learning (Dillenbourg, 2002), Technology-Enhanced Learning (Dror, 2008), Fach-Didaktik (Hudson, 2009) and T-PACK theory (Mishra & Koehler, 2008). These are described in more detail in the literature review in article 2.

In article 2, we found no major difference between Europe and North America in the usage frequency of the BL expression while exploring

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[9] I have made an attempt to imagine such an "unblended" teaching and learning situation in an invited blog post, on https://blended.online.ucf.edu/morning-blend/a-back-to-basics-thought-experiment-about-blended-learning/.

university websites for North American and European universities. Teachers and administrators appear to use the term in both regions. In the research reviews, however, we observed significant differences. Generally speaking, BL is not a research term that is of importance in Europe, as researchers there prefer other disciplinary categorisations and traditions, compared to North America. Similarly, there is in Europe not much corresponding to the research traditions of instructional design and instructional technology in North America. ICT questions in education in Europe are often addressed in computer science and informatics, and by teachers who research their own teaching practice, besides educational researchers. Biesta (2011) argues that education in Europe is a research subject, not only a research object.

BL research has initially worked with definitions and categorisations, but also increasingly with models: Graham proposes a value-adding categorisation in enabling, enhancing and transforming blends (2006); Picciano and Dziuban (2007) introduce a conceptualisation of BL as variable on a scale from fully online to fully conventional face-to-face; Garrison & Vaughan (2008) adapt *Communities of Inquiry* as a BL model (Shea & Bidjerano, 2010); BL models for *Course Redesign* address specific problems (Twiggs, 2003); Graham presents the challenge for BL in combining the *best of two environments* (2006); and Khan's *Octagonal framework* for BL (2005) also covers organisational perspectives on BL. In the corporate sector, BL was interpreted and applied by using many components in a designed blend, such as *IBM's Four Tier Model* for BL (Hall & LeCavalier, 2000); Clark's *multiple component concept* of BL (2003); Carman's *multiple ingredient blending* (2002) and Bersin's sequential *program* approach versus the *core-and-spoke* approach (2004).

Recent research about blended learning, besides many case studies, has dealt with questions about institutional adoption and implementation of DL (Moskal, Dziuban & Hartman, 2013; Graham, Woodfield & Harrison, 2013; Porter, Graham, Spring and Welch, 2014). Other research has focused on the construction of student and faculty experience of blended learning, as for example ambivalence concerning online and blended learning, related to convenience and social priorities (Dziuban, Moskal, Kramer & Thompson, 2013). Recent bibliographic reviews of research trends in BL comprise overviews of the most-frequently cited research articles (Halverson, Graham, Spring & Drysdale, 2012) and dissertations (Drysdale, Graham, Halverson & Spring, 2013).

BL research seldom deals with questions about access to education: these questions still tend to be considered to be part of the DL, EL and OL fields, as BL is commonly viewed as a campus-based phenomenon. The access, gains or losses with BL arrangements are considered to be incidental and seldom researched or theorised, although there are a few examples in this direction (Mayadas & Picciano, 2007; Power 2008). This dissertation

focusses on access: can we hope that BL, interpreted as ICT-integrated sustainable forms of teaching and learning, will be designed as more inclusive, for instance by enabling conventional full-time campus students to study together with working students who are located far from the physical campus?

4.6 Broadening the scope of BL concepts

There are other concepts in research and practise that are similar to BL, which emphasise the integration of ICTs with traditional education in one way or another, rather than presenting alternatives to traditional education (as in table 1). In comparison, table 2 below presents the online occurrences of expressions or concepts that are built from a new ICT-related modifier and a traditional educational noun. Here, combinations of *blended, hybrid, "seamless, boundless and flipped* occur together with conventional nouns that refer to education, namely: *learning, teaching, classroom, education, course and campus.*

Table 3. Occurrences on the Internet: ICT integration expressions

	LEARNING	TEACHING	CLASSROOM	EDUCATION	COURSE	CAMPUS
BLENDED[10]	4 690 000	40 700	79 200	40 200	137 000	3 820
HYBRID	270 000	22 900	16 500	22 200	190 000	2 510
SEAMLESS	47 000	2 200	1 380	41 200	5 560	1 330
BOUNDLESS	21 000	21 900	636	10 700	1210	252
FLIPPED	398 000	27 200	443 000	10 800	8 460	216

The most common expressions in table 3 are *BL*, followed by *flipped classroom. Blended* is the most popular modifier and, as in table 1, *learning* is the preferred educational noun to modify. In this dataset, there may be more hidden and irrelevant noise than in the previous set, as expressions can

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[10] Yellow shows the most frequent expression found overall for "x y" Google searches on 2016-11-02 in this data set, namely "blended learning". Green show the most frequent combination for the modifier (if not yellow), which for "flipped", is "classroom". Blue shows the most frequent combination for the modified noun (if not yellow or green), which for "course", is "hybrid". An inclusion criterion for integration expressions was >100 occurrences for any combined expression.

arise randomly. A course may be called blended or boundless while not referring directly to ICT or learning.

Blended and *hybrid* appear to have quite related meanings, while the latter has about half the occurrences of the former. Interestingly, for the noun *course*, *hybrid* is more common as a modifier, while *blended* is more often used for modifying the meaning of *classroom*. *Seamless* is a modifier which relates primarily to the individual's personal learning process, the self-design of learning in a personal time and place flow, and the student's transition between time modes, places, media and types of communication. It also includes the smooth transition between formal and informal learning (Wong, 2012). The modifier *boundless* can have a similar meaning, connected to the learning *activity* (as in Jaldemark, 2009). A separate reference of boundless learning is solutions for integration of open text content in LMS:s (Fitzgerald, 2013). The modifier *flipped*, as in *flipped classroom*, emerged on a larger scale around 2009[11] and soon became a popular term. Many of the first applications concentrated mainly on inverting the use of place for functions in teaching and learning while watching or listening to lectures became mediatised and moved to the home environment. What was earlier viewed as homework activities (as doing assignments), moved to the campus setting. If one-way lectures are taken away, the use of the concept is not as obvious (see literature review in Bishop & Verleger, 2013).

4.7 Blending and integration?

Determining whether a course can be described as blended is dependent on the definitions that are held and the positions that are taken with regard to the uncertainties that are inherent in these definitions. On a local and practical level, in discussing course design and describing and classifying the characteristics of courses, a practical situation is at hand to make the discussion more sensical. Below are some examples that are mentioned in the literature:

1. A course is blended if ICTs are at all used in a course, in addition to traditional tools and methods (Allen & Seaman, 2003, p. 6)
2. If a course has reduced seating time in classrooms, due to the use of DL, EL or OL, it is called blended (Baepler, Walker & Driessen, 2014, p. 227).

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[11] Popularity of a concept as a Google search term from 2004 until the present can be examined as a trend graphic at https://www.google.com/trends/.

3. If a course uses the online environment instead of the classroom for more than x % of the instruction, it is called a blended course (Allen, Seaman, Poulin & Straut, 2016, p. 4).
4. A blended course is a course on a scale between a fully face-to-face course and a course that is fully online: a continuum of EL implementation (Garrison & Kanuka, 2004, p. 96-97).

Only propositions 1 and 2 are measurable but do not offer any meaningful insights. Nr 3 demands that instruction or possible content volume is measured percentage-wise in relation to classroom practices, which is not helpful. Nr 4 demands that online use is measured, which can be done by adopting criteria, thereby becoming a technicality. None of these address increased access directly. In all of these suggestions, the balance between using a traditional common physical place and DL, EL and OL tools and environments seem crucial, and direct the focus on technical or spatial blend proportions. The Spanish translation of BL as *aprendizaje semipresencial* (a half-present mode of learning) mirrors this. The blend in practice appears to be aimed at balancing quality, access and cost. In a longer, historical and more abstract perspective, few would object to the view that BL also concerns a long-term integration of ICTs into the normal, which in turn can be expected to change. Translations of the BL term, such as *Integriertes Lernen* (German) or *Solatuva oppinem* (Finnish) are indications of such a later *integration interpretation* (see Art. 2 on national terms for BL). French, Olrech, Hale and Johnson call BL "An ongoing process for Internet integration" (book subtitle, 2003).

For research purposes in this dissertation, I have chosen to consider BL as *the ongoing long-term integration of ICTs into the normality of education practice* which may also affect how this normality is perceived and constructed. I consider this move to be a necessary way of freeing thought from the limiting demands of physical place or technology use in other interpretations of BL.

5. Theory

5.1 On theory

As a term, theory has many separate and overlapping references and is also very elastic within some disciplines (Sayer, 2010, p. 49). References range from meanings in everyday talk, in which theory can stand both against *fact* and *practice,* to physicists aiming to develop a one-and-only theory by which to explain and predict observations. In social-science theory, Abend (2008) distinguishes between the following seven meanings of theory:

1) Propositions about relationships between variables.
2) Explanations of a specific social phenomenon.
3) Strategies for making sense of a defined part of the empirical world.
4) Interpretations of writings by main authors in the field.
5) Overall perspectives from which a researcher observes and interprets the world.
6) Accounts having a basic normative component, such as feminist or critical theory.
7) A distinct use of the word theory to refer to general discussions in a discipline.

These meanings stand in describable relations to one another. Abend argues that theory and data do not exist as independent parts of the observed world. They are only convenient analytic distinctions which make communication between researchers easier if they are used wisely. Theory is a relative term, and its usefulness in communication varies. Examples of Abend's varying meanings in research on ICT and learning can be (1) Measurement of ICT-enabled learning results in comparison with classroom-based learning, (2) Explanations of experienced learner isolation in distance learning, (3) Moore's theory of transactional distance, (4) McLuhan's concepts on the use of emerging media, applied on Internet technology, (5) Activity theory, (6) Critical Pedagogy and (7) Learning theories, such as behaviourism, constructivism, sociocultural theory, connectivism and constructionism.

Abend's list of meanings appears first as an exhaustive description, but Sayer (2010) makes it more complex by working with a tension between three meanings:

1) Theory as an *ordering framework*, which permits data from observations to be sorted and utilised for explanations or predictions.

2) Theory as *conceptualisation*, where theory is a way of bringing the objects of observations under a concept – or using observations (also concept-dependent) to form a new concept.
3) Theory meaning the same as *hypothesis or explanation* (which reconnects to commonly held understandings in common language).

If these three meanings are compared with Abends seven, most of them are what Sayer refers to as ordering frameworks.

Sayer (2010) advises not to equate or interchange (1) and (2), as they are different. In (1), the data must have rather unproblematic meanings and internal relations to other data in order for it to be used, or else risk being disregarded as useful or relevant data. Theory allows one to view some materials as data, while not others and research becomes *theory-laden*. In (2), the sorting of data is not the priority, but the *conceptualisation* of that which is observed before it becomes data, is. The focus lies on the meaning or understanding of that which is observed, and the ordering of data is secondary to the conceptualisation of that which is observed. But if not data, should facts be more important than concepts? Sayer refutes this, arguing that we never pick up facts themselves but rather formulate and use our factual statements about the world, which are not unproblematic in relation to concepts which already affect us. From the onset, our concepts affect what and how we observe, and if observations do not fit, we must become conscious of it and problematise our concepts in order to change them. This is not easy, as observation is conceptually mediated (p. 51). We can never suppose we observe the world unbiased. Concepts also affect the distinction between the observable and the unobservable, and humans with different concepts make different observations, not only concerning characteristics but also existence. In this light, the commonsensical expression "I wouldn't have believed it if I hadn't seen it" may be better expressed as "I wouldn't have seen it if I hadn't believed it".[12] Observational data may change our understanding, but only through re-conceptualisation. As an ordering framework or conceptualisation, theory has different priorities in social-science frameworks: Sayer mentions that economics often uses theory as an ordering framework, while sociology associates it more with conceptualisation. From Sayer's discussion on conceptualisation, it can be concluded that in considering theory as conceptualisation, it is not viable to state that in order to study x today, I use theory y and get results z (which makes more sense if viewing theory as an ordering framework). Many layers of conceptualisation may be involved. However, researchers must try to make conscious use of theory as conceptualisation. This entails adopting one

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[12] Einstein, quoted in Pruzan (2016), p. 143.

theory for guidance in all work, or choosing theory according to what should be done in a study, or both on different levels and in covering different aspects of a research topic. Another takeaway is that using a chosen theory as a convenient sorting framework is practical if it is easy to handle and visible for the researcher. The straightforward use of a theory does not, however, take away the researcher's responsibility to question and work with conceptualisation. Concepts are also the building blocks of theory; without well-defined concepts and ongoing critical conceptualisation to revise these if needed, theories are at risk.

Floridi and Sanders (2004), and Floridi (2008a) underline the importance of roles and intentions in understanding how concepts are formed. This understanding lays the focus on agency: how we from our roles, interrelate to professions, interact with and cause change to a system and thereby to the world. His examples are practical, such as a car mechanic, a car insurer, a car designer and a car buyer whom all observe the same car, but form different *observables* and hence, theorise differently. Their sets of observables can be *nested* or *disjoint* with one another, meaning that they can have some observables in common, or not. There is no good absolute question that can be posed about the car, but each epistemic agent has a *level of abstraction* for his extraction of data. I find Floridi to be very helpful at this point, as I experience myself as primarily having a role as a researcher, which entails a profession and an agency by which to make education more accessible in Northern Sweden by using ICTs. This affects what I consider relevant and significant and how I conceptualise the research objects.

Haraway (1988) has a similar view when reasoning about epistemology in feminist studies; researchers should not pretend that they are doing "the god trick of seeing everything from nowhere" (p. 581). The most objective researcher may be one who declares his perspective, is aware of its limitations and tries to variate perspectives (Sporre, 2007, p. 57).

5.2 Use of theory in articles

The different papers in this dissertation use different theory, the usage of which has progressed during the work. A common question that I received in discussing my research with others regarded which learning theory informs this research. My research does not draw heavily on learning theories in relation to ICT. In articles 3 and 4, Garrison and Vaughan's constructivist model for blended teaching and learning and Communities of Inquiry (2008) are used to inform the design and interpret results. All practitioners, ranging from behaviourists to cognitivists, constructivists, constructionists and sociocultural theorists can, and do, use ICTs to develop characteristics in course design. Some of these designs increase access, while others do not. In

this dissertation, I am primarily interested in access in space and time to any education in which a student may wish to participate. Furthermore, I do not consult common theorists on education, such as Dewey, Bourdieu or Bernstein. Their theories could be and have been applied to education access in many ways, especially for critically analysing differences in access to education for social groups. For the potential students that I have in mind, namely those in sparsely populated parts of Northern Sweden, I am primarily interested in understanding new access possibilities, against obstacles of time and space. In accessing education, people may have conditions other than being remotely located, such as those related to family background, ethnicity, handicap and gender, which may have an adverse impact on their capacity to study. This dissertation does not include an exploration of these interrelations or their intersectional effects on education.

Instead, the articles that are included in this dissertation use theory explicitly in the following ways:

1. Adaption of theory by the re-conceptualisation of basic concepts.
2. Drawing on tensions between theories to analyse data.
3. Combining theoretically-informed models for design purposes.
4. Analysing phenomena or results of empirical research.

Adaption of theory by re-conceptualisation.
The time-based model for BL (Art. 1, used in 3&4) was not explicitly theory-driven. Rather, it was driven by the authors' (i) understanding and knowledge of teaching and learning theories as these underpin ICT in education, and (ii) critical approach to the field. Drawing on these two dimensions, we evaluated the BL concept as being too unclear, under-theorised and often superficial to be operationally useful in designing courses that are informed by theory, as well as in identifying openings for increased access to under-represented students. Simultaneously, BL refers to something important which needs further research, study and theorisation, namely the integration of ICTs into mainstream courses, rather than viewing ICTs as a technology driver of alternatives to them. A conceptual analysis and an element of heuristics led us to refresh an older time perspective on the educational process, which stands in contrast to the contemporary emphasis on the place-related perspective that we identified. By abstraction, the blending, or rather integration, of ICTs into the mainstream is understood as synchronous and asynchronous modes of communication, and as a shift in the consecutive time flow between these modes. Through this time perspective, we argue that the use of ICTs can be more clearly understood.

In article 5, the concern is that *Triple Helix Theory*, the functions of which are commonly viewed as a necessity for regional development in the knowledge society, does not work if one or more of the factors is weak or non-existent. Triple Helix theory relies on an analysis of institutions in a particular geographic area and on their combined interactions in a complex set of organisational development dimensions. Regional development is the result of such successful interactions but relies on the effective and highly functioning combination of factors that are not always present. A region may lack a university, or the existing university may not be sufficiently interested in regional development, or there may be a weak business sector or a rather inactive local government. In this article, we describe and analyse the situation in four European regions that we classify as 'less favoured regions', given their geographic characteristics, the level of economic and social development, and existing higher-education institutions and access provisions. The four regions are represented by authors from four different countries, following the Double Coin model. On the basis of our analysis, we design adaptions of the malfunctioning Triple Helix model, resulting in a design of an extended Quadruple Helix theory which we exemplify with four case studies from our respective countries and regions.

Drawing on tensions between theories to analyse data.
In article 2, the data that were gathered through a survey and literature review show a different frequency in use and differences in the kind of use of the term BL, while comparing European and North America research. We seek to understand this difference by comparing *Instructional Design* theory in North America with *Didaktik* and *Fach-didaktik* in continental Europe and Scandinavia, as research traditions in which it can be meaningful or not to use the term BL in referring to theory and the construction of new theoretical ideas. We find that researchers in the European Didaktik tradition often had limited interest for the use of technology in teaching and learning. The technologies that were used and combined for teaching were not an important general focus for Didaktik as a theory. The more recent tradition of Fach-didaktik has shown to have more interest in questions about the use of technology in its ambition to shape subject-specific teaching and learning methods. On the other hand, North American *Instructional Design* is a theory that sprung from the discipline of Instructional technology and which placed questions about the effectivity of instruction that is aided by technologies in the centre of attention. On this basis, we consider what kind of researchers in education, there are in Europe versus North America. We find that, in most European traditions, education is itself the research object for education researchers, whereas in North America, education is a field withobjects for research in other disciplinary areas, such as psychology, sociology, statistics, history and philosophy, as well as instructional design.

The roots of these differences are found in the paradigms that frame the understanding of education practice and theory, as explored by Biesta (2011), in which the Anglo-American tradition draws on education as a field of practice that relies on other disciplines for its definition and that the majority of other European traditions follow the Germanic conceptualisation of education as Erziehung (the study of Pädagogik) and Bildung (the study of Didaktik) (see also: Keiner, 2002; Schriewer & Keiner, 1992).

Combining models for design purposes.
In articles 3 and 4, the time model for BL from article 1 is adopted for course design and underpinned by constructivist learning theory, according to Garrison and Vaughan's Community of Inquiry model for BL (2008). Both studies began by adopting a mode of Design-Based Research (DBR) as a method. In cooperation with a teacher and an instructional designer (Art. 4), and a study-centre manager (Art. 3), I analysed problems and possibilities and developed a design, by adopting the role of education designer. The evaluation was subsequently performed by adopting the role of researcher. Design-Based Research accentuates that it is important to distinguish these roles if the same person carries out both of them.

In article 3, the main question regards the need of learning centres in developing new forms of education provision, in which the centre could be an active agent in facilitation and in providing a physical meeting place for social presence. The actual course implementation was built on constructivist learning theory (Garrison & Vaughan, 2008) and combines a globally-accessible and asynchronous MOOC course with a synchronous local study-circle concept, for use by local learners. The BL time model (Art. 1) was used as an instrument in designing the shifts between course content and study-circle meetings. The MOOC phenomenon as such was also interesting as part of the design but was not yet much theorised at the time, but the more discussed in media.

Article 4 is based on the Communities of Inquiry model (Garrison & Vaughan, 2008) and combined the concept of BL from the time perspective in article 1 with the *agile framework model* for project work in software development. This was done because procrastination was identified as being a considerable risk with the pilot course being in a flexible form. Mechanisms from agile frameworks proved to be apt for combination with the time model, as both include elapsing time in relation to their focus on results.

Analysing phenomena or results.
In article 3, we theorise MOOCs as a global phenomenon and examine how they can be applied and understood in local contexts. In this way, MOOCs

range from elite universities which claim global research excellence in course subjects, to local active use by local learners (as in the example of Arvidsjaur in Northern Sweden). We wanted to understand more about the interactions between agency and structure in this kind of development, and considered it unsatisfactory to only refer to a shared global online world in which teaching and learning were said to happen anytime and anyplace. People's reality is also both physically and culturally embedded in local contexts, and elite universities' MOOCs are culturally-dependent forms of teaching. We found Marginson and Rhoades' *glonacal agency heuristics theory* (2002) to be well suited for interpreting, discussing and theorising MOOCs' role in globalisation, as it works with both institutional and individual agents at three or more interacting levels, namely the global, the national and the local.

In article 4, the same model for *agile frameworks* that we had operationalised in design was used in analysing the results, driven by our interest in how students experience the flow of courses over time, their learning within specific time frames, as well as their strategies for coping with the pace of courses, including dimensions of procrastination.

Chapter 7 adopts Adam's social theory of time (2006; 2008) in order to synthesise and contextualise results, and the discussion (chapter 8) of this synthesis adopts Floridi's Philosophy of Information (2012) in discussing and questioning the results, and in envisioning a new context for and other kinds of blend.

6. Methodology and Methods

6.1 On methodology and methods

Methodology and *methods* are terms that are sometimes used interchangeably. When they are not, methodology often constitutes an overarching approach to the research and a particular approach to research design, while methods are then the actual tools that are chosen for that methodology.

In this dissertation, a critical methodology is used, which questions current and common understandings of, and perspectives on ICTs and education, attempts to de- and reconstruct them and to provide possible alternative understandings and applications. Critical methodologies are characterised by the application of perspectives from the vantage point of structurally disadvantaged and powerless groups who are not favoured by the current social and economic arrangements. Habermas (1986) argues that the research and development of knowledge are grounded in human interest. A critical methodology has a strong aspect of social justice.

Methods should be appropriate for answering research questions. That does not necessarily mean that quantitative questions should be managed only with quantitative methods or qualitative questions only with qualitative methods. Alvesson and Kärreman argue that this kind of orthodoxy in research, combined with a narrow research question, runs the risk of producing very few interesting new theoretical insights (2011, p. 16). They prioritise the need to "explore how empirical material can be used to develop a theory that is interesting rather than obvious" and recommend the use of empirical material as a critical dialogue partner in theory development: "how empirical inquiry can be used to challenge assumptions" (p. 17). They also suggest that researchers need to *defamiliarise* themselves with the research environment. Bell, Blythe and Sengers (2005) view defamiliarisation not as a scientific method in itself, but as a process that shed new light in which to view designs and practices of which the researchers are part (p. 154). The problem should be developed to a *breakdown* in understanding (Alvesson & Kärreman 2011, p. 19), which should be solved by restoring understanding and applying new theory, hand in hand with empirical work of the kind that is needed. Hence, the matter at hand is not the exploration of the empirical situation, but also its adherence to or misfit with the challenging new theory. Though it is tempting to use the term *hypothesis* here, it may lead associations to a more positivistic form of fallibilistic natural science (as in Popper, 1959). Social science is about understanding. To theorise something is here understood as Alvesson and Kärreman's notion of *disciplined imagination*. Empirical data, methods and theory development have a

preventive effect toward developing ideas carelessly and arbitrarily (2011, p. 18).

The research questions in this dissertation are partly of a conceptual kind and need conceptual analysis as a method, along with more empirical methods, as Design-Based Research in education (DBR Collective, 2003), as well as mixed-methods research (Cresswell, 2003, pp. 208-225; Cohen, Manion, Morrison & Bell, 2011, pp. 21-26, 162.) including both quantitative and qualitative methods. Adopted here are common methods for surveying, interviewing and analysing qualitative results (Cohen et al., 2011, p. 559-560) by qualitative content analysis (Mayring, 2014). The following table offers an overview of this and of the uses of DBR and Conceptual Analysis.

Table 4. Use of methods in articles, overview

Article		Methods used	Comments
1.	A time-based blended learning model	Literature review Conceptual analysis	*See description below*
2.	Are you working in the kitchen – European perspectives on blended learning	*Mixed methods:* Literature review Email–based survey Word-frequency counts Comparisons on university websites	Word frequency counts were performed as a general reference and orientation. Email survey with 67 experts, of whom 33 replied
3.	Using MOOCs at learning centres in Northern Sweden	Literature review DBR Intervention study Interviews Content analysis	Work began with DBR, which became a case/intervention study in lack of iteration. *See description below*
4.	Time shifting and agile time boxes in course design	Literature review DBR Intervention study Interviews Content analysis	Work began with DBR, which became a case/intervention study in of lack of iteration. *See description below*
5.	Quadruple Helix, Innovation and the Knowledge-Based Development	Literature review Conceptual analysis Minor case studies as examples	Conceptual analysis was used for adaption of theory

DBR= Design-Based Research

6.2 Design-Based Research in education

DBR (DBR Collective, 2003; Wang & Hannafin, 2005) is a rather recently developed research strategy which is possible to combine with a critical methodology. The underlying idea is to develop cooperation between teacher, teaching team or instructional designer and a researcher, who is acting in two separate roles of designer and researcher (DBR Collective, 2003; Wang & Hannafin, 2005). The intention of DBR is to depart from the possibly irresponsible role of a researcher when acting as an experimenter who implements something new to solve a problem in a teaching-learning

situation or only tests a new technology or strategy, collects data and leaves to analyse the results and to publish.

DBR is a pragmatic research strategy in which both qualitative and quantitative methods can be used, in accordance with the research questions and objects of study. The focus lies on enhancing the studied activity by an empirically and theoretically-underpinned and adapted design, quality gain, and a responsible relation between those who are involved and the researcher. DBR is similar to action research but has a stronger emphasis on iterative development.

There are weaknesses in the approach, especially in relation to the long-term sustainability of the research situation which DBR demands. Quality enhancement demands long-term relations, in which the researcher can work with the course in several iterations. The results after one design-implementation cycle are analysed and discussed, and a new altered design is made for a second cycle, data are collected and analysed, and the design is adjusted, after which a third cycle begins, and so forth. This kind of parallel design and research work takes time, and in the best case, university courses repeat themselves in the following semester or study year. There are many changes that affect the research, including closed-down courses, changes of teacher, teaching team or instructional designer, new students and so forth. Iterations of courses in higher education are not as customisable for the educational researcher as new generations of banana flies are in genetics.

Two of the articles began as projects with DBR design, namely article 3 on MOOCs in learning centres and article 4 on time shifting and agile frameworks. They became intervention case studies instead, without the planned iteration, as for article 3, the waiting time for a meaningful iteration was too long and complex to fit into a PhD project. The design element is rather general here and represents an asset for teacher-less groups, but is also difficult to variate and implement. For the pilot course in article 4, the planned iterations could not be executed due to discontinued project funding.

Even though the research as it features in articles 3 and 4 evolved in different ways, DBR remains relevant as it was the methodological framework on the basis of which those two articles were constructed.

6.3 Conceptual analysis

Conceptual analysis is a method in which the characteristics of a concept and its relation to other concepts are sorted out and clarified. As an example from philosophy, the definition of knowledge as *justified true belief* has been tested and discussed with many thought experiments (Floridi, 2004; Turri, 2011). This form of concept analysis is traditionally viewed as contemplative,

philosophical work with very central concepts, such as *truth, knowledge, cause, mind, matter* and so forth. It adopts internal logical analysis and thought experiments in order to discuss a concept, but the task is largely an *a priori* one, namely to describe what the concept must logically mean after flaws such as self-contradictions and unnecessary uncertainties are removed. Levering (2002) argues that iterative thought experiments and falsification attempts *are* empirical methods. Putnam (1975) indicates that empirical research can sometimes have direct consequences even for this kind of philosophical, conceptual analysis. That the shortest distance between two points is a straight line was long considered to be a clearly necessary and a priori knowledge that was unrelated to the empirical world, in the same way as we do not need empirical evidence for the proposition *bachelors are unmarried* (as it carries its own truth conditions). However, non-Euclidian geometry proposed that the shortest distance between two points could be a bent line, which can be demonstrated empirically. The earlier assertion is only necessarily true within the scope of Euclidian geometry.

Unlike terms such as *knowledge* and *matter*, BL is not the same kind of central philosophical term for human knowledge and existence, following human thinking through the history of ideas. Rather, it is a discipline- and practice-specific concept which may in later evaluations prove to be a concept that forms a transition between understandings. As with newly emerging phenomena, we see what stands out from the normal. The practice that BL describes is in constant development and the world of education changes and adapts in terms of the expectations, pressures and connections to other institutions. There is a developmental and empirical side to BL and the actual use of the term by practitioners and researchers, as well the change in such usage over time cannot be disregarded and must inform the conceptual analysis. Concepts of this kind are dependent on the historical, socio-political and institutional context within which they emerge, develop and change, all of which are very much applicable to the concept of BL.

Nuopponen (2010a) points out that achieving conceptual clarity for discipline-specific central terms is a matter of uttermost importance to all research. She also observes that there is very little guidance available on how to make a conceptual analysis of concepts within research fields and that theorists on concept analysis and development often write that all methods of concept analysis must be adapted according to the purpose and context of analysis. Within the context of professional work, this tends to lead the precision of terminology use, visible in glossaries or databases. But definition entries in glossaries are not necessarily the direct results of conceptual analysis: they can be descriptive, stipulative or normative, relate more indirectly to research and, in some cases, be randomly constructed but widely accepted. If classic philosophical analysis of terms as knowledge is situated on one end of a continuum, then terminological questions,

definitions and classification are situated on the other. There is, however, need to better develop and establish methods for terminological concept analysis, as Nuopponen argues (p. 5). Conceptual analysis is involved in terminological work, though this is not always particularly visible. Näsi[13] (as adapted and referred to in Nuopponen, 2010a; 2010b) argues that it is impossible to establish any exact steps in a terminological concept analysis. He suggests that the following four elements should be used in conceptual analysis, all of which can be interwoven and iterated:

1) *The creation of a knowledge foundation* around the term by starting with a literature review of research

2) *External analysis* (to localise the term among similar concepts, as well as among super- and subordinate concepts and to sort out non-related uses of the term for the analysis)

3*) Internal analysis* (to break apart the concept, discuss the parts and fragments, analyse different views on the concept and re-assemble it with differing meanings)

4) *Forming of conclusions* (accepting or modifying old concepts or forming new ones, making recommendations, proposals and guidelines, and so forth).

What follows is a description and exemplification of how we used conceptual analysis in article 1, in accordance with this strategy for it, as it is central to the thesis.

(1) Firstly, we constructed a knowledge foundation through our work background of work experience, literature reviews and agreed on the view that BL is beginning to appear as a new normality, thereby making it is important to better understand the term.

(2) We made an external analysis and found several definitions and propositions for components of BL, and also found recommended strategies, case-based studies and accounts of effective implementation of BL. We approached these steps through a systematic analysis and a review of the similarities between BL, DL, OL and EL as concepts and as practices. This was followed by a critical analysis of their applications in what we argue are often the not appropriate contexts of learning there where the context of teaching would be more appropriate and relevant.

(3) Throughout our reviews, we found synonyms to BL, such as *hybrid learning* and *mixed mode*, and deconstructed these concepts as part of an internal analysis in which we scrutinise each term independently. This showed that the *blend* that is implied in the terms *hybrid* and *mixed*

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[13] Näsi's original work is from 1980, in Finnish and hard to retrieve (apparently only in print). Nuopponen adapts Näsi's model and compares it with other models for conceptual analysis in two sequential papers. (2010a, 2010b).

presupposes *components,* such as classroom environment and online environment, classroom communication and mediated communication, analogue media and digital media, collocated participants and remote participants, and so forth. We found that these components were commonly only of two categories for each understanding or definition, with a possible exception in corporate BL, in which they were instead often constituted of multiple categories of media or communication (Hall & LeCavalier, 2000; Clark, 2003; Carman, 2002; Bersin 2004). We find the BL concept itself to be very general in indicating how these components should be combined. Although there are many descriptions of priorities to bear in mind, and many sets of advice and ways of reaching learning objectives through a blend, on a theoretical level, there was seldom any description of blending processes regarding how these categories of components should be combined. There was also an absence of another expected semantic side of the blend, namely what the result of the blended process is expected to be: a sum of its components, an *emulsion* as a forced blend or a *solution*, i.e., something which transcends the sum of its components?

We identified a notable characteristic that features in most of the literature on BL, namely that one of the components in the blend is old, traditional and physical, while the other is related to digital ICTs in some form, or a state enabled by ICTs to communicate remotely. One major semantic problem appears when we reassemble the parts: is it a serious proposition that *learning* should be *blended*, and if yes, from whom and why? How can this not be a category mistake (Ryle, 2009) in the use of language? We also find that the BL term would be better suited to cover students' holistic personal strategies for learning, but this possibility has been abandoned by the current most dominant and widely-used understandings of BL. A term other than learning would be better suited, such as teaching, but a term for activity which is a successful combination of teaching and learning would be preferred.

We observe that three dualities are constructed in BL:

> (A) A *place duality* is a blend of here and there, classroom and remote location. We note that there are also traditional learning processes that contain frequent elements of individual and flexible studies, dependent on the availability of asynchronous media.
>
> (B) A *technology duality* is a blend between the technical and the non-technical, which leads to a questioning of where to draw the line between technologies and non-technologies.
>
> (C) A *presence duality* in which with the participants are present and non-present in various configurations in different environments, leading to the question of how communication and mediation relate to presence and a dualistic world view.

We then applied a time-historical view and questioned whether BL is new. Throughout education history, we found recurring processes in which new technologies were integrated into education. The introduction of print is a good example (Hajnal, 1959) as well as the introduction of dedicated learning spaces in classic Sumer (Kramer, 1949; Robson, 2001). We followed up on this time perspective and looked at a teaching-learning process, such as a course, from an *abstracted time perspective*, which provided the possibility for interesting and powerful explanations, such as synchronous and asynchronous *time duality*.

(4) As a recommendation, in the last step of Näsi's model for concept analysis, we found that the term BL can be considered from a time and process perspective onto how different ICTs can be integrated into the synchronous–asynchronous shift pattern in the educational process. At first, we thought that this might be a too mundane and old pattern, but also found it highly relevant in times of rapid technological developments. Consequently, previous traditional practices are also blended by their use of older ICTs, and the choice between using a digital or a printed text becomes less dramatic. In a time perspective, the classroom becomes just one of the synchronous information and communication technologies, with print being an asynchronous ICT, although none of them is digital. The borders between the two domains are thereby redefined: both are old and new, technical and less technical. We suggest that by the integration of ICTs into the teaching and learning process, the possibilities of design to variate and adapt the process to different needs multiply. This process of conceptual analysis, as exemplified here, allows us to return to a model that is traditional and known to all teachers, namely that of involving synchronous lectures and asynchronous homework, which is followed up by next synchronous session. We list five new affordances that are acquired with *digital* ICTs from this perspective and conclude that the only non-blended models that remain are a purely synchronous or a purely asynchronous teaching and learning process.

6.4 Reliability, validity and credibility of results

In this section, I briefly discuss the concepts of validity, reliability and credibility and illustrate, through selected examples from the articles, how these concepts were understood and incorporated into the research. Reliability and validity are quality criteria that are most clearly understood and developed for quantitative methods. Both Golafshani (2003) and Stenbacka (2001) argue that, in essence, reliability and validity are positivistic concepts that do not have the same straightforward meaning in qualitative research. Quantitative research typically examines a single,

context-free, observer-independent objective reality against which cause-and-effect hypotheses are tested. Quantitative research treats multiple context-dependent and observer-dependent realities and is aimed at understanding and construction. Instead, in qualitative research, reliability and validity often become conceptualised as rigour, trustworthiness, quality and credibility (Golafshani, 2003, p. 597; Graneheim & Lundman, 2004).

Researchers who use qualitative approaches are nonetheless highly aware of reliability and validity as demanded quality criteria and understand reliability and validity in ways that can be adapted to qualitative methods. Reliability and validity are also increasingly used as criteria in qualitative research, partly due to the users of research results in society, namely policymakers and practitioners who want to *know* if a practice or a policy is *evidence-based* (Hammersley, 2008, p. 287). Biesta (2010) considers speaking about *value-based* instead of *evidence-based* educational research, as the evidence-based practice concept has deficits in qualitative contexts, stating that "In the epistemological domain there is a knowledge deficit, in the ontological domain an effectiveness or efficacy deficit and the practice domain an application deficit" (p. 500).

Reliability refers mainly to the repeatability of a transparent research process in replicating the results of a study. Repeatability or replication has its limitations in qualitative research as people and contexts differ in time, and also as interviewing the same person again about the same situation can generate new and different responses, as is the case when a different interviewer or analyser gathers the same data. Nevertheless, the transparency of the method that is used and the researcher's awareness of his/her own non-neutral role as an interviewer or observer is relevant. Researchers should be able to tell colleagues and readers how they used the chosen method in the data-generating situation and what the underlying deliberate decisions were.

Validity as a criterion concerns *if what was to be measured was actually measured*. Qualitative researchers seldom measure anything in the classical meaning of the natural sciences, but rather scan for patterns in the data that create or reveal something new which furthers understanding. Stenbacka (2001) writes that "In qualitative research, the answer to the question of how to generate good validity is actually very simple", in that the researcher is interested in "another person's reality based on a specific problem area" (p. 522). The articles that used interviewing methods followed this approach in relation to validity. The understanding of the phenomenon is valid if the person is allowed to speak freely, and if it is well and strategically chosen as part of the problem area. In addition, validity as 'truth' is the extent to which the researchers convince their audience that their interpretation is as close

as possible to the intended meaning of the participants who were interviewed (Hammersley, 1991).

Quantitative studies: Here, I exemplify how the concept of reliability was used in the research that is presented in article 2. The necessary task in this paper was to acquire an estimation concerning the use of the term BL among administrators and teachers at European universities. This was done through searches within university websites by using their search engines, as well as through Google site search. The first sample was chosen from the Times university ranking order for European universities, for which we selected the first 10 on the list. For a second sample, we found listings of non-ranked universities per country in alphabetical order and chose number 2 for the sample, for each of 47 (out of 49) countries for which such lists were available. The terms we searched were *blended learning* and *hybrid learning*. We also tried to search the translated terms in national languages, which showed to be unnecessary in most cases, as the national terms were commonly so unestablished that we almost always found BL in English as well within brackets beside the national term in the texts. We considered this to be a reliable approach with internal consistency, and possible to replicate. We tried to ensure validity through our selection of terms and collection sites and by checking the quality of the occurrences; so for example, we excluded library catalogues or other websites. Our assumption was that the presence of expressions as BL in university websites had a fairly strong relation to internal realities within universities, as experienced and enacted by students, teachers and administrators.

In article 2, we also designed and carried out an email expert survey. A survey of a sample of experts can be seen as a quantitative method, but our aim was qualitative. We wanted to acquire leads for further work with detecting patterns of any possible European versions or perspectives on blended learning, if there was one, by asking about the experts' general reflections (1) on the term, if they had any literature recommendation (2) and how they more explicitly saw the term in a North-American – European perspective (3). The aim was not to get a representative image of how European experts in the field of ICT and learning viewed blended learning. In our first phase of data collection for the literature review, we had searched for (a) cited authors on "blended learning" and "hybrid learning" (and known translations) on general databases, but also made searches limited by national Internet domains (such as .se, and .fr) of European countries (Bologna signatory countries). In the correspondent, national Internet domains, we tried to identify also (b) researchers with published and cited articles in ICT and learning more widely; using terms as e-learning, Computer-Supported Collaborative Learning (CSCL), Technology-Enhanced Learning (TEL) and online learning. From some countries we could not find

authors in both (a) and (b), or not at all, possibly due to our language shortcomings, but there were also other difficulties, as if the question of nation-belonging of research in an increasingly europeanised Europe with complex global interactions and co-authorships was a meaningful categorisation. With its limitations, this material was used for choosing authors in 10 European countries in a so well-spread sample as possible. We wanted to balance those who used the term BL actively or as keywords on BL since it was with the help of them any European version could begin to unpack. We included ICT and learning researchers who did not use the term blended learning actively, or not at all, for acquiring a more distanced and critical view of the term in a European context. The border was not sharp; many authors not using the expression otherwise can mention something like a "blended learning situation" without having any elaborate thinking behind, just because the term is commonly used at many universities. A third category (c) was project managers of EC projects addressing blended learning, as there had been a number of them between 2005 and 2012. From them, we expected some kind of policy input. These managers were often researchers as well. In all, we sent the survey to 67 experts, and received 33 replies, resulting in a 49% response rate. In addition, we went out with these questions at two web forums for discussion, and received additional input, in all about 50 contributions in total. This did not form any representative sample, but as our intention was to acquire leads for the further work with literature review and for formulating better and more detailed questions about BL in Europe in relation to North America, and as such it was very helpful and contributed to our understanding and further analysis.

Articles 3 and 4 included interview studies where we were interested in the perceptions and experiences of participants in courses. In both cases we constructed semi-structured interview schedules (Cohen & Crabtree, 2006; Mayring, 2014), with the intention to encourage students-participants to first talk as openly freely as possible about their experiences and perceptions of the course, but with a possibility for the researcher to follow up and ask for more information on relevant issues when needed. The material from the interviews in article 4 was analysed through qualitative content analysis (Mayring, 2014) and showed that the participants had significantly similar experiences. We followed a number of steps in order to ensure that the data that we collected covered the relevant areas of the course and the participants' participation (guided by our research questions). Firstly, we discussed the interview schedule with the manager of the study centre (in article 3) and the pilot course coordinator (in article 4) before the start of the interviews and adapted our schedule where necessary. Secondly and at the end of the first few interviews, we revisited the questions and areas for discussion in order to ensure that our schedule covered the issues that the interviewees raised as being important to them, which meant that some

questions were abandoned, while others were changed or added for subsequent interviews. Finally, during the analysis, we followed the same procedures for the analysis of each transcript and compared categories across interviews (Hammersley, 1991).

Conceptual analysis is a fundamental part of articles 1, 2 and 5. At the very core of conceptual analysis lies the attempt to define terms and concepts in their abstract meaning and in relation to their practical applications, in this case around BL and how it is used for higher education access. Hence, the principles of validity and, where applicable, reliability are at the root of this approach to analysis. The way in which these principles have been embedded in the conceptual analysis is through the systematic deconstruction of the relevant BL concepts, and through the careful definition of their conceptual parts and their practical applications throughout the research.

6.5 Ethical considerations

In the empirical elements of these studies, the respondents were participants in adult education and volunteered their participation to the studies and interviews in separate decisions. They were informed before the beginning of their participation through documents that described the research (see attachments). At the beginning of the interview they were again informed about the general aim of the study, the voluntary nature of their participation and their right to not respond to individual questions or to withdraw from the interview if they wished. Participants were also given assurances around the protection of their identity in the published works, as well as in discussions with other participants or teachers, and around the safety and use of the recordings and transcripts, which would only be used by the researchers and be kept in secure storage. Throughout the research, we applied the principles of ethical research and practice as provided by the Swedish Research Council (Vetenskapsrådet, 2011). Beyond these formal steps by which to conform to established ethical requirements of research practice, we were highly sensitive in all of the empirical work that involved participants, to issues of wider responsibility toward the courses' students and teachers. This sense of responsibility emerged as a result of our positions as researchers who also are (or have been) teachers. We committed to faithfully convey the concerns and experiences of students about issues that are of high importance to them. In addition, the core problematic in this research is rooted in critical perspectives around access to education in relation to non-conventional students who live in less advantaged regions. By definition, this carries a high degree of ethical responsibility toward the

participants of the research. All of the researchers in the published articles brought this sense of responsibility toward participants and regions with limited access to education, as well as the commitment to respond with empirical work that will have a practical and developmental capacity.

7. Time, Access and Education

7.1 Introduction

This chapter positions time as the main perspective in research on BL, which is the model that is presented in article 1 and used in articles 3 and 4. It offers a background in time philosophy, science and culture, as well as of the use of time in social research, and provides a literature review of research into time and education. It ends by synthesising the time model for BL and clarifying how it relates to access to education.

7.2 Time in philosophy and natural science

Arguably, time lies at the centre of human experience, as Lucas describes, "If we are aware of anything, we are aware of the passage of time" (1973, p. 8). McLuhan argues that "For tribal man, space was the uncontrollable mystery. For technological man it is time that occupies the same role" (McLuhan, 1951, p. 85).

On one level, time is very concrete and easy to grip; clocks, calendars and time until lunch break, the weekend, the next summer or a work deadline. This level of experience is based on biological and astronomical cycles. Clocks are precise instruments, but cannot be said to measure time as it is experienced, but rather as measuring clock speed in covariance with astronomical and biological cycles.

On another level, time is also utterly abstract and complex, invisible, impersonal and difficult to define or grasp. St Augustine of Hippo's problem formulation is well known, namely "What, then, is time? If no one ask of me, I know; if I wish to explain to him who asks, I know not" (Augustine, 1923, Book XI, Ch. 14). The distance between the experienced, utterly self-evident biological and astronomical cyclicity with clock time on one hand, and the opaque and very complex "what is" question on the other, may be unique in its semantic span. Lucas has an interesting twist on this, stating that "We cannot say what time is because we know already, and our saying could never match up to all that we already know" (Lucas, 1973, p. 4).

Newton viewed time and space as absolute and independently-existing reference scales, which were guaranteed by God (Knudsen & Hjorth, 2012, p. 30). Leibniz questioned time as absolute and considered it instead to be relational: time as a way by which to compare one event to another (Falk, 2009, p. 131-134). Kant later pointed out that all of our empirical data are experienced in space and time, never outside of them, and draws the conclusion that they are part of epistemology, as human filtering and

ordering tools for impressions (1781, 1998). Modern physics, with relativity theory and quantum physics, by default disregard the concept of time as anything other than a characteristic of human experience. The main reason is that equations of physics are necessarily considered to be symmetrical in time, working in both directions, with no real difference between past and future. This forms the deterministic *block universe* (Ellis, 2007, pp. 50-51) in which all data are present but experienced by humans in personal trajectories. Minkowski made a mathematical model of spacetime, as a one and only dimension (1918). Einstein was still worried about the strong human experience of the flow and arrow of time (Falk, 2009, pp. 293-296), the perceived direction from the past, through the present to the future. McTaggart attempted to define this problem by his A- and B-series of time (1908). The A-series or the tensed view of time consists of the past-present-future, in which our individual perspective is from the present, or the now. The B-series of time focuses on relations between spots on a line, as *earlier than* or *later than*, but *the now never enters* into it. It is only as the *here* on a map and only of subjective personal interest. The flow of time can be viewed as common sense, which, as our intuition, is a product of biological adaption. It appears, however, that there are irreversible laws of nature that support the feeling of a flow and the direction of a time arrow. One of them is the *second law of thermodynamics* (Popper, 1957). While the first law states that energy is constant within a closed system, the second states that, with time, energy becomes unusable by the progress of entropy. Quantum theory has an opening for less determinism with the notion of *probabilistic determinism* for individual particles or entities, in which it is not possible to determine which entity will be affected by a cause, but only that a percentage of them will (Falk, 2009, pp. 176-179).

The quantum cosmologist Lee Smolin and the philosopher Roberto M. Unger have recently questioned the timeless and deterministic block universe of physics (Smolin, 2014; Unger & Smolin, 2015). They place *time as the most fundamental reality* in the universe and consider space to be secondary and emerging, consequently being obliged to sacrifice the belief in a timeless and unchanging nature of natural laws. With this, they also want to re-institute a causality which enables human agency to affect the future in approaching possibly fatal environmental threats such as global warming. There is a future that we as humans can affect: the now can shape the future (Smolin, 2014 p. 257; Unger & Smolin, 2015, pp. 364-365).

This kind of belief sounds like a necessary one for the education sector as well. If we do not believe that people have at least some agency to make their lives meaningful and the world a better place and that education can affect the world, what then is education and what are we doing working in this field?

7.3 Time, change and culture

Change is tightly associated with time. Without change, the concept of time has little or no meaning, and without time, change would never be experienced. If time just stopped and everything froze for an hour, and then continued as before, we would never notice it. We view a change from the perspective of the present, the now, which instantly becomes the past as we move slightly into the future. We often view *the now* as the only state in time which is fully real, in comparison with the past which is no more and the future which we do not know. People often feel assured that the presently experienced now is not the critically decisive now for us. It can be tough to live with the idea that every now or "every day is a personal Doomsday"[14]. We postpone and procrastinate. Falk remarks that "Relativity makes all moments equal, but to be human is to declare them *un*equal" (2009, p. 284).

The experience of time is highly culturally dependent (Falk, 2009, pp. 79-100). We speak about different mindsets for respecting set times in different cultures, but this is only the tip of the iceberg. The Jewish-Christian linear time; history as a meaningful line from beginning to the end of the world, is together with clock measurement, two of the most successful and conflict-free cultural exports from the Western to other parts of the world. However, below this, there are old layers of experience of time. Event time in parts of Africa, says that time only runs when something happens, we have the infinite circular time of Hindu and Buddhist religion, the complex Chinese partly astrological and partly political time, the Dreamtime of Aboriginal culture in Australia where initial happenings with ancestors shaped the patterns of life that then are repeated but deteriorates. The Aymara in Chile can point behind their backs when talking about the future, which we see as highly counterintuitive as we point forward, but is quite logical: we cannot see the future, but we know the past. McLuhan and Fiore (1967. p. 74-75) as well as Benjamin (1974) write about Western versions of this attitude toward the future; we drive or are blown into the future backwards, blindfolded.

7.4 Research about time and education

Time in education has, as to be expected, been previously researched and discussed. The larger part of it appears to be research on concrete and applied time-resource ratios for teaching and learning in levels K-12, and in different subjects and school forms (for a Swedish study, see: Nyroos, Rönnberg & Lundahl, 2004). Other researchers take a perspective on the

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[14] R. W. Emerson: "No man has learned anything rightly, until he knows that every day is Doomsday".
Emerson (2005), *Society and Solitude, Work and Days*.

school day, school year or the whole education situation for an individual. In North America, interest is also about the effectiveness of schooling in connection to the science of instructional design (instructional time) and is often also viewed from an angle of global competition, questioning if time in school is used well in the context of a global knowledge race. U.S. presidents often appoint school commissions to address contemporary school crises and in 1994, a special commission on time in schools drafted the report *Prisoners of Time* (2005), indicating that U.S. pupils have about half of the time in school compared to those in other countries. The report starts with the following:

> *Learning in America is a prisoner of time. For the past 150 years, American public schools have held time constant and let learning vary. The rule, only rarely voiced, is simple: learn what you can in the time we make available. It should surprise no one that some bright, hard-working students do reasonably well. Everyone else—from the typical student to the dropout—runs into trouble* (2005, p. 5).

Disadvantaged students do not learn enough in the allocated time, but the system rolls on, and disadvantage grows. In his model of school learning, Carroll (1963; as cited in Carroll, 1989) identifies time as the central variable for learning. Both the teaching quality and the focus of the student on learning must be optimised to attain the best results. For long, there has been a parallel tradition of arguing for mastery learning (Bloom, 1968), but this has complex organisational and social consequences within the mainstream school system. Bloom (1974) writes:

> *Spending extra hours of time within the same calendar period to attain the same level of achievement as one's contemporaries leaves the student with a belief that he is doing as well as others. There are psychic and motivational rewards when a student believes he is doing as well as others in the group. Spending extra years in attaining the same level of achievement as one's contemporaries leaves the individual with the belief that he is inferior to others, and he is likely to suffer frustration and decreased motivation for school learning* (p. 683).

Drawing on earlier research, Bloom proposes a rule of thumb stating that the fastest 5% of students in a class use only a fifth of the elapsed school time that is needed for the slowest 5% (1974, p. 684) to learn the same thing. This

is not primarily due to cognitive ability, but to different social backgrounds and to differing time-on-task, or how well time is used by students.

If not more scheduled learning time can be added, other approaches are possible. Walberg (1988) discusses the effects of the spacing of teaching instead of direct sequencing, observing that two lessons that lie some time apart appear to yield better learning results than when the same two lessons follow one another.

There are various studies on time in higher education, but as time-on-task for older students develops into the sector of personal responsibility, the discussions on time allowance are different. Compensation for excessively fast teaching in a classroom can be studying more at home, provided that there are asynchronous media and time and energy is devoted. If much of the central course content is only orally mediated, this becomes more complex. Stein and Irvine (2014) discuss how ICTs and classrooms can interact in a *lossless learning* process. Romero focuses on time in EL, DL and game-based learning settings (Romero & Barbera, 2011; Romero, 2011; Romero & Usart, 2013). For time in game-based learning, see also Rughiniș, 2013; Capdeferro, Romero, and Barberà, 2014, who review and discuss polychronicity in online learning. Kumpulainen and Rajala (2016) build on Bakhtin's chronotope concept, a spacetime in literature theory, for studying ICT-enabled collaborative learning on campus. McEwan (2012) discusses and questions some classic beliefs about teachers and time. Kakkori (2013) builds on Heidegger in modelling education and time. Giroux points at democratic problems in the use of time: "As higher education becomes increasingly corporatised, public time is replaced by corporate time" (2003, p. 150). Sharma (2013) criticises a technology-imposed "speed culture" in higher education, where we are led to believe in a false equal possession of time, and envisions a critical time perspective where time is seen as "multiple, relational, and deeply uneven" (p. 312). Sheail (2015) scrutinises the *anytime-anywhere* discourse brought into the digital university by online and mobile learning and argues for a more honest and complex time approach in higher education.

7.5 Adam's social theory of time

Barbara Adam argues that social researchers should take time at least as seriously as space and matter, even though time is more abstract and invisible. She criticises social science for being too focused on questions about space and matter, and using time only as an instrumental factor for comparing two states, as before and after a change: "Take space and matter, add on time and stir" (Adam, 2008, p. 1). Hence, time mostly serves to set the comparable space situations apart. It is very easy to occasionally

emphasise one isolated aspect of time and make a specific point. Instead, argues Adam, we ought to be aware of and try to unpack many aspects of experienced time at once, stating that "Timescapes are analogous to landscapes because they include the temporal features of socio-economic events in a variety of socially constructed contexts." (Adam 2000, p. 137). The aim of timescapes thinking is not to define time, but to "understand interpretative views of time" (2008, p. 1). Time is not an abstract vector of some combination of physics, clocks, and ageing; it is a thick and rich concept, overflowing of characterisations and understandings, which social researchers often disregard.

Adam has used her social theory on time for studying "culture, education, environment, environmental economics, food, globalisation, gender, health, international relations, management, media, risk, technological innovation, transport and work"[15]. Studies on education illustrate how it teaches clock time to pupils for functionality in society (1995, pp. 59-65).

To help our understanding of temporality on the way, Adam has listed seven *timescapes*, which all are seen as *facets* of the *invisible temporal dimension*. See Table 5 where Adam's timescapes are in column 1, her question for identifying a timescape in column 2, my examples of the timescape applied on education in column three, my examples of timescape questions in column 4 and referrals to my articles in column 5.

However, the demand to study all of the possible facets of temporality at once to make time a thick concept is all but straightforward. Moran (2015) is also troubled by Adam's demand to work with temporality as a holistic complexity for understanding time in everyday experience. He argues that "a time is a social practice that translates temporality into meaningful codes and organises temporality's material influence" (p. 283). Moran writes that temporality works by many distinct functions (p. 286), but that these can hardly be brought in under a one and only framework. He presents *duration*, *access* and *inevitability* as interesting dimensions of the temporal. Duration is something *between* states of time, but more characterised by consciousness and becoming than clock measurement. Access is instead a *property of* states in time; the specific possibility to access something by synchronisation, something that is accessible at one time but not at other. Interaction is one example. Earlier, communities measured time differently as they had no possibility of instant interaction with one another. Today it becomes a failure of communication to not be synchronised, to not be able to translate temporality into time. *Inevitability* is different from both duration and access. It "has the certainty of the past but will only occur in the future" (p. 288) and can be regarded as a fact of the present. Mortality is just one example which affects our daily temporal experience.

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[15] http://sites.cardiff.ac.uk/experts/professor-emerita-barbara-adam/

Table 5: Adams seven timescapes commented

1.Timescapes	2.Adam's question	3. Applied to education, example	4. Question generation	5. In articles[16]
Time frame	In which time frame?	X years of child and youth education, length of course, time until break or summer, life expectancy, etc.	How much should learning be collectively time framed? How are time frames best designed, big or small?	Art. 1: A course as a process within a time frame Art. 3: Week and course frame Art. 4: Day, week and course frame
Temporality	How?	Learning makes people grow while they age, the half-life of knowledge teaching methods become outdated.	Is youth education the finish or start of education? Learning? Which up-to-date demands should we have on teaching?	(Art. 1, 3, 4) BL as a historic first phase of digital ICT integration into the mainstream of education.
Timing	When?	Synchronise studies with peers, study progress with the exam, coordinate needs and resources for learning, etc.	How to find the best time for learning? How to coordinate social learning? How to peak learning trajectory at the exam?	Art. 4: Scheduled and limited flexibility creates simultaneity between learners, enabling natural interaction.
Tempo	At which speed?	Study pace in course, too much homework until Friday, not prepared for speed of instruction	How to compensate outside lecture for excessively high pace? How to optimise learning within frames? How to relate to peer-learning tempo?	Art. 4: Students appreciated to determine their own tempo within the frame, while a lecture hardly can be halted.
Duration	How long?	Instantaneity (no duration), lesson, education programme, boredom, temporal distance	How to prevent pro-crastination? How to handle bad timing for learning? How to use dramaturgy in courses?	Art. 4: Procrastination is addressed with social and agile mechanisms.
Sequence	In which order?	From A-Z mastery learning? Core-and spoke sequence, start from any direction?	How much does a subject discourse correspond to learning stages? Can it be learned in another order? What if mastery is not achieved before continuing?	Art. 4: Friday synchronous meetings should assure enough mastery for proceeding to next week.
Temporal Modalities	When?	Past, present, future, synchronous and asynchronous social modalities in a time flow or process	How does my past affect my learning now? Does mental time travel motivate learning? What learning is best done in social synchronicity or asynchronously?	Art. 1, 3, 4: The shift between synchronous and asynchronous modalities is central for the time-based model.

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[16] For further elaborations on timescapes, and ICT and learning in the same context, see "A back-to-basics thought experiment about blended learning" concerning the relation between media and temporal modalities, and "Edu-Sync", a working paper about using global simultaneity (as duration) and transparency of common courses as a future affordance. https://www.researchgate.net/profile/Anders_Norberg

7.6 The time-based BL model

The time-based model for BL has been formulated, adjusted, used for course design and discussed in articles 1, 3 and 4. In what follows, an overview and synthesis are given, starting from the shortcomings of a place perspective on BL. Although it is an open and versatile term, BL appears to have met a need for the integration of DL, EL and OL into the normality of teaching and learning. Elements and strategies from DL, EL and OL, are tried out but anchored in the concrete classroom situation. The place-based understandings of BL have certain distinct disadvantages. There are dimensions of learning, teaching and technology that a place perspective does not acknowledge, cannot explain or design. From a place perspective, the following aspects are invisible:

1. **Time and processes.** Educational technologies are used in an educational process, not only as transport vehicles. Whether these technologies are digital or not cannot be a disruptive distinction. What is more crucial is how technologies contribute to a development process rather than their categorisations in opposite domains.

2. **Similarities between old and new ICTs.** Reading a text from paper or from the screen has some differences, but a digital text can be printed, and a paper can be digitalised.

3. **Education history.** ICTs have been previously integrated into perceived normalities of education, at many stages in history. In place-based BL, ICTs appears as a something that is completely new and different.

4. **Use of ICTs within the classroom.** ICTs within the classroom have become very common for most agents. A student can be online in the classroom, with all of its implications.

5. **The classroom as an ICT itself.** In a place model of BL, the classroom is a monolithic component, independently of what goes on within it, as long as some ICTs are used in combination. Can the classroom be another ICT, to be varied in use as well?

Article 1 proposes a *time- and process-based perspective* for studying and designing the integration of ICTs in teaching and learning. The question of who has access to a BL course must thereby not be related to regular access at a default gathering place (campus, classroom), but to having time, a local place to study and the possibility of interaction. The question of access becomes one of who can be included to interact in a process, not about who can access a place regularly enough.

   A fundamental idea here is that even if digital ICTs are new, their use in BL settings is not very different from teaching a similar course about 30

years ago. A time perspective is used that is compatible with Adam's temporality focus; an abstraction is made of what is happening with the help of time modalities, and ICTs are classified according to their temporal functions independently of digital form or not. The results in article 4 suggest that synchronicity can form a kind of presence that is built on synchronous time, rather than on place, and through interaction. This finding is compatible with Floridi's re-definition of presence in the infosphere, as is discussed in the following chapter.

Figure 1 illustrates the time-based blended model presented in article 1. There are two social domains or modalities, namely synchronous and asynchronous as social facets of a time framed line. In its core, this model is traditional and well known, and includes lesson meetings with peers and a teacher in a room, readings, assignments or at least reflection as homework until the next meeting, and so forth. Every teacher knows and practices some form of time-development planning model such as this one. But what have ICTs added to this process?

A classroom lecture is in the synchronous modality, as is a lecture or seminar that is video-conferenced or telephone-mediated, as long as there is interactive communication. One-way lectures may in many cases instead be recorded and placed in the asynchronous modality. In the same modality can also be found the work with assignments, text readings, personal filling of knowledge gaps, forum discussions, and so forth. Planned or spontaneous group work among students can be imagined as a third, semi-synchronous domain (Power, 2008). The shifts between modalities are crucial so that students can get started with their work in time, acquire a learning flow and avoid procrastination. The teacher must be able to know that preparatory readings have been done, and the assignments completed, for the next meeting to be built on. An asynchronous forum discussion can take place after a synchronous event, reflecting on this event, and so forth. Central for these shifts are the synchronous meetings with teacher and peers and the positions in time when something must be delivered or performed for the process to continue. All of this is still possible to imagine without ICTs. In article 1, we propose the following five ways in which ICTs work within this model:

Support: Especially in the asynchronous domain, the teacher or course designer can support and help to structure the students' work better than before, usually through an LMS.
Migration: Activities can be moved between the modalities, which previously was not easy to do. A recorded lecture moves to the asynchronous modality and assignments can be moved to the synchronous modality.
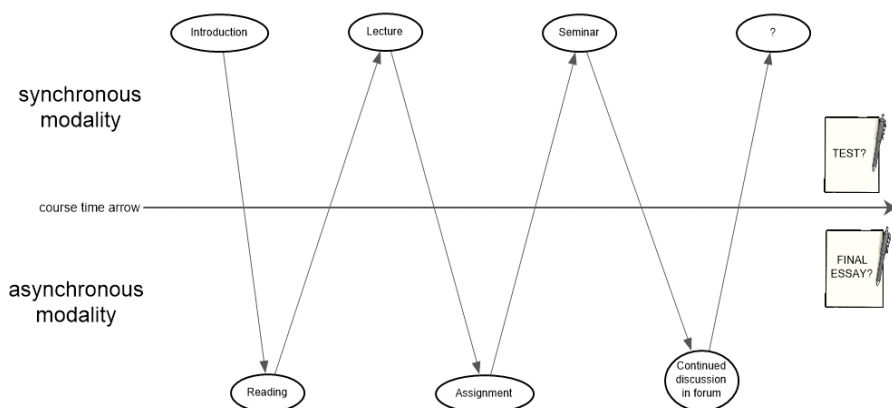
Introduction   Lecture   Seminar   ?

synchronous
modality

TEST?

course time arrow →

FINAL
ESSAY?

asynchronous
modality

Reading   Assignment   Continued
discussion
in forum

Figure 1. Simplified time-blended course design

Synchronous location: Synchronous co-located meetings can be replaced with technology-enabled synchronous meetings with interactivity if the co-location is not also needed.

Flow: ICTs can direct, control and stimulate workflow, by ensuring connections and progressions all the way through planned shifts in time modalities throughout the course.

Learner empowerment: Students can more easily take ownership of their study process if all course materials are accessible anytime and anywhere, and of the process is transparent. Learners can also address personal knowledge gaps.

This dissertation claims that education access through BL is better enabled through applying a time perspective. Places for education are now increasingly negotiable with the help of ICTs, as the DL, EL and OL traditions have shown. Articles 3 and 5 show alternative environments, such as a learning centre or a multi-institutional campus, which also constitute possible spacetimes for learning. A human always possesses a personal place, whether in prison, on Bouvet Island or in a well-connected and designed study environment. The crucial issue is to which degree it is possible, from this personal space, to communicate with others, access learning materials, focus on what needs to be done, create, reflect, and interact with teachers and peers. A campus is no longer a necessary condition, although, for many, it may be an ideal one.

Time is, at least on one level, not negotiable for education. If a person in a pressed life situation does not possess any time at all for studies, courses can hardly be attended or completed, be they ICT-enabled or not. To have or make some time available is a necessary condition for learning new things. Change and time presuppose one another, as previously discussed. If the student has some time available but is also working, taking care of family,

having long travels and so forth, there are openings for education access, but both the scheduling and the use of ICTs become more crucial. The time that is available does not need to be fully synchronised with scheduled lectures and seminars, but must be available. Some modules, moments or courses may still demand synchronicity and at times also co-location with teachers and peers, which makes access more complex. At the end of the day, it is easier to access a slot of time for learning, than to access a dedicated place for learning, which also routinely entails a time demand and travel time to a certain place *at* a certain time. Furthermore, accessing a place consumes time that could have been used for other purposes. Accessing time for learning is however only productive if the learner also can access a suitable place for the learning endeavour in question, as well as suitable media and communication.

When universities find that some of their online or distance courses have several campus students or students who live near campus and for whom such forms of education were not originally designed (Dziuban, Hartman, Juge, Moskal & Sorg, 2005), many explanations are possible. One of them is that the dimensions of time are more disrupting to access and attendance than the dimensions of place, or that students have a complex combination of time and place obstacles to their participation in standard face-to-face settings. Place and time in flexible and less flexible education solutions can be understood and described together, as in table 6.

Table 6. Conventional time-space course access designs[17]

| | Student place | | | | | |
Student Time	A. Living near campus	B. Commuting to campus	C. Can visit campus	D. Living in same geo-time zone	E. Living in other geo-time zones	F. Place not suited or no com-munication
1. All of day time	CF2F	(CF2F)	SYNC	SYNC	(SYNC)	NP
2. Some day time	(CF2F)	((CF2F))	SYNC	(SYNC)	((SYNC))	NP
3. No day time, but time	ASYNC	ASYNC	ASYNC	ASYNC	ASYNC (((SYNC)))	NP
4. No time	NP	NP	NP	NP	NP	NP

[17] Course access designs: CF2F means on Campus Face-to-Face, SYNC means Synchronous course (but not co-located), ASYNC means Asynchronous course. (x) means x with difficulty, ((x)) means x with considerable difficulty, NP means Not Possible. The course designs (CF2F, SYNC, ASYNC) are one-way exclusive: a 1A student who can attend CF2F can alternatively use and attend both SYNC and ASYNC courses, a 1C student using the SYNC category can also use ASYNC, but not CF2F, and a student in category 3 who is participating in an ASYNC course cannot attend courses with any other access design without altering time and place conditions.

For full access to a campus face-to-face course (CF2F), the student must (A) live nearby and (1) have all day time available. If only some day time is available (2) and the student is commuting to campus (B), then CF2F courses are accessed only with some or considerable difficulty (B2). In comparison, a student with no day time available (3) and who lives close to campus (A), has the same situation as a student who lives outside of commuting distance (C, D, or E), in which case only an asynchronous course is possible. If no time to study is available at all (4), or the student only has an unconnected or unsuited place (F), no course participation appears possible.

However, with solutions aligned with the time-based BL model (Art. 1), where co-location (CF2F) constitutes one of the optional synchronous modalities, in addition to video conferencing, telepresence and so forth, it is possible to construct the access designs of table 7 instead.

Table 7. Time-blended course access designs

Student Time access	Student place access					
	A. Living near campus	B. Commuting to campus	C. Can visit campus	D. Living in same geo-time zone	E. Living in other geo-time zones	F. No study place/ no commun-ication
1. All of day time	SYNC/ASYNC	SYNC/ASYNC	SYNC/ASYNC	SYNC/ASYNC	SYNC/ASYNC	NP
2.Some day time	SYNC/ASYNC	SYNC/ASYNC	SYNC/ASYNC	SYNC/ASYNC	SYNC/ASYNC	NP
3.No day time, but time	SYNC/ASYNC	SYNC/ASYNC	SYNC/ASYNC	ASYNC	ASYNC	NP
4.No time at all	NP	NP	NP	NP	NP	NP

I do not hereby claim to have solved any problem other than providing a perspective in which the classroom as a *default option* or template for understanding access in BL becomes unnecessary. There are courses in which co-location with peers and teachers is needed, somewhere, but this can be further scrutinised if, instead, synchronous communication can be used for the course process to continue. It may be the synchronous interaction, as an element in a synchronous-asynchronous shift process, that is needed or sufficient for teaching and learning, not the co-location. I also see no unsolvable problem with blending students in classrooms on campus with students at learning centres, workplaces and in homes, provided that there are good communication and interaction affordances. This entails a

design question, which is complex but not unsolvable. However, the first easy technology-driven solutions that come to mind may be too simple for a sustainable learning process. A web surveillance camera in the classroom to which remote students can log in, video transmission from the classroom to groups at learning centres or lecture-capture-enabled Hyflex models (Beatty, 2007) will probably not suffice. Students, irrespectively of place, must be part of the group of peers in an equal way: they must be represented and interactable.

8. Discussion

8.1 The Infosphere as critical environment

In this section, I use Floridi's Philosophy of Information to discuss both the elements that DL, EL and OL bring into BL and my time perspective on BL. This also widens the scope of ICTs in education. The discussion will end with an illustration and discussion of a future scenario with new blends, based on Floridi's *e-ducation* concept for the information society or *Infosphere*, also called the *Onlife*. The expression *Learning Onlife* is my experimental construction for learning in an ICT-integrated environment.

Floridi argues that human self-understanding of being in the world changes through history. For westerners, Galileo and Copernicus showed that Earth was not at the centre of the universe, Darwin established that humans are not separate from other biological life and Freud proposed that we may not have full control over ourselves. All of these changes also had contemporary philosophical consequences. Instead of only amending and adapting philosophy, it may be necessary to create new philosophy from scratch, as also Descartes realised in his time. Today, we as thinking humans live together with other entities that also process information, such as computer programs, algorithms and robots. We are not the only information processors in the world, and a smartphone now beats any grand master in chess but does not comfort the loser. For Floridi, this calls for a new philosophy to reposition human agency.

Philosophy of Information, or *Informational Structural Realism* (Floridi, 2008b, 2013a), is by Floridi seen as a philosophy "of our time, for our time" (Floridi, 2011b). Many countries live mainly from informational goods and a test of that is what a serious informational sabotage could entail for the national economy: "only those who live by the digit, may die by the digit" (Floridi, 2014a, p. 4). Other countries are coming a similar way, in stages, in a global world with pervasive ICTs. Humans have an increasingly *digital ontology* and experience the world as information, not merely as physical entities. The world consists increasingly, in human experience, of information. *What is real is what we can interact with* and modify, not what is stable and never changes as in earlier times (as for Plato). Floridi calls humans *inforgs*, in analogy with *cyborgs*. We live increasingly *onlife* (2014b), as the difference between being online and offline vanishes (2007, p. 61). Our world and the new environment that ICTs are prompting, but which we are constructing, is *the infosphere*, the world perceived as information, in analogy with *biosphere*. Information is not knowledge, but knowledge can be built on and of information by creating and constructing,

and humans are poietic (creating, building) entities (Floridi, 2011a). Humans handle information in a semantic way, with interpretation and construction as *semantic entities*. Computer programs, algorithms and robots are *syntactical entities*, which syntactically know the rules of the game, but do not interpret or understand it (2014a, p. 137; 2016b). They are specialised and very effective, and increasingly also communicate with one another. Floridi denounces strong artificial intelligence (AI), the Sci-Fi kind of strong super-human AI threatening to enslave humans (Boström, 2014; Harari, 2016). Strong AI is "logically possible", as Floridi writes, but "utterly implausible" (2016b; see also: 2015b). Later he has called AI "almost an oxymoron" (2017, para. 60). It is the weak and specialised AI that we deal with and customise after human needs, and we must "make AI make us more human" (2016b). None of this is science fiction, "it is all happening in our kitchen" (2007, p. 61) claims Floridi, and exemplifies with robot vacuum cleaners and dishwashing machines. Floridi attributes this change in self-perception to Alan Turing (1912-1954), the first to clearly see machines as independent information processors besides the human mind (Floridi, 2012).

Floridi is not an educational researcher, but a system-building philosopher with an ongoing project that he develops through main works in 2012 and 2014 (with two volumes to come). The relevance of Floridi's philosophy as a way by which to understand how to contextualise my work has become increasingly clearer to me. This is the kind of theory that I was missing and which can be useful in understanding and critiquing the concepts that I scrutinise in a new way. What I have been looking for may be a *post-Gutenberg* way of approaching education (Floridi, 2014b, p. 22). Or *e-ducation*, as Floridi calls it; education in an ICT-integrated environment (2013b, 2013c, 2016b).

8.2 Critique of the spatial component in BL

With his philosophy, Floridi provides new tools and theories with which to scrutinise contemporary concepts, beginning with an approach towards the *distance* component in DL. Floridi reconstructs or *re-ontologises* what *presence and telepresence* can mean in the infosphere[18]. In a world in which many people (especially in Europe and North America) do not make any distinction between online and offline (Floridi, 2007, p. 61), the *ontological*

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[18] Floridi argues that doing concept analysis is not enough, if the old concept just is taken apart and the fragments are left around in disorder. The ethical action of a responsible researcher is to make the concept work again in the changed context. The process is then called *Conceptual Reengineering* (Floridi 2011a) and is a part of construction of a good and common infosphere for future generations to live in.

friction for information has become very low, communication is easy, cost-effective and have good interfaces with human perception. According to Floridi (2005), we must rethink the concept of *presence*. This has implications for the concept of DL.

Presence, as a concept, has been frequently discussed in relation to ICTs. (Riva, Waterworth & Waterworth, 2004). A common definition which Floridi discusses, is presence as the feeling of *the unmediated being here/being there (*Floridi, 2005, p. 656*)*. When technology-mediated telepresence works, it feels like presence: like *being there*. Floridi scrutinises the subjective feeling of the technology-mediated telepresence of an agent, and also the other agent's observation in the remote space of the person who is telepresent in the same space. He remarks that, even if a remote agent does not feel such a technology-forgetting presence, "presence as epistemic failure" (p. , that a person can still, via technology use, appear as being present for agents in the remote space. Presence or telepresence therefore cannot be defined by feelings. Floridi takes a different direction and claims that presence in a connected infosphere should be defined as *being interactable* in combination with *successful observation*. This forms a model of forward and backward presence in a local and remote space of observation (Floridi, 2005, p. 662). If we think of a large lecture room, we can have student A on the last row, facebooking and not being interested at all. He can be successfully observed (bodily) by others, but from the perspective[19] of the teacher and the active students, student A is not interactable and thereby not present in that sense. Student B, who follows the lecture via ICTs (video conference, telephone or personal telepresence robotics), is far more present than student A, as student B is attentive and interactable. From another perspective, however (such as student C who has a crush on student A), student A is present, and his failing interactability and weak presence in the teacher's perspective is not an important observable.

Returning to DL, Floridi's re-ontologisation of presence appears to fit better the more that technology develops, communication works, and there is user accommodation to ICTs. A student's physical whereabouts will become increasingly less important in pace with how the means to be interactable in a teaching and learning process independent of place develops. However, the teacher's perspective will be different if there is a control issue that is important (assessment or use of dangerous equipment) or if the teaching and learning involves bodily interaction, and so forth.

As a consequence, Floridi writes that "There is no obviously privileged place to be defined as *local*. Call this an antilocalist thesis" (2015a, p. 49).

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[19] What here is called "perspective" is a simplification of Floridi's *Level of Abstraction,* his main method in PI. A Level of Abstraction is an intentional or professional perspective of an epistemic agent in studying a system (Floridi & Sanders, 2004; Floridi 2008). The system is never studied from any absolute point of view, trying to do that creates "a conceptual mess" (2008, p. 317).

Places are increasingly less crucial than synchronisation and interaction. Places, like classrooms, provide platforms for interaction, but other ICTs do that as well. Floridi predicts that the infosphere will become increasingly *delocalised* concerning *space, synchronised* relating to *time* and *correlated* regarding *interaction* (2007, p. 61). "The infosphere has many nodes, but no ultimate centre, so one can be only more or less provincial" (2014a, p. 80). Distance may not be an important issue for learning communication.

Hence, if from a teacher's perspective, if it is better to have interactable and interacting students than uninterested ones, the physical whereabouts of a student becomes less important. Student interest, preparedness and will to interact re-appear as central issues, instead of if the communicating is mediated or not. It can also be argued that not even oral communication in a room is problem-free or non-mediated, although it can be more multi-channeled and thereby experienced as robust (Rubin & Rubin, 1985, p. 39). In the future, it may be better motivated to design courses differently for interacting versus non-interacting students, than for local and remote students, but for other reasons, this may not be a good idea.

8.3 Critique of the technology component in BL

E-learning began by using ICTs to deliver and structure learning materials and became increasingly interactive, with an emphasis on the technology aspect, the ICTs. Floridi points out that, transitioning from a situation of scarcity of learning resources into an abundance of resources in a short period of time, may have distorted our understanding (2015a, p. 2). The lack of accessible material for learning may only have concealed the real problem of learning (Floridi 2013b; 2013c). Floridi's historical review of ICTs is relevant here, as is his categorisation of technologies, which reveals two ideas: 1) ICTs are not only digital and 2) the special affordances of digital ICTs to process information, are not yet much used in the education sector.

Pre-historical societies have no ICTs. There are still small pockets of such societies. History arrives with documentation and communication ICTs. Information has been cumulated, preserved and communicated. *Hyperhistorical* societies are characterised by the central position of *digital ICTs*. According to Floridi, the characteristic new affordance of these ICTs is the *processing of information*, not digital storage or communication. Humans currently have other information-processing entities by their side and with which to co-exist, namely digital ICTs, which also process information (such as computer programs and algorithms), although humans are the "only known semantic engines" (2013a, p. XIII). In reflecting on DL, EL and OL concepts, it becomes clear that they all use digital ICTs, but not yet to a significant extent the *information processing* characteristic of digital

ICTs. DL can be arranged with print and analogue electronic media and communication as well, and EL does not always necessitate advanced information processing. Processes have become faster, cheaper, more useful and more versatile, but does that make them a disruption of education? EL uses affordances of ICTs, but not yet many information-processing ICTs.

For Floridi, technologies are characterised by their *in-between-ness* (2014a, p. 25ff). *First order* technologies follow the pattern of *agent-technology-prompter*. The axe is a technology (T) between the human agent (A) and the prompter (P), for instance, a piece of wood, forming a simple A-T-P pattern. *Second order technologies* have a pattern with more steps, such as human-screwdriver-screw-piece of wood (agent-technology-technology-prompter, or A-T-T-P). Technologies as machines and transmissions for production in the industrial era often have many steps, such as A-T-T-T-T-T-P. *Third order technologies* are characterised by their connectedness to the information society or the infosphere. The human agent may not even be the agent in a technology loop, and the process progresses in many steps. Digital information-processing entities gather specialised information and act in their programmed ways, communicating with other informational entities, acting, evaluating, learning, and so forth. A version of Nike running shoes detect the runner's energy status, and evaluates it in relation to pre-set training objectives and actual pulse, and downloads the preferred music with the optimal rhythm, which it plays it in the runner's ears for the best possible training. The pattern becomes T-T-T-T-T-T-P. The human agent is not always *in the loop*, but must be *on the loop*, thereby controlling it (2014a, p. 30). Technology serves humans, in which the crucial elements are the interfaces between human and machine, and the ideal work distribution.

I propose that it is functionally motivated to view *the classroom* as a Floridian *first order technology,* enabling learning; a classic ICT for teaching and learning communication. A classroom is positioned between a user (teacher or student) and a prompter, the addressed students. A teacher uses the classroom in order to be heard and to focus the attention of the students, while the world outside should be locked out by the walls. The classroom is not necessarily the ideal metaphor for teaching and learning, if it limits how we can think of using other ICTs, be they digital or not.

8.4 Critique of the dualistic component in BL

The emphasis of our self-understandings as humans is on epistemology, or how we gather the information that is relevant to us and process this actively into knowledge. There is an observer-independent reality out there for Floridi, but for humans, the central issue is epistemology, which regards how information reaches us and how we process it into demonstratable

knowledge. We do not deal directly with the reality behind information and do not have to worry about it, but can rather propose that "reality appears to be informational with information the whole way up and the whole way down" (Dodig-Crnkovic, 2012, p. 12). Floridi writes that "The infosphere will not be a virtual environment supported by a genuinely 'material' world behind; rather, it will be the world itself that will be increasingly interpreted and understood informationally" (2015a, p. 10).

To conceptualise the infosphere as a virtual world, alongside our ordinary world, can easily foster a dualistic worldview, in which we log in and out, and shift or blend worlds or environments. According to Floridi, this is not a productive understanding (2007, p. 61). The infosphere is also not an informational layer on top of the conventional physical world, but rather *the world perceived informationally*. If this makes sense to us, it urges us to imagine the infosphere as an integrated world, *the Onlife*, which is made this way by our growing new self-understanding as inforgs. The so-called *virtual world* is not any imagined, private, anonymous, virtual, not fully real or other world. Instead, it integrates with[20] the one-and-only world that we have in common. The construction of this integrated onlife world is important, as Floridi describes:

> *We are constructing the new environment that will be inhabited by future generations. We should be working on an ecology of the infosphere, if we wish to avoid problems such as a tragedy of the digital commons. Unfortunately, I suspect it will take some time and a whole new kind of education and sensitivity to realise that the infosphere is a common space, which needs to be preserved to the advantage of all* (Floridi, 2007, pp. 61-62).

"Average philosophy does not do well with nuances", Floridi argues (2015b, p. 8). It loves dualisms in order to spark debate and conflict. Good philosophy, however, often ends up in complex positions between extremes. The dualism that was recently created in several ways by the advent of the digital can be remediated and contextualised, especially by looking forward at what society we want to form for future generations. Tensions between *dualities* foster thinking, debate and development, but in the history of ideas, frozen dualisms seldom appear to lead to creative developments and Dunlop argues that dualisms should be handled with care in education (1999). In *A Cyborg Manifesto* (1991), Haraway envisioned technology integration as an

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[20] Floridi's term for ICT integration is that digital ICTs (weak specialised AI:s) are *inscriptions into* (not descriptions of or prescriptions for) the world. There is nothing natural about them, but they inscribe themselves into our world and form thereby our environment, the infosphere (2014, pp. 142-143) where they, not we, are natives. It is our responsibility as semantic entities to interpret and direct this process so the infosphere becomes a good, democratic end environmentally friendly mileu.

opportunity for the liberation from dualisms, such as man and woman, animal and human, organism and machine, and physical and non-physical, which have important social consequences, and result in divisions and inequality (Haraway, 1991, p. 177).

8.5 Critique of the time-based model of BL

As is the case with DL, EL, OL and place-based BL, the time-based model of BL (Art. 1. 3, 4) focuses mostly on *documenting and communicating ICTs*, as enhanced versions of non-digital ICTs. The time perspective can shed new light on an ICT-enabled teaching-learning process, which, although it is known by every teacher, may have been temporarily distorted by ICTs as technical, communicating and access-providing technology. The time model does not have a clear place for *information-processing digital ICTs* and suffers from the additional duality between synchronous and asynchronous social modalities. However, it fits better into Floridi's way of looking at ICTs as technologies, without differentiating between analogue and digital media and communication, and thereby also reducing the feeling of disruption that is caused by the digital ICTs. The time-based model also relates well to teaching and learning as social information-processing activities. It reduces the feeling of dualism between the digital and the non-digital as separate environments, bringing them into a one-and-only world. From an infosphere perspective, the present use of ICTs in education, in all its forms, can show to be the transition of concepts and phenomena into a new educational environment.

Floridi's theory provides a concept of a new ICT-integrated human environment that is not separate from our lived experience, but rather an integral part of it. It makes increasingly less sense to say, "I learned it online", as if an information environment constituted another world, alongside our usual world. The ideas of the infosphere or the onlife suit the conceptualisation of "blended" that I reached by following the time and process perspective: an ICT-integrated world.

8.6 E-ducation and new blends onlife

Floridi proposes to imagine *e-ducation*, in which ICTs, both non-digital and digital, are increasingly integrated into a new normal world for us, *the infosphere*, which also applies to teaching and learning. However, Floridi does not hold the *How?* of e-ducation to be the most important issue. Instead, he concentrates on the *What?* and *What for?* of e-ducation, or what humans should learn at educational institutions and why? He does not

definitively answer the curricular question on what to learn, only mentions "the languages of information" (Floridi 2013b, 2013c), which comprise one's own language, other languages, conceptual structures of knowledge areas and techniques for connecting and processing information. Floridi presents three ideas that can enrich our understanding of BL, or rather the integration of ICTs in e-ducation or Learning Onlife. Nr 2 and 3 can be seen as new kind of blends in education.

1. ICTs are re-ontologising education. When we realise that we are living as inforgs with digital ICTs around us, we must revise some of the older basic understandings of general concepts or we risk confusing old and new meanings, cannot think clearly and end up in unnecessary conflicts. Concepts such as *Presence* and *Privacy* are examples of this (Floridi, 2005). The method of *Levels of Abstraction* (Floridi & Sanders, 2004; Floridi, 2008a) is the advised method for critically unpacking and re-ontologising central concepts such as these. Re-ontologisation of education as a fundamental concept in society, in relation to other concepts changing along with it, benefits from questioning and discussion to enable changed practices.

2. ICTs are enveloping education. Within this context, an *envelope* is the term for the agency space that an industrial robot demands and within which it can be successful, and humans are wise not to interfere within this area. For long, we have attempted to optimise the conditions for our machines and informational entities. If we have a vacuum cleaner robot vacuuming our floors, the next time that we buy a new sofa, we will buy one with higher legs so that the robot can do its job there as well, so that we do not have to. This is an example of enveloping. In a teaching and learning process including ICTs, the basic questions are what they can do for us and what we want them to do. Of importance is also how the interfaces between informational entities and teaching humans are best designed. It must also be ensured that informational entities do not take over what humans need to know and do in order to function well. Floridi offers the metaphor of marriage (Floridi 2014a, p. 150), in which one partner is very effective, specialised, and has relentless energy and focus, while the other is lazy, creative, philosophical and social. How can this co-existence be a happy one? The answer is that the creative and lazy partner must be active in designing the co-existence, and the design must be tailored around what the effective partner can do (Floridi, 2014a, p. 150). ICT-enabled practices as *Learning Analytics* (Siemens & Long, 2011) and *Adaptive learning (*Dziuban, Moskal, Cassisi & Fawcett, 2016; Moskal, Carter & Johnson, 2017*)* are good examples of uses of ICTs as information processors in education, taking burdens off teachers and permitting teachers to do a more rewarding job. In the same

way, learners can use ICTs for concentrating on critical issues for learning, leaving more tedious tasks to ICTs.

An especially interesting example of enveloping is *Calibrated Peer Review*, (CPR)[21]. Coursera, the largest MOOC platform, integrates CPR into MOOC functionality in enhancing peer review between students in the assessment (Balfour, 2013, p. 43). It is a carefully-designed interaction between humans, teachers, students and computers. On the day of the test, within a given time period, an Internet-based test is accessible for students to take under secured conditions. It is an essay question with some instructions (500 words about problem x, remember to clarify a, b, c). The student completes this and clicks *submit*. Subsequently, two solution examples are shown, one of which is quite good and one of which has some flaws as a result of not following instructions, missing elements in other ways or being unclear or badly written. The student is asked to evaluate these examples and accesses a template for doing so. After the job is done and submitted, the student is calibrated by a computer programme as a peer reviewer, who determines if the student was categorical or nuanced, careful or inattentive, and so forth. Once all of the students have completed their tests and have been calibrated as reviewers, they receive from the CPR system two anonymous solutions by classmates and are asked to review them with the same template. When this is submitted, every student receives his/her essay again and has to review it in a coherent way. When all of this has been completed, the teacher receives an overview of evaluations from the system, makes a check of samples and checks essays there where the review results differ or behave irrationally. In this example of CPR, an informational entity (a computer program) performs the logistics, the protection of identities, some calibration and creates an overview of results for the teacher. Humans review, but the teacher only looks at some obvious discrepancies and some samples. Massachusetts Institute of Technology, a member of the EdX MOOC platform, has taken another route with more artificial intelligence, namely independent Automatic Essay Scoring (Balfour 2013, pp. 41-43). These two solutions *envelop* new technologies in education differently in work distribution between digital ICTs and humans.

3. ICTs are transdiegetising education. Floridi has not yet published on transdiegetisation[22], but lectured about it. Diegetic information is information which previously belonged to an environment, such as voices or

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[21] http://cpr.molsci.ucla.edu/Home.aspx , https://library.educause.edu/resources/2013/10/7-things-you-should-know-about-calibrated-peer-review.

[22] "Transdiegetic Information – what it is and why it matters" is listed as a work-in-progress by Floridi: http://www.philosophyofinformation.net/articles/. In a personal email conversation with Floridi, on 2016-12-05-06, I received affirmative feedback on my example with transdiegetisation and classrooms, which appears to be on track with the author's intentions.

sounds from a scene in a film (which the actors can perceive in their environment). Non-diegetic information is other information, which does not belong or is accessible inside the environment, such as background music, a narrator's voice, and so forth. Floridi argues that *ICTs are transdiegetising* the world (2014c), which means that information flows with *minimal ontological friction* over borders. It is not easily controlled by the walls of a room or anything similar. In the classroom or education situation, the ability to control and design what information flows within a learning environment has become almost impossible. With students using ICTs, they can access any information and focus on what they like, as long as they have ICT entities such as smartphones, tablets, laptops or Google glasses. They can also experience the right to do so, whereby ICTs become part of their identity. In education the question becomes how we can live with this blend and make it an asset instead of a potential continuous sabotage. It becomes increasingly clear that learning demands learner motivation and poietic agency. The teacher-made setup can no longer design or implement a learning situation that is built on information scarcity as a means of focusing students' attention. The learner is a motivated and social maker of knowledge, who does not learn in the same way by observing or by being informed (Floridi, 2016a).

Finally, Floridi provides a thought-provoking and refreshing reversed perspective on *e-ducation*. Instead of educators trying to spread as much information as possible within the limited place and time frames that are provided, the focus could instead be on *distributing ignorance* globally as evenly as possible, through social interactions between learners both locally and globally. What is it that we do not yet know and what can it be that we do not know that we do not know? (Floridi, 2013b). To share this kind of humble Socratic knowledge more also has global political and ethical dimensions for the global construction the infosphere.

8.7 To problematise Floridi

I have here used Floridi for discussion, but Floridi can of course also be discussed critically, and has been (Demir, 2012). First: he is not propagating for the infosphere as such, or for informational entities to take over human jobs. He is a messenger, analysing the world and presenting a scenario well worth to reflect on. He is asking us to localise and fully use our human agency in this changing world, as we are the only entities to interpret it and act ethically upon our understanding. It is therefore our responsibility as humans to form the infosphere into a common good, and Floridi is proposing ontology, epistemology, methods and ethics to enable the needed

human action. He is not alone in predicting that ICT-related changes will bring loss of many jobs. Frey and Osborne (2013) estimated that 47% of studied 702 professions in the US were at high risk of computerisation. Categories of teachers were commonly in the lower risk categories, with a spread of positions between 20 to 229 of 702 professions, (pp. 57-72). Floridi views "any job in which people serve as an interface" (Floridi, 2017, para. 5) to be at risk, and he is also worried. To reflect upon this, there is a need in education to think of what parts of the teacher's role to cherish, guard and develop, and for which other parts we can take increasing help of specialised information-processing ICTs. As examples, if correction of tests can be better done with an ICT, the teacher can save time and energy for personal and motivating feedback on student progress which is clearly a social and human teaching activity. However, these two processes must also communicate well through interfaces. The *Manifesto for teaching online* (2016), from Edinburgh university, provokes with "Automation need not impoverish education: we welcome our new robot colleagues". A crucial question, however, is if the gains made by ICT-enhancements can be kept within the education sector to improve it, or if the gains will end up as profits in investor's pockets. Floridi discusses a Robo-tax on AI applications (2017, para. 9). The cost for the human transformation into the infosphere should be borne by society, and the gains shared by all, argues Floridi (2016a). He writes further

> *All of these profound transformations oblige us to reflect seriously on who we are, could be, and would like to become. AI will challenge the exalted status we have conferred on our species. While I do not think that we are wrong to consider ourselves exceptional, I suspect that AI will help us identify the irreproducible, strictly human elements of our existence, and make us realize that we are exceptional only insofar as we are successfully dysfunctional. In the great software of the universe, we will remain a beautiful bug, and AI will increasingly become a normal feature.* (2017, para. 13-14)

In *Education is not an app* (2017), Poritz and Rees argue that the use of ICTs in education must become connected, in future-oriented ways, to a broadened concept of academic freedom (p. 23, p. 53). They also formulate five laws to follow in all education, ICT-enabled or not, here are the first and the last: "1. Every real student deserves individual attention from, and interaction with, a real teacher." "5. It is the responsibility of the academic faculty to keep current on technological developments, no matter how far from their comfort zone they may be" (p. 117). Floridi would agree, although he might work with a re-ontologised meaning of "real" in the infosphere.

9. Concluding remarks

One interesting aspect of writing a dissertation by publication is that it enables the cooperation and interaction with senior researchers, in addition to that with supervisors. Receiving feedback after publication, both as citations and personal communication, also highly enriches and motivates further work. A less ideal aspect of writing by publication is that it can be complex to bring everything together under an understandable and coherent synthesis.

I view my attempts to answer my research questions, which will be commented below, as constructive and promising. It was helpful to consciously adopt a perspective that I carry from my professional experience in working for a community and in European Commission projects, rather than a university, toward making education accessible more broadly in a region outside of central university sites, and mainly for lifelong and second-chance learners.

I am glad that I had the impetus and possibility at the beginning of this dissertation project to work on a book chapter (Art. 2) concerning BL from a European perspective. This has provided a roadmap for definitional clarity and conceptual analysis, which were necessary for the subsequent work. It is interesting that few had ever posed this question about BL within practice and research in Europe in relation to North America. Article 2 has also been used in a Portuguese doctoral thesis on terminology and concept analysis around BL, within the linguistic terminology field (Fernandes, 2015).

My relation to theory in this work can be seen as unconventional, as I had not from the onset chosen a specific theory to accompany the work, and as no single BL definition or theory was fully adequate for my purposes of studying access in combination with BL. I am influenced by both constructivist learning theories and my critical approach in demanding increased access to higher education. Looking back, I think that I have questioned and studied concepts such as DL, EL, OL and BL from my experience as a philosophy teacher at upper secondary school, in which I always attempted to find new thought-provoking angles on concepts and practices, so they became more problematic and possible to discuss, deconstruct and reconstruct. I argue here for relevant new perspectives on the concept of BL in order to provoke discussion and interaction with existing literature and to thereby begin to unpack the concept and its implications for practice, and hence, to understand it better and develop it.

Finally, I believe I have found a suitable theory in Floridi's philosophy of information, on the track on which my conceptual analysis attempts led me, and which further provoked my conceptualisation. I also discovered Adam's social analysis of time late in this process, after many other theory readings on time. Floridi's philosophy is not actively used in articles, as I initially knew his theories insufficiently to realise their potential, given that they demand a theoretical deep-dive. His philosophy of information provides a relevant and thought-provoking set of theoretical ideas, methods and ethics, not only for philosophers but also for researchers in education who are interested in scrutinising understandings of ICTs in education from a contemporary and future perspective. Floridi's philosophy includes several dimensions of ICTs that other theories do not.

Concerning *my general aim*, namely to identify new constructive perspectives on ICTs for increased access to education for lifelong and second-chance learners, I am not disappointed, although the scope of possible research and development work constantly widens. I am interested in implementing new or altered designs, in studying them empirically, developing them further, reconceptualising more extensively and finding new perspectives. I hope that the presented perspectives will be useful and thought-provoking to others as well, or as idea seeds on which to reflect, build on and expand.

The first research question about BL and increased access proved to be complex, but not impossible to begin to unpack. The answer, which I worked out together with my co-authors, is that BL if reformulated into a question of ICT integration in learning, may not only be the DL, EL and OL practises that return to campus. Rather, it may also prove to be forming a new broad normality of practice which can contribute to solving issues of access. The education form for a close future may not be DL or OL for all, or a continued separation of campus-based and ICT-enabled education, but rather a combination of campus and remote students in one-and-the-same and more flexible ICT-enabled, blended, organisational setting. I acknowledge that some researchers and developers are working on a similar track, including Bower et al.'s (2013) *blended synchronous learning*, Power's *blended online learning* (2008), Irvine et al.'s *multi-access learning* (2013), and so forth. I am not alone in taking this direction.

For the second question on time compared to place as a constructive perspective to BL practices, my conclusion is that time is a very useful and constructive perspective on ICTs in education, both for analysis and design. Discovering this perspective was similar to a trivial déjà vu experience: the old pattern of iterated cycles with lessons and homework showed to have a

renewed actuality in studying and designing the integration of ICTs into mainstream education. In comparison with other perspectives, however, the usefulness of the time perspective also depends on the epistemic agent's perspective and role, which Floridi calls level of abstraction (2008a): What do we want to know about the studied system in interacting with it from our role and intentions? If we do not prioritise increased access, we can avoid it by emphasising that the perspective from the physical classroom as a necessary place is unalienable. ICTs can be used effectively both for decentralisation and centralisation.

Research in timescapes of ICT-integrated education appears to be a promising and vast field to further develop, also as a refurbished timespace of education, and in relation to education participation and access. The current research provides merely a beginning for further exploration. The communication between local learning environments, such as learning centres (Art. 3) or multi-institutional campuses (Art. 4) and larger environments appear possible, although this certainly requires much research and development.

The two design intervention articles 3 and 4 were stimulating to work with in order to tweak time and place conditions with the aid of ICTs. The design in article 3, in which MOOCs were used in study circles at local learning centres, proves to be a model of elegant simplicity and has been in continued use within this and similar projects. As expected, the interest from learning centres has been high, as the design provides a possible new instrument for local agency. Even more interesting for me to work in was the experimental approach in article 4, on time shifts and agile mechanisms, focusing on pacing and procrastination as time problems in flexible education. This is a far more complex field, which would be interesting to further develop and research.

Article 5 responds to the contextual issues around the research questions and connects to the background and to their spatial dimensions in defining the needs for regional development in the information society, also outside of university cities. Such environments, together with the learning centre environment in article 3, are important. People, excluding young people who move from their parental home, usually want to continue to live where they already do (Holm et al,. 2013, p. 7; Lundholm, et al., 2004), but for subsistence and survival, higher education is increasingly needed and access to education becomes a crucial issue, both for individuals and communities.

ICTs have many affordances if used thoughtfully, and not only from centre-periphery-, learning quality- or cost-minimising perspectives. A wise use of ICTs in mainstream education can make it more inclusive, also for people who are currently held back by time and place obstacles. Such an increased

ICT-enabled opportunity for universities to provide education more widely has clear ethical and political consequences. Flexible and accessible education cannot remain as activities for recruiting missing students in a program, doing technical experiments or making policy-motivated outreach and generosity projects from universities. New groups of students can be provided with access to education within more flexible forms of mainstream education, as outlined in this dissertation and which seems to be already happening (Norberg, 2012). In order to also offer potential students with time and place obstacles the opportunity to develop their capabilities in an accessible education design must then increasingly become the norm, rather than something that is peripheral or beside the normal. Here, Daniel, Kanwar and Uvalic-Trumbic's Iron triangle model (2009) on the balancing of access with quality and cost is, of course, critical. As Meyer, one can ask, "If higher education is a right, and distance education is the answer – then who will pay?" (title of paper, 2008). The cost of making a mainstream campus course more accessible in a region with a time-blended design is however not as deterring as the costly design of asynchronous courses. We also have objectives about widening participation in higher education, which is an issue that is still not improving quickly (SCB, 2014, pp. 36-38). We can also want more even educational levels in regions of Sweden, which is not presently a national goal, but can possibly return in some form (SOU 2017:1).

Over the globe, higher education is growing fast in volume and becoming more accessible as a common good (Marginson, 2016, pp. 22-50).

Zgaga, Teichler, Schuetze and Wolter (2015, p. 20) write that "…access to higher education has been expanded remarkably over the last few decades, but inequality perpetuates and is taking on new and not always easily recognised forms". They mention this within the context of phenomena such as the student as a consumer, higher costs and fees, globalisation of education with MOOCs, global competition in international ranking lists, the tension between elite universities and mass education, new public management bureaucracy, quality assurance systems and so forth. Higher education reform is very complex and continues to be so.

Sheail (2015) discusses the "digital university" as being in a tension between the anytime-anywhere meme and the concrete spatial campus dimension. She proposes

> *…that the digital university, viewed as translocal and transtemporal, engaged with multiple timeframes and temporalities, is one idea that opens up possibilities for imagining the university beyond its traditional (actual or imagined) temporal and spatial boundaries.* (2015, p. 18).

Barnett (2011) discusses multiple concepts of a university, with the aim of expanding the diversity of ideas about the university in society. He reviews past and present ideas as the *metaphysical* university, the *scientific*, the *entrepreneurial* and the *bureaucratic* university, but also presents more utopical ideas as the *therapeutic*, the *liquid*, the *authentic* and the *ecological* university. He argues that there is a lack of ideas about the university in the public domain, and some universities have "...closed in ideologically, spatially and ethically" (2013, p. 15) to prioritise the direct physical and economic interests as organisations, while treating ideas about the university as a public function in society as secondary. The idea which Barnett finds most interesting for the future is *the ecological university* in global interconnectedness and corresponding to the needs of the liquid or ecological learner who learns in multiple places, networks and time frames. He views the *entrepreneurial university* as too risky for a university to engage fully in; its identity and authencity is at stake. This makes me reflect: If higher education is seen as a crucial vehicle for regional development, an obvious possible priority is the aggregation of a maximum number of young students around a physical campus environment in a vibrant city, in order to drive population growth and local knowledge-based development, envisioned to later grow regionally, nationally and globally. More or less all municipalities appear to have visions in this direction, at different scales. These visions cannot, as I propose, override goals of widening participation in higher education by making education offerings more accessible also to second-chance and lifelong learners, who wish to access higher education close to home.

Wedemeyer, one of the DL pioneers, writes in *Learning at the back door* (1981, p. 36) about an envisioned educational system for adult learners, stating that "instruction should be available any place where there are students – or even only one student – whether or not there are teachers at the same place or the same time". He recommends an optimal and simultaneously student-optional mix of teaching and learning media, and methods which are adapted to the student. He argues that education providers should not raise barriers concerning "the *place* where the students studies, nor the *rate* at which he studies, nor the *method* by which he studies or even the *sequence* in which he studies, but instead by evaluating as directly as possible the achievement of learning goals".

By integrating ICTs in mainstream education in wise ways and with the aid of well-enveloped digital ICTs as in learning analytics and adaptive learning, higher education may, hopefully, be slowly on the way.

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List of references

Abend, G. (2008). The meaning of "Theory". *Sociological Theory,* 26(2), 173-199.

Adam, B. (1995). *Timewatch: The social analysis of time*. Cambridge: Polity.

Adam, B. (2006). Time. *Theory, Culture & Society*. 23(2–3), 119–138.

Adam, B. (2008). *Of timescapes, futurescapes and timeprints*. Lüneburg University. Retrieved from http://www.cardiff.ac.uk/socsi/futures/conf_ba_lueneberg170608.pdf

Allen, I. E., & Seaman, J. (2003). *Sizing the Opportunity: The Quality and Extent of Online Education in the United States, 2002 and 2003*. Sloan Consortium (NJ1).

Allen, I. E., Seaman, J., Poulin, R., & Straut, T. T. (2016). *Online report card: Tracking online education in the United States*. Retrieved from http://onlinelearningsurvey.com/reports/onlinereportcard.pdf

Alvesson, M. & Kärreman, D. (2011). *Qualitative Research and Theory Development - Mystery as Method*. London: Sage.

Amneus, I. (2011). *Kartläggning av distansverksamheten vid universitet och högskolor*. Stockholm: Högskoleverket.

Anderson, T. (2003). Getting the mix right again: An updated and theoretical rationale for interaction. *The International Review of Research in Open and Distributed Learning*, 4(2), 1-14.

Anderson, B., & Simpson, M. (2007). Ethical issues in online education. *Open learning*, 22(2), 129-138.

Anderson, T. (2008). *The theory and practice of online learning*. Athabasca University Press. Retrieved from http://cde.athabascau.ca/online_book/contents.html

Augustine (398, 1923 *). Confessions*, *Book XI*. Chapter 14 i P. Schaff et al. (Ed.) (1923): Nicene and Post-Nicene Fathers, Peabody: Hendricksson

Baepler, P., Walker, J. D., & Driessen, M. (2014). It's not about seat time: Blending, flipping, and efficiency in active learning classrooms. *Computers & Education*, 78, 227-236.

Balfour, S. P. (2013). Assessing Writing in MOOCs: Automated Essay Scoring and Calibrated Peer Review. *Research and Practice in Assessment*, 2013(8), 40-48.

Barnett, R. (2011). The coming of the ecological university. *Oxford Review of Education*, 37(4), 439-455.

Barnett, R. (2013). *Imagining the university*. Routledge.

Bates, A. T. (2005). *Technology, e-learning and distance education*. London and New York: Routledge.

Beatty, B. (2007). Transitioning to an online world: Using HyFlex courses to bridge the gap. *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications* (pp. 2701-2706).

Bell, G., Blythe, M., & Sengers, P. (2005). Making by making strange: Defamiliarization and the design of domestic technologies. *ACM Transactions on Computer-Human Interaction (TOCHI),* 12(2), 149-173.

Benjamin, W. (1974). *On the Concept of History. Gesammelten Schriften I:2*. Frankfurt am Main: Suhrkamp.

Bersin, J. (2004). *The blended learning book: Best practices, proven methodologies, and lessons learned*. John Wiley & Sons.

Biesta, G. J. J. (2010). Why 'What Works' Still Won't Work: From Evidence-Based Education to Value-Based Education. *Studies in Philosophy and Education* 29, 491–503.

Biesta, G. J. J. (2011). Disciplines and theory in the academic study of education: a comparative analysis of the Anglo-American and Continental construction of the field. *Pedagogy, Culture & Society*. 19(2), 175-192.

Biesta, G. J. (2015). *The Beautiful Risk of Education*. London: Routledge.

Bishop, J. L., & Verleger, M. A. (2013). The flipped classroom: A survey of the research. *ASEE National Conference Proceedings*, 30(9).

Black, A. G. (2010). *At a Distance: A Comparative Study of Distance Delivery Modalities for PhD Nursing Students*. (Doctoral Thesis.) Capella University. Retrieved from http://search.proquest.com/docview/89174426

Bloom, B.S. (1968). Learning for mastery. Evaluation comment. In C.W. Fisher, and D.C. Berliner, (Eds.), *Perspectives on Instructional Time*, pp. 73-93. New York: Longman.

Bloom, B. S. (1974). Time and learning. *American psychologist*, 29(9), 682-688.

Bonk, G. & Graham, C. (2006). *The Handbook of Blended Learning: Global Perspectives, Local Designs*. New York: Wiley

Boström, N. (2014). *Superintelligence: Paths, dangers, strategies*. Oxford, Oxford University Press

Bower, M., Kenney, J., Dalgarno, B., Lee, M. J., & Kennedy, G. E. (2013). Blended synchronous learning: Patterns and principles for simultaneously engaging co-located and distributed learners. In *Electric dreams. Proceedings of the 30th ASCILITE Conference* (pp. 92-102).

Bradford, G. R. (2011). A relationship study of student satisfaction with learning online and cognitive load: Initial results. *The Internet and Higher Education*, 14(4), 217-226.

Capdeferro, N., Romero, M., & Barberà, E. (2014). Polychronicity: review of the literature and a new configuration for the study of this hidden dimension of online learning. *Distance Education*, 35(3), 294-310.

Carlen, U., & Jobring, O. (2005). The rationale of online learning communities. *International journal of web based communities*, 1(3), 272-295.

Carman, J. M. (2002). *Blended learning design: Five key ingredients*. Retrieved from http://www.agilantlearning.com/pdf/Blended%20Learning%20Design.pdf

Carroll, B. (1989) The Carroll Model: A 25-Year Retrospective and Prospective View. *Educational Researcher*, 18(1), pp. 26-31.

Clark, D. (2003). Blended learning. (White paper.) Epic Group. Retrieved from http://www.alapitvany.oktopusz.hu/domain9/files/modules/module 15/261489EC2324A25.pdf

Cohen, D., & Crabtree, B. (2006). *Qualitative research guidelines project*. Retrieved from http://www.qualres.org/HomeSemi-3629.html

Cohen, L., Manion, L., Morrison, K., & Bell, R. (2011). *Research methods in education* (7th ed.). New York: Taylor & Francis.

Cole, M (2009). The Perils of Translation: A First Step in Reconsidering Vygotsky's Theory of Development in Relation to Formal Education. *Mind, Culture, and Activity,* 16, 291–295.

Cresswell, J. W. (2003). *Research design. Qualitative, Quantitative and Mixed Methods Approaches.* London: Sage

Daniel, J., Kanwar, A. & Uvalic-Trumbic, S (2009). Breaking Higher Education's Iron Triangle: Access, Cost, and Quality. *Change Magazine*, March-April 2009.

DeRouin, R. E., Fritzsche, B. A., & Salas, E. (2004). Optimizing e-learning: Research-based guidelines for learner-controlled training. *Human Resource Management*, 43(2-3), 147-162.

DBR Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. *Educational Researcher*, 32(1), 5-8, 35-37. Retrieved 2014-08-01 from http://www.designbasedresearch.org/reppubs/DBRC2003 .pdf

Demir, H. (Ed.) (2012). *Luciano Floridi's philosophy of technology: Critical reflections*. Dordrecht: Springer.

Dewey, J. (2004). *Democracy and education*. New York: Dover.

Dillenbourg, P. (2002). Over-scripting CSCL: The risks of blending collaborative learning with instructional design. In P. A. Kirschner (Ed.) *Three worlds of CSCL. Can we support CSCL?*, Heerlen: Open Universiteit Nederland, pp. 61-91.

Dodig-Crnkovic, G. (2012) Floridi's Information Ethics as Macro-ethics and Info-computational Agent-Based Models. In H. Demir, (Ed.). (2012).

Luciano Floridi's philosophy of technology: Critical reflections. Dordrecht: Springer.

Driscoll, M. (2002). Blended learning: Let's get beyond the hype. *E-Learning*, 1(4): 1-4. Retrieved from http://www-07.ibm.com/services/pdf/blended_learning.pdf

Dror, I. E. (2008). Technology enhanced learning: The good, the bad, and the ugly. *Pragmatics & Cognition*, 16(2), 215-223.

Drysdale, J. S., Graham, C. R., Halverson, L. R., & Spring, K. J. (2013). Analysis of research trends in dissertations and theses studying blended learning. *Internet and Higher Education*, 17 (1), 90-100.

Dunlop, R. (1999). Beyond dualism: Toward a dialogic negotiation of difference. *Canadian Journal of Education/Revue canadienne de l'education*, 24(1), 57-69.

Duranton, H. & Mason, A. (2012). The loneliness of the long-distance learner: social networking and student support. A case study of the distance-learning MA in translation at Bristol University. *The Journal of Open, Distance and e-Learning* 27(1), 81-87.

Dziuban, C.D., Hartman, J., Juge, F., Moskal, P.D. & Sorg, S. (2005). Blended learning: Online learning enters the mainstream. In C. J. Bonk & C. Graham (Eds.) (2005) *Handbook of Blended Learning Environments* (pp. 195-208). San Francisco, CA: Pfeiffer.

Dziuban, C. & Moskal P. (2011). A course is a course is a course: Factor invariance in student evaluation of online, blended, and face-to-face learning environments. *Internet and Higher Education*, 14(4), 236-241.

Dziuban, C., Moskal, P., Kramer, L., & Thompson, J. (2013). Student satisfaction with online learning in the presence of ambivalence: Looking for the will-o'-the-wisp. *Internet and Higher Education*, 17, 1-8.

Dziuban, C., Moskal, P., Cassisi, J., & Fawcett, A. (2016). Adaptive learning in psychology: wayfinding in the digital age. *Online Learning Journal*, 20(3), 74-96.

Dziuban, C., Moskal, P. & Norberg, A. (2017, forthcoming) Innovation, Course Modality, Time and the Digital World. In K. Linder, (Ed.)

Innovating Online: Practical Tips and Advice from e-Learning Leaders. Sterling, VA: Stylus Publishing

Ellis, G. F. (2007). Physics in the real universe: Time and space-time. In *Relativity and the Dimensionality of the World* (pp. 49-79). The Netherlands: Springer

Ericsson, A-J. (2006). *Mini-lärcentra i fjällkommun - att studera i den yttersta glesbygden*. [Report] Vilhelmina: Södra Lapplands forskningsenhet.

Falk, D. (2009). *In Search of Time*. London: National Maritime Museum
Fernandes, J., Costa, R., & Peres, P. (2016). Putting Order into Our Universe: The Concept of Blended Learning—A Methodology within the Concept-based Terminology Framework. *Education Sciences*, 6(2), 15.

Fernandes, J. (2015). *Definição do conceito de blended learning*. *Proposta metodológica no quadro da terminologia de base conceptual*. (Doctoral Thesis) Universidade Nova de Lisboa, Lisbon, Portugal.

Finkelstein, J. (2006). *Learning in Real Time*. San Franscisco: Jossey Bass.

Fitzgerald, M. (2013). Free textbooks spell disruption for college publishers. *Technology Review*, 116(1), 65-66.

Floridi, L. (2004). On the logical unsolvability of the Gettier problem. *Synthese*, 142(1), 61-79.

Floridi, L., & Sanders, J. W. (2004). Levelism and the method of abstraction. *IEG Research Report* 22.11.04, Oxford University. Retrieved from http://web.comlab.ox.ac.uk/oucl/research/areas/ieg.

Floridi, L. (2005). The Philosophy of Presence: From Epistemic Failure to Successful Observation. *Presence: Teleoperators and Virtual Environments*. 14(6), 656-667.

Floridi, L. (2007). A Look into the Future Impact of ICT on Our Lives. *The Information Society*, 23(1), 59-64.

Floridi, L. (2008a). The Method of Levels of Abstraction. *Minds and Machines*, 18(3), 303-329.

Floridi, L. (2008b). A defence of informational structural realism. *Synthese* 161, 219–253.

Floridi, L. (2011a). A Defence of Constructionism: Philosophy as Conceptual Engineering. *Metaphilosophy*, 282-304.

Floridi, L. (2011b). *The philosophy of information - of our time, for our time*. [Video lecture]. Retrieved from https://vimeo.com/27333888

Floridi, L. (2012). Turing's three philosophical lessons and the philosophy of information. *Philosophical Transactions of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*, 370(1971), 3536-3542.

Floridi, L. (2013a). *The philosophy of information*. Oxford University Press.

Floridi, L. (2013b). Spreading ignorance equally. [Editorial letter] *The Philosophers' Magazine* 63:24-25

Floridi, L. (2013c). E-ducation and the Languages of Information. Editorial letter. *Philosophy and Technology* 2013(26), 247–251.

Floridi, L. (2014a). *The Fourth Revolution: How the Infosphere is Reshaping Human Reality*. Oxford: Oxford University Press

Floridi, L. (Ed.) (2014b). *The Onlife Manifesto: Being human in a Hyperconnected era*. Basel: Springer

Floridi, L. (2014c). *Transdiegetic information: What it is and why it matters*. (Lecture slides.) June 27, 2014 Politecnico di Torino. Retrieved from https://nexa.polito.it/nexafiles/2014-floridi-transdiegetic-information.pdf

Floridi, L. (2015a). *The Ethics of Information*. Oxford: Oxford University Press.

Floridi, L. (2015b). Singularitarians, AItheists, and why the problem with artificial intelligence is HAL (Humanity At Large), not HAL. *Philosophy and Computers*, 14 (2), 8-11.

Floridi, L (2016a). Should we be afraid of AI? True AI is both logically possible and utterly implausible. *Aeon Essays*. Retrieved from https://aeon.co/essays/true-ai-is-both-logically-possible-and-utterly-implausible

Floridi, L. (2016b). What a maker's knowledge could be. *Synthese (2016)*, 1-17.

Floridi, L. (2017) Charting Our AI Future. (News article, January 2nd. 2017) Retrieved from https://www.project-syndicate.org/commentary/human-implications-of-artificial-intelligence-by-luciano-floridi-2017-01

French, D., Olrech, N., Hale, C. & and Johnson C. (2003). *Blended Learning: An ongoing process for Internet integration*. Victoria, CA: Trafford

Frenette, M. (2004). Access to college and university: Does distance to school matter? *Canadian Public Policy/Analyse de Politiques*: 427-443.

Frey, C. B., & Osborne, M. A. (2013). The future of employment. How susceptible are jobs to computerisation. Retrieved from http://www.oxfordmartin.ox.ac.uk/downloads/academic/future-of-employment.pdf

Företagarna (2016). *Tillväxt i hela landet – företagarnas perspektiv på landsbygden*. October 2016. Retrieved from http://www.foretagarna.se/globalassets/media/opinion/rapporter/2016/landsbygdsrapport-oktober-2016.pdf

Garrison, D. R. (1990). An analysis and evaluation of audio teleconferencing to facilitate education at a distance. *American Journal of Distance Education*, 4(3), 13-24.

Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87-105.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7(2), 95-105.

Garrison, D. R. & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. San Francisco: Jossey-Bass.

Giroux, H. A. (2003) Youth, Higher Education, and the Crisis of Public Time: Educated Hope and the Possibility of a Democratic Future. *Social Identities*, 9(2), 141-168.

Golafshani, N. (2003). Understanding Reliability and Validity in Qualitative Research. *The Qualitative Report*, 8(4), 597-606.

Goodyear, P., & Ellis, R. A. (2008). University students' approaches to learning: rethinking the place of technology. *Distance Education*, 29(2), 141-152.

Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 3-21). San Francisco, CA: Pfeiffer Publishing.

Graham, C. R., Woodfield, W., & Harrison, J. B. (2013). A framework for institutional adoption and implementation of blended learning in higher education. *The internet and higher education*, 18, 4-14.

Graneheim, U.H. & Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24, 105-112.

Guri-Rosenblit, S. (2006). Eight paradoxes in the implementation process of e-learning in higher education. *Distances et savoirs*, 4(2), 155-179.

Habermas, J. (1986). *Knowledge and Human interest*. Cambridge: Polity Press.

Hajnal, I. (1959). *L'ensignement de lecriture aux universites medevial*. Budapest: Academie des Sciences de Hongrie

Hall, B., & LeCavalier, J. (2000). E-learning across the enterprise. *E-learning*, 1, 27-34.

Halverson, L. R., Graham, C. R., Spring, K. J., & Drysdale, J. S. (2012). An analysis of high impact scholarship and publication trends in blended learning. *Distance Education*, 33(3): 37-41.

Hammersley, M. (2008). *Questioning qualitative inquiry. Critical Essays*. Los Angeles: Sage.

Hammersley, M. (1991) *Reading Ethnographic Research: A critical guide*. London: Longman.

Harari, Y. N. (2016). *Homo Deus – A brief history of tomorrow*. New York, Random House.

Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist studies*, 14(3), 575-599.

Haraway, D. (1991) A Cyborg Manifesto: Science, Technology, and Socialist Feminism in the Late Twentieth Centur*y*. In *Simians, Cyborgs and Women: The Reinvention of Nature*. New York; Routledge, 1991, pp.149-181.

Henry, P. (2001). E-learning technology, content and services. *Education+ Training*, 43(4/5), 249-255.

Heydenrych, J. F., & Prinsloo, P. (2010). Revisiting the five generations of distance education: Quo vadis?. *Progressio* 32(1), pp. 5–26.

Holm, E., Karlsson, S., Strömgren, M., & Westin, K. (2013). Vad ska man ha ett land till?: Matchning av bosättning, arbete och produktion för tillväxt. VINNOVA Rapport 2013:06.

Holmberg, B. (1983). Guided didactic conversation in distance education. *Distance education: International perspectives*, 114-122. Retrieved from http://e-tutor.sml.zhaw.ch/pluginfile.php/561/mod_resource/content/1/holm83_English.pdf

Holmberg, B. (1995). The evolution of the character and practice of distance education. *Open learning*, 10(2), 47-53. Retrieved from http://www.c3l.uni-oldenburg.de/cde/found/holmbg95.htm

Hrastinski, S. (2008). Asynchronous and synchronous e-learning. *Educause Quarterly*, 31(4): 51-55.

Hrastinski, S. (2009). A theory of online learning as online participation. *Computers & Education*, 52(1), 78-82.

Hudson, B. (2009). Didaktik design for technology supported learning. In *Perspektiven der Didaktik,* 2009, pp. 139-157. VS Verlag für Sozialwissenschaften.

Irvine, V., Code, J. & Richards, L. (2013). Realigning Higher Education for the 21st Century Learner through Multi-Access Learning. *MERLOT Journal of Online Teaching and Learning*, 9(2): 172-186.

Jaldemark, J. (2009). Participation in a boundless activity: computer-mediated communication in Swedish higher education. (Doctoral dissertation.) Umeå University.

Jaldemark, J., Lindberg, O. J., & Olofsson, A. D. (2005). Sharing the Distance or a Distance Shared. In A. K. Svensson & M. Chaib (Eds) (2005). *ICT and Teacher Education: A Lifelong Learning Perspective*. p. 142-160. Jönköping: Jönköping University Press.

Kakkori, L. (2013). Education and the Concept of Time. Educational Philosophy and Theory, 45(5), 571-583.

Kant, I. (1998). *Critique of pure reason*. In translation by P. Guyer and P. Wood. Cambridge University Press.

Kaufman, D. (1989). Third generation course design in distance education. In R. Sweet (Ed.). *Post-secondary Distance Education in Canada: Policies, Practices and Priorities*, 61-78.

Keiner, E. 2002. Education between Academic Discipline and Profession in Germany after World War II, *European Educational Research Journal*, 1 (1), 83-98.

Khan, B. H. (Ed.). (2005). *Managing e-learning: Design, delivery, implementation, and evaluation*. Hershey: IGI Global.

Knudsen, J. M., & Hjorth, P. G. (2012). *Elements of Newtonian mechanics: including nonlinear dynamics*. Berlin: Springer.

Kramer, S. N. (1949), Schooldays: A Sumerian Composition Relating to the Education of a Scribe, *Journal of the American Oriental Society*, 69(4), pp. 199-215.

Kumpulainen, K. & Rajala, A (2016, in press). Negotiating time-space contexts in students' technology-mediated interaction during a collaborative learning activity, *International Journal of Educational Research* (2016), http://dx.doi.org/10.1016/j.ijer.2016.05.002

Kuutti, K. (1996). Activity theory as a potential framework for human-computer interaction research. Context and consciousness. In B. A. Nardi (Ed.) *Context and Interaction. Activity theory and human-computer interaction*, 17-44. Cambridge MA & London, MIT Press.

Landell, E (2015) *Underlagsrapport till analysgruppen Arbetet i framtiden.* Arbetsmarknadsdepartementet. Retrieved from http://www.regeringen.se/ contentassets/01bc9a3155ab44c9affe296b2f274882/underlagsrapport-utbildningsutbud-for-livslangt-larande-i-arbetslivet---151214.pdf

Laumakis, M., Graham, C., & Dziuban, C. (2009). The Sloan-C Pillars and Boundary Objects As a Framework for Evaluating Blended Learning. *Journal of Asynchronous Learning Networks*, 13(1), 75-87.

Laurillard, D. (2002). Rethinking teaching for the knowledge society. *EDUCAUSE review*, 37(1), 16-24.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Leeds, B. (2014). Temporal experiences of e-learning by distance learners. *Education+ Training*, 56(2/3), 179-189.

Levering, B. (2002). Concept analysis as empirical method. *International Journal of Qualitative Methods*, 1 (1). Retrieved from http://citeseerx .ist.psu.edu/viewdoc/download?doi=10.1.1.111.9477&rep=rep1&type=pdf

Lovén, I., Hammarlund, C. & Nordin, M. (2016) *Vem stannar kvar? Närhet till högskola och val av bostadsort.* Rapport 2016:3. AgriFoods Economic Centre. Retrieved from http://www.agrifood.se/Files/AgriFood_Rapport _20163.pdf

Lucas, J. R. (1973). *A Treatise on Time and Space*. York: Methuen.

Lundholm, E., Garvill, J., Malmberg, G., & Westin, K. (2004). Forced or free movers? The motives, voluntariness and selectivity of interregional migration in the Nordic countries. *Population, Space and Place*, 10(1), 59-72.

Manifesto for teaching online (2016). The research group Digital Education at the School of Education at Edinburgh University. Retrieved from https://onlineteachingmanifesto.wordpress.com/the-text/

Marginson, S., & Rhoades, G. (2002). Beyond national states, markets, and systems of higher education: A glonacal agency heuristic. *Higher education*, 43(3), 281-309.

Marginson, S. (2016) *Higher Education and the Common Good*. (Ebook edition). Melbourne: Melbourne University Press.

Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational psychologist*, 38(1), 43-52.

Mayadas, A.F. & Picciano, A.G. (2007). Blended learning and localness: The means and the end, *Journal of Asynchronous Learning Networks*, 11(1): 3-7.

Mayring, P. (2014). *Qualitative content analysis: theoretical foundation, basic procedures and software solution.* Retrieved from http://www.ssoar.info/ssoar/bitstream/handle/document/39517/ssoar-2014-mayring-Qualitative_content_analysis_theoretical_foundation.pdf?sequence=1

McLuhan, M. (1951). *The mechanical bride: Folklore of industrial man*. New York: Vanguard.

McLuhan, M. & Fiore, Q. (1967). *The Medium is the Massage: An Inventory of Effects*. Co-ordinated by J. Agel. New York, London, Toronto: Bantam.

McEwan, A. E. (2012). Time and teaching. *The Educational Forum*, 76(1), 81-89.

McTaggart, J. E. (1908). The unreality of time. *Mind 1908*, 457-474.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. US Department of Education.

Meyer, K. A. (2003). Face-to-face versus threaded discussions: The role of time and higher-order thinking. *Journal of Asynchronous Learning Networks*, 7(3), 55-65.

Meyer, K.A. (2005), Common metaphors and their impact on distance education: What they tell us and what they hide, *Teachers College Record*, 107(8), pp. 1601-1625.

Meyer, K. A. (2008). If Higher Education is a Right, and Distance Education is the Answer, Then Who Will Pay? *Journal of Asynchronous Learning Networks*, 12(1), 45-68.

Minkowski, H. (1918). Time and Space. *The Monist* 28(2): 288-302.

Mishra, P., & Koehler, M. J. (2008). Introducing technological pedagogical content knowledge. In *Annual meeting of the American Educational Research Association* (pp. 1-16).

Moore, M. G. (1993). The theory of transactional distance. In D. Keegan (ed.) *Theoretical Principles of Distance Education*. New York: Routledge

Moore, M. G. & Kearsley, G. (1996). *Distance education: A systems view*. Washington: Wadsworth.

Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same?. *The Internet and Higher Education,* 14(2), 129-135.

Moran, T. (2015). Time as a social practice. *Time & Society* 2015, 24(3) 283–303.

Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea?. *The Internet and Higher Education*, 18, 15-23.

Moskal, P., Carter, D. & Johnson, D. (2017) *7 Things You Should Have Known About Adaptive Learning*. (Fact sheet.) Educause Learning Initiative. Retrieved from https://library.educause.edu/~/media/files/library/2017/1/eli7140.pdf

Norberg, A. (2012). Blended Learning and New Education Logistics in Northern Sweden. (Case study.) in Oblinger, D. (Ed.), *Game Changers: Education and Information Technology*. Book/ebook, Washington, D.C.: EDUCAUSE.

Nuopponen, A. (2010a). Methods of concept analysis –a comparative study. Part 1 of 3. *The LSP Journal-Language for special purposes, professional communication, knowledge management and cognition*, 1(1).

Nuopponen, A. (2010b). Methods of concept analysis-towards systematic concept analysis (part 2 of 3). *The LSP Journal-Language for special purposes, professional communication, knowledge management and cognition,* 1(2).

Nyroos, M., Rönnberg, L. & Lundahl, L. (2004). A Matter of Timing: time use, freedom and influence in school from a pupil perspective. *European Educational Research Journal*, 3(4), 743-758.

Oliver, M. & Trigwell, K. (2005). "Can 'blended learning' be redeemed?", *E-learning*, 2(1), 17-26.

Peters, O. (1967). Distance education and industrial production: A comparative interpretation in outline. In D. Sewart, D. Keegan and B. Holmberg (Eds.) (1983) *Distance Education: International Perspectives*, London and New York: Croom Helm Routledge, pp. 95-113. Retrieved from http://www.c3l.uni-oldenburg.de/cde/found/peters67.htm

Picciano, A. & Dziuban, C. (2007) *Blended Learning – Research Perspectives*. Sloan Consortium.

Pettersson, S. (2011). *Kompetensförsörjning i glesbygd. Om betydelsen av avstånd och närhet*. Kulturgeografiska institutionen, Uppsala. Retrieved from http://www.diva-portal.org/smash/get/diva2:391818/FULLTEXT01.pdf

Popper, K. R. (1957). *Irreversibility; or, Entropy since 1905*. The British Journal for the Philosophy of Science, 8(30), 151-155.

Popper, K. R. (1959). *The logic of scientific discovery*. London: Hutchinson.

Popper, K. R. (1979). Of Clouds and Clocks. An approach to the problem of rationality and the freedom of man. In Popper, K. R. (1979) *Objective Knowledge: An Evolutionary Approach*, pp. 265ff. Oxford: Oxford University Press.

Poritz, J. & Rees, J. (2017) Education is not an app. (Ebook version.) London and New York: Routledge

Porter, W. W., Graham, C. R., Spring, K. A., & Welch, K. R. (2014). Blended learning in higher education: Institutional adoption and implementation. *Computers & Education*, 75, 185-195.

Power, M. T. (2008). The Emergence of a Blended Online Learning Environment, *MERLOT Journal of Online Learning and Teaching*, 4(4): 503-514.

Prisoners of Time (2005) (Reprint from 1994) The Education Commission of the States. Retrieved from http://www.ecs.org/clearinghouse/64/52/6452.pdf

Pruzan, P. (2016). *Research methodology: the aims, practices and ethics of science*. Springer.

Putnam, H. (1975). The Logic of Quantum Mechanics. *In Mathematics, Matter and Method – Philosophical Papers*, p. 174-197. Cambridge; Cambridge University Press.

Raddon, A. (2007). Timescapes of Flexibility and Insecurity Exploring the context of distance learners. *Time & Society*, 16(1), 61-82.

Riva, G., Waterworth, J. A., & Waterworth, E. L. (2004). The layers of presence: a bio-cultural approach to understanding presence in natural and mediated environments. *CyberPsychology & Behavior*, 7(4), 402-416.

Robson, E., (2001). The tablet House: a scribal school in old Babylonian Nippur. *Revue d'assyriologie et d'archéologie orientale* 93(1), p. 39-66.

Romero, M., & Barberà, E. (2011). Quality of e-learners' time and learning performance beyond quantitative time-on-task. *The International Review of Research in Open and Distributed Learning*, 12(5), 125-137.

Romero, M. (2011). Distance learners' work life learning balance. *International Journal of Instructional Technology and Distance Learning,* 8(5), 43-48.

Romero, M., & Usart, M. (2013). Time Factor in the Curriculum Integration of Game-Based Learning. In *New Pedagogical Approaches in Game Enhanced Learning: Curriculum Integration*, 248-266.

Rubin, A. M., & Rubin, R. B. (1985). Interface of personal and mediated communication: A research agenda. *Critical Studies in Media Communication*, 2(1), 36-53.

Rughiniş, R. (2013). Time as a Heuristic in Serious Games for Education. Proceedings from The 5th International Conference on Computer Supported Education. Retrieved from https://www.academia.edu/2502605/Time_as_a_heuristic_in_serious_games_for_engineering_education

Runesson, U. (2005). Beyond discourse and interaction. Variation: a critical aspect for teaching and learning mathematics. *The Cambridge Journal of Education*, 35(1): 69–87.

Rye, S. A., & Støkken, A. M. (2012). The implications of the local context in global virtual education. *The International Review of Research in Open and Distributed Learning, IRRODL*, 13(1), 191-206.

Ryle, G. (2009). The concept of mind. New York: Routledge.

Salmon, G. (2004). E-moderating: The key to teaching and learning online. Hove: Psychology Press.

Salmon, G. (2005) Flying not flapping: A strategic framework for e-learning and pedagogical innovation in higher education institutions. *ALT-J, Research in Learning Technology*, 13 (3), 201-218.

Sayer, A. (2010). Method in Social Science: Revised 2nd Edition. Routledge.

Scagnoli, N. I., Buki, L. O., Johnson, S. D. (2007). The influence of online teaching on face-to-face teaching practices. *Journal of Asynchronous Learning Networks*, 13(2) pp. 115-128.

SCB (2014). *Högskolenybörjare 2013/14 och doktorandnybörjare 2012/13 efter föräldrarnas utbildningsnivå*. (Report) Retrieved from http://www.scb.se/Statistik/UF/UF0212/2013L14/UF0212_2013L14_SM_UF20 SM1403.pdf

SCB (2016) Statistikdatabasen Befolkningsstatistik 2015. Retrieved from http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/START__BE__BE01 01/?rxid=df092d90-6d8e-44dc-9679-ea7acbb8690a

Schriewer, J. & Keiner, E. (1992). Communication Patterns and Intellectual Traditions in Educational Sciences: France and Germany, *Comparative Education Review,* 36 (1), 25-51.

Sharpe, R., Benfield, G. & Francis, R., (2006). *The undergraduate experience of blended e-learning: a review of UK literature and practice*, The Higher Education Academy. Retrieved from https://www.heacademy .ac.uk/system/files/sharpe_benfield_roberts_francis_0.pdf

Sharma, S. (2013). Critical time. *Communication and Critical/Cultural Studies*, 10(2-3), 312-318.

Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of

inquiry in online and blended learning environments. *Computers & Education*, 55(4), 1721-1731.

Sheail, P., & Ross, J. (2014). Disrupting the illusion of sameness: the importance of making place visible in online learning. In *Proceedings of the ninth international conference on networked learning* (pp. 555-558).

Sheail, P. (2015). *Time-shifting in the digital university: temporality and online distance education.* (Doctoral thesis, University of Edinburgh.) Retrieved from https://www.era.lib.ed.ac.uk/handle/1842/15815

Siemens, G., & Long, P. (2011). Penetrating the Fog: Analytics in Learning and Education. *EDUCAUSE Review*, 46(5), 30.

Simpson, O. (2008). Motivating learners in open and distance learning: do we need a new theory of learner support? *The Journal of Open, Distance and e-Learning*, 23(3): 159-170.

SKL (2015). *Urbanisering. Utmaningar för kommuner med minskande och växande befolkning*. (Report.) Sveriges Kommuner och Landsting. Retrieved from http://webbutik.skl.se/bilder/artiklar/pdf/7585-308-6.pdf

Smolin, L. (2014). *Time reborn.* London: Penguin.

SOU (2016:26). *På väg mot en ny politik för Sveriges landsbygder – landsbygdernas utveckling, möjligheter och utmaningar*. (Delbetänkande från parlamentariska Landsbygdskommittén.) Statens Offentliga Utredningar.

SOU (2017:1) *För Sveriges landsbygder – en sammanhållen politik för arbete, hållbar tillväxt och välfärd.* (Slutbetänkande från Parlamentariska Landsbygdskommittén.) Statens Offentliga Utredningar.

Sporre, K. (2007). *Att se med andra ögon. Feministiska perspektiv på kunskap i ett mångkulturellt samhälle.* Stockholm: Lärarhögskolan

Spring, K. J., Graham, C. R., & Hadlock, C. A. (2016). The current landscape of international blended learning. *International Journal of Technology Enhanced Learning*, 8(1), 84-102.

Star, S. L. & Griesemer, J. (1989). Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science* 19 (3): 387–420.

Stein, J. & Irvine, A (2014) Toward Lossless Learning by Connecting Face-to-face. (White paper.) Retrieved from https://www.canvaslms.com/downloads/Lossless-Learning.pdf

Stenbacka, C. (2001). Qualitative research requires quality concepts of its own. *Management Decision*, 39(7): 551-555.

Söderström, T., From, J., Lövqvist, J., & Törnquist, A. (2012). The Transition from Distance to Online Education: Perspectives from the Educational Management Horizon. *European Journal of Open, Distance and E-learning*, 15(1).

Tu, C. H. (2002). The measurement of social presence in an online learning environment. *International Journal on E-learning*, 1(2), 34-45.

Turri, J. (2011). Manifest failure: The Gettier problem solved. *Philosophers' Imprint*, 11(8), 1–11.

Twigg, C. A. (2003). Improving learning and reducing costs: New models for online learning. *EDUCAUSE Review*, 38(5): 29 – 38.

Unger, R. M. & Smolin, L. (2015). *The Singular Universe and the Reality of Time*. Cambridge: Cambridge University Press.

UKÄ (2014). *Stora regionala skillnader i rekrytering av unga till högre utbildning*. (Statistical analysis 2015-10-06/7.) Universitetskanslersämbetet. Retrieved from http://www.uka.se/download/18.418d928c147afe46a08487/1413385875070/regionala-skillnader-statistisk-analys-2014-7.pdf

UKÄ (2015a). *Unga från storstadslänen mest studiebenägna*. (Press release. 2015-10-05.) Universitetskanslersämbetet. Retrieved from http://www.uka.se/nyheter/2015-10-05-unga-fran-storstadslanen-mest-studiebenagna.html

UKÄ (2015b). *Rekrytering till högre utbildning från Sveriges län och kommuner*. (Statistical analysis nr 2015-09-30/6.) Universitetskanslersämbetet. Retrieved from http://www.uka.se/download/18.56851a3814fe052223e5669/1443788134734/regional-rekrytering-statistisk-analys-6-2015.pdf

Vetenskapsrådet (2011). *God forskningssed*. Vetenskapsrådet, Stockholm. Retrieved from https://publikationer.vr.se/produkt/god-forskningssed/

Vygotsky, L. S. (1980). *Mind in society: The development of higher psychological processes*. Boston: Harvard university press.

Walberg, H. J. (1988). Synthesis of research on time and learning. *Educational leadership*, 45(6), 76-85.

Wang, F. & Hannafin M. J. (2005). Design-based research and technology-enhanced learning environments. *Educational Technology Research and Development* 2005, 53(4), 5-23.

Wedemeyer, C. (1981). *Learning at the back door*. Madison, WI: University of Wisconsin Press.

Wong, L. H. (2012). A learner-centric view of mobile seamless learning. *British Journal of Educational Technology*, 43(1), E19-E23.

Zgaga, P., Teichler, U., Schuetze, H. G. & Wolter, A. (2015). Introduction: Reforming Higher Education for a Changing World. In P. Zgaga, U. Teichler, H. G. Schuetze & A. Wolter (Eds.) *Higher Education Research and Policy* Nr 8. Peter Lang edition.

Östh, J. (2016). Stat och regioner driver avfolkning och överhettning. (Press release). Department of Cultural Geography, Uppsala University, 2016-03-16. Retrieved from http://equipop.kultgeog.uu.se/Press.pdf

Attachments

1. Email expert survey, article 2

Dear European researcher,

…who has worked or done research on "blended learning", in one way or another (e.g., CSCL, TEL,..). You are one of about 60 people chosen from European countries.

Blended learning is a mix of …. ? Sure, easy….or not? Actually, what does "mixed" mean, in what ways/how? Have you ever asked yourself if there is any "unblended" learning?

For a research study we are looking for European perspectives on "blended learning". Is there anything like that? We also want to create a list with blended learning authors in order to make diverse approaches visible.

1. What is "blend" in "blended learning" for you? (e.g., components, type of blend, or just your definition) (1)

2. Could you possibly recommend a favourite paper on "blended learning", or an author, conference or other favourite resource? (2)

3. Do you have any feeling or hypothesis about differences between European and North American research on "blended learning"? (3)

We would we very happy if you could help us by answering the three questions, as a reply to this email, why not right away? :-)
It would be great when you could reply not later than June/14, 2012.

Thanks a lot,

Anders Norberg, Education Strategist, Campus Skellefteå.
email: anders.norberg@skelleftea.se; cell phone +46703970738,
Web: www.campus.skelleftea.se http://www.linkedin.com/in/andersnorberg

Isa Jahnke, Professor ICT, media and learning,, Umeå University, Dep. of Applied Educational Sciences, Interactive Media and Learning (IML) unit.
email: isa.jahnke@edusci.umu.se<mailto:isa.jahnke@edusci.umu.se>
Web: http://www.isa-jahnke.de

2. Letter to participants, article 3

About interviews with course participants in connection to the Nordplus Horizontal project "Global Learning Services – Local Lifelong Learners"

My name is Anders Norberg, and I am a PhD student at Umeå University in Northern Sweden, doing my research at the Department for Applied Educational Sciences. I am also a strategist and developer for a small multi-institutional campus in Northern Sweden, Campus Skellefteå – and it is in connection to this job I do my research. I am looking for, investigating, modelling and developing new technology-enabled models for accessible and social lifelong learning.

In my interviews, which can be done face-to-face or via Skype and in English or Swedish/Scandinavian, I am interested in experiences and reflections, both positive and negative and more complex, concerning the global MOOC course you have attended, and also concerning the local arrangements where you studied – and the combination of these two and the experience as a whole. I will also ask about age, gender, occupation, earlier education, etc. You do not have to prepare in any way.

The participation is voluntary, and you can leave the interview at any moment, by any reason. (I hope that will not happen.) I am recording the interview for later transcription and study, and I hope that is OK with you. In other case, I will make notes. The research raw material is my own, which is not accessible for anyone outside our research group. When I write and publish about this project in some scientific journal, no real names or such details from the interview that can easily identify a person is used – so your participation is anonymous. If I make small quotations from an interview, which happens, it can be that somebody that knows you very well and also know you were interviewed can guess who said it – but that is seldom a problem. The paper is published for the global research community.

I am very happy if You can participate in my interview study. Normally, it will not take over 30 minutes.

If you have any questions, please contact me. Thanks!

Anders Norberg, PhD student / Education Strategist, email anders.norberg@umu.se, cell phone +46703970738. My Skype Id is andersnorbergumu

My supervisor is Professor Isa Jahnke, email isa.jahnke@umu.se, which can also be contacted

3. Interview guide, article 3

Interview guide Global Cloud Services – Local Lifelong Learners Arvidsjaur Lärcentrum

Basic	Gender, age?
	Living, pre-Arvidsjaur?
	Family situation?
	Educational background?
	Experience flexible education?

Participation	How come?
	Interest in design?
	Heard of MOOCs before?

Course	Opinion about the asynch web course itself?
	Content?
	Form?
	Difficulty?
	English?
	Cultural?
	Expectations met?

Technology	Worked?
	Own study environment?
	Assessment and grading?

Group	Importance overall? How? Example?
	Importance for motivation? Completion?
	Feelings before Monday meetings?
	Ever thought of quitting? What happened?

Forward	This kind of courses again?
	Could you make it without a group?

More comments?

4. Information to participants, article 4

Information och förfrågan om medverkan i forskningsstudie

Den forskning inom ämnet Pedagogiskt arbete som sker vid avdelningen Interaktiva Medier och Lärande på Umeå Universitet, syftar bl a till ökad kunskap om hur undervisning kan läggas upp och stödjas med nya medier och ny teknikstödd kommunikation, även i kombination med traditionella medier och kommunikationssätt i undervisning. Denna kunskap kan användas för att stödja förbättringsarbete då det börjar bli en normalsituation att alla kurser har IT-stöd på ena eller andra sättet. En forskargrupp under ledning av professor Isa Jahnke heter "Digital Didaktik" och arbetar bl a med denna typ av frågor.

Du som deltar i pilotförsök med basårskurser på distans vid Luleå Tekniska Universitet under våren 2012 inbjuds att delta i en forskningsstudie, som både syftar till att bidra till ny kunskap och att förbättra kursen vid nästa genomförande. Deltagandet kommer att bestå i individuella intervjuer på 30-60 minuter eller ev intervjuer i grupp, s k. fokusgruppsintervjuer. Intervjuer spelas in och skrivs ut för analys men kopplas inte till person och personliga resultat. Det är upplevelser och synpunkter i sig som är intressanta, så personuppgifter som t ex namn och emailadress kommer bara att användas till att kalla till intervjutillfällen, de kommer inte att lagras tillsammans med materialet i övrigt, så inga personer kommer att kunna identifieras av utomstående. De som deltar i studien kommer att kunna ta del av resultatet.

Deltagandet i studien är frivillligt, och du kan närsomhelst avbryta utan att ange orsak. Ditt bidrag är viktigt och kan användas till att förbättra själva kursen och ge insikter om mekanismer i kurser som är helt eller delvis stödda av IT-teknik.

Jag som kommer att utföra studien heter Anders Norberg och är doktorand på Institutionen för Tillämpad Utbildningsvetenskap på Umeå Universitet, avdelning Interaktiva Medier och Lärande. Ansvarig handledare heter Isa Jahnke, mailadress isa.jahnke@edusci.umu.se. Vi kan båda lämna mera information om studien vid behov. Studien sker i samarbete och samförstånd med kursledning vid Luleå Tekniska Universitet.

Med vänliga hälsningar,

Anders Norberg, Doktorand, anders.norberg@edusci.umu.se , tel 070 3970738

5. Interview guide, article 4

Intervju pilotförsök basår

Vi startar nu, och kommer att hålla på max 60 minuter.

Jag är intresserad av din upplevelse och dina synpunkter och jag vill att du berättar så fritt som möjligt. Men jag kanske frågar upp på olika saker jag vill veta mer om. Jag kommer inte att kommentera vad du säger. Det beror inte på ointresse, utan på att jag inte vill styra för mycket. Du kan, som du vet, välja att inte svara på en fråga eller avbryta intervjun när du vill.

Om det kanske kommer upp saker under intervjuerna som jag glömt att fråga dig om, kan jag återkomma då?

Lite grundläggande uppgifter vill jag ha först:

- Ålder, kön?
- Bostadsort gymnasiet?
- Vilken utbildningsresa har du bakom dig?
- Framtidsplaner med att gå basåret?
- Vad gjorde att du anmälde dig till det här försöket med försöksperioder i Fysik på distans?

Kan du berätta för mig hur du jobbat en vanlig dag under försöksveckorna, eller berätta om ett par dagar?

Förändrades du i ditt sätt att jobba under tiden i försöksveckorna?

Du har ju också erfarenhet av basåret på konventionellt sätt ... upplever du skillnader mot de vanliga veckorna i basåret?

Interaktion med studiekamrater brukar anses viktigt i studier, problemlösning, diskussion, att hjälpa varann eller att dela att man inte förstår, etc. Sådant kan bli annorlunda i distansstudier. Kan du kommentera det?

Jag är också intresserad av vad du känner för olika delar i upplägget, "undervisningen"?

Multi-media-materialet i Fronter – filmer, bilder, animationer, texter, föreläsningar?

Har du själv letat sådant mtrl också för att förstå något bättre?

Uppgifterna?

Checklistorna?

Statusrapporter torsdagar?

Skill points?

Fredagsmötena?

Växlingen mellan självständigt arbete måndag till torsdag och sedan samtidighet och interaktion på fredagsmötena. Vad är din erfarenhet av det?

Sammanfattningsvis funderar jag också över

Vilken är din reflektion över upplägget i stort?

Mest positiva för dig i försöksveckorna?

Mest negativa eller problematiska?

Om du jämför, har det varit lättare eller svårare att lära för dig under försöksveckorna?

Om du jämför, uppfattade du studierna under försöksveckorna som mera flexibla eller mera styrda än de vanliga veckorna i basåret? (TID o PLATS)

Hur känner du: Var går gränsen för hur styrda studieuppläggen får vara? *Ovanligt strukturerade "distansstudier".*

Många människor upplever sig ha problem med att man skjuter upp en knepig eller arbetssam uppgift om den är flexibel i tid. Hur upplever du sådant?

Det här försöket är ju ett beslutsunderlag för om man ska utveckla hela basåret åt det här hållet. Vad är din åsikt eller reflektion kring detta?

Är det något annat du vill tillägga eller kommentera?

List of included papers[23]

Article 1:
Norberg, A., Dziuban, C. & Moskal P. (2011). A Time-Based Blended Learning Model. *On the Horizon*, 19(3), p. 207-216.

Article 2:
Norberg, A. & Jahnke, I. (2014) Are You Working in the Kitchen? – European Perspectives on Blended Learning. [Book Chapter] In A. G. Picciano, C. Dziuban, & C. R. Graham, (Eds.), *Blended Learning–Research Perspectives Volume 2*, New York: Routledge. pp. 251-267.

Article 3:
Norberg, A., Händel, Å. & Ödling, P. (2015). Using MOOCs at Learning Centers in Northern Sweden. *The International Review of Research in Open and Distributed Learning*. 16(6) p. 137-151.

Article 4:
Norberg, A., Stöckel, B. & Antti, M-L. (in review) Time Shifting and Agile Time Boxes in Course Design. *Paper under review.*

Article 5:
Kolehmainen, J., Irvine, J., Stewart, L. Karacsonyi, Z., Szabó, T., Alarinta, J. & Norberg, A. (2016) Quadruple Helix, Innovation and the Knowledge-Based Development: Lessons from Remote, Rural and Less-Favoured Regions. *Journal of the Knowledge Economy*, 7(1) pp. 23-42.

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